



Proceedings  
of the  
13th European Conference  
on  
e-Government  
University of Insubria  
Varese, Italy  
13-14 June 2013



**VOLUME TWO**  
Edited by  
**Professor Elena Ferrari and**  
**Professor Walter Castelnovo**  
**University of Insubria,**  
**Varese, Italy**

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# **Proceedings of the 13th European Conference on eGovernment**

**Department of Theoretical  
and  
Applied Sciences  
University of Insubria  
Como, Italy**

**13-14 June 2013**

Edited by  
Professor Walter Castelnovo and Professor Elena Ferrari  
Department of Theoretical and Applied Sciences,  
University of Insubria  
Como, Italy

**Volume Two**

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## Preface

These proceedings represent the work of authors at the 13th European Conference on e-Government (ECEG 2013). The Conference this year is hosted by the University of Insubria in Como, Italy. The Conference Chair is Professor Walter Castelnovo and the Programme Chair is Professor Elena Ferrari, both are from the Department of Theoretical and Applied Sciences and the Research Center "Knowledge and Service Management for Business Applications" at the University of Insubria.

The opening keynote address is given by Dr Gianluca Misuraca from the European Commission, Joint Research Centre, Institute for Prospective Technological Studies, Seville, Spain and Gianluca is addressing the topic "*eGovernment: Past, Present & Future: A policy-research perspective for renewing governance in the digital age*". The second day of the conference is opened by Dr Antonio Cordella from the London School of Economics, London, UK, who will talk about "*Public value creation: the new challenge for e-government policies*".

ECEG brings together, researchers, Government officials and practitioners in the area of e-Government from around the world. Participants are able to share their research findings and explore the latest developments and trends in the field which can then be disseminated to the wider community.

With an initial submission of 153 abstracts, after the double blind, peer review process there are 81 papers published in these Conference Proceedings. These papers represent research from 40 countries including Australia, Austria, Belgium, Brazil, Canada, China, Costa Rica, Croatia, Denmark, Egypt, Germany, Greece, India, Iran, Iraq, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Pakistan, Poland, Romania, Russia, Saudi Arabia, Serbia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, UK and USA. This will ensure a very interesting two days.

Selected papers will be published in special issues of the Electronic Journal of e-Government ([www.ejeg.com](http://www.ejeg.com)) and the Journal of E-Government Studies and Best Practices.

We hope that you have an stimulating conference, and enjoy your time in Como.

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Walter Castelnovo      Conference Chair  
Elena Ferrari      Programme Chair  
June 2013

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# Biographies

## Conference Chair



**Walter Castelnovo**, Ph.D., is Assistant Professor of Information Systems at the University of Insubria (Italy). His research interests concern technological and organizational innovation in Public Administration and Interorganizational Information Systems. He is co-founder of the Research Center for Knowledge and Service Management for Business Applications (K&SM) of the University of Insubria and he is member of the Scientific Committee of the Interdepartmental Center for Organizational Innovation in Public Administration of the University of Milan. He is also member of the Department of Institutional Reforms, E-Government and Institutional Federalism of the Association of the Municipalities of Lombardia (Italy). He served as member of the committee for many international conferences on E-Government and ICT evaluation; and he was the General Chair of The 5th European Conference on Information Management and Evaluation (ECIME). He is co-founder of the "ICT for Development International School" (ICT4DEVIS) and is the Director of the first edition of the school in 2012.

## Programme Chair

**Elena Ferrari** is a full professor of Computer Science at the University of Insubria, Italy and scientific director of the K&SM Research Center. She received the IEEE Computer Society's prestigious 2009 Technical Achievement Award for "outstanding and innovative contributions to secure data management". In 2011, she has been named ACM Distinguished Scientist and she received a Google research award for her research on social network privacy. Her research activities are related to various aspects of data management, including access control, privacy and trust in social networks, secure cloud computing and emergency management, secure semantic web, multimedia databases. On these topics she has published more than 170 scientific publications in international journals and conference proceedings. She gave several invited lectures and tutorials in Italian and foreign universities as well as on international conferences and workshops. Prof. Ferrari is in the Editorial Board of the IEEE Transactions on Knowledge and Data Engineering, the IEEE Transactions on Dependable and Secure Computing, the Transactions on Data Privacy, and the International Journal of Information Technology (IJIT). She is a distinguished member of the ACM and senior member of IEEE.



## Keynote Speakers



**Dr Gianluca Misuraca** is a Senior Scientist at the Information Society Unit of the European Commission's Joint Research Centre, Institute for Prospective Technological Studies (IPTS) based in Seville, Spain. Before joining IPTS, he was the Managing Director of the Global Executive Master in e-Governance at the Ecole Polytechnique Fédérale de Lausanne (EPFL). Previously he held several positions as policy advisor for different International Organisations and bilateral cooperation agencies as well as working with various consulting and industrial organisations in the area of e-Government, regional development, research and innovation. His background is economics with focus on the interface between ICTs and public administration, specialised in the area of business process reengineering and e-Transformation. He holds also a Diploma of Specialisation in European Union Economics and Law, a specialisation in Security Management, an Executive Master in e-Governance and a PhD in Management of Technology from EPFL.



**Dr Antonio Cordella** is a Lecturer in Information Systems at the London School of Economics and Political Science. His main research focus is on the impact of ICT on public sector organisation and government service delivery. He has published extensively in the area of e-government. He has led and participated in international research projects looking at different aspect associated to the deployment of ICT to reform public sector organisations. His most recent contributions in the e-government field are: Cordella, Willcocks, L. paper "Government Policy, Public Value and IT Outsourcing: The Strategic Case of ASPIRE", Journal of Strategic Information Systems, Forthcoming; Cordella, A., Bonina, C. "A Public Value Perspective for ICT Enabled Public Sector Reforms: A theoretical reflection", Government Information Quarterly (2012), vol. 29 (4), pp. 512-520; Cordella, A., Iannacci, F. "Information systems in the Public Sector: the e-Government enactment framework", Journal of Strategic Information Systems (2010), 19(1), pp.52-66; Cordella, A., Willcocks, L. "Outsourcing, Bureaucracy and Public Value: Reappraising the notion of the "contract state"" , Government Information Quarterly (2010) 27(1), pp. 82-88.

## Mini Track Chairs



**Dr Jakob Svensson** is a researcher with a PhD in Media and Communication Studies. Jakob current research revolves around civic communication, political participation and the construction of citizenship through online communicative practices. He is currently involve in a research project studying relations of power, practices of discipline and surveillance among both outspoken political activists in southern Stockholm. Jakob Svensson is currently holding a position of assistant professorship in Media and Communication Studies at Karlstad University and is the Director of the research network HumanIT.

**Prof. Dr Mirko Vintar** gained his doctorate in IT and management studies at the Faculty of Economics, Ljubljana. For over 20 years his work has dealt with the informatisation of public administration, with a major focus on the development of e-government in recent years. He is in charge of a series of domestic and international research and development-application projects in this field. He is a member of international scientific and specialist bodies involved in the research of this field (EGPA, Study Group on Informatisation of Public Administration, IFIP, WG 8.5, NISPacee, WG on E-government). From 1993-2002 he was the editor-in-chief of the journal Uporabna informatika (Applied IT).



**Dr Gianluigi Viscusi** is currently post-doc research fellow at the Department of Informatics, Systems and Communication (DISCo) of the University of Milan Bicocca. Research interests concern methodologies for policy driven information systems planning, e-Government, convergence and information growth impacts on information systems design, digital information asset evaluation (Information Value), business modelling and IS strategy alignment, data reverse engineering. He has published more than 50 referred papers in books, conference proceedings, and journals as Data & Knowledge Engineering and Government Information Quarterly. In 2010 he has co-authored with Carlo Batini and Massimo Mecella the book "Information Systems for eGovernment: a quality of service perspective" (Springer, Heidelberg).

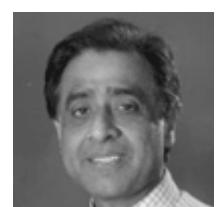
**Mehdi Asgarkhani** is a principal lecturer in strategic management of ICTs alongside holding the position of Academic Leader (ICT qualifications) at CPIT, New Zealand. Mehdi's background covers both ICTs and Strategic Management. Prior to accepting his current academic role, he held various strategic advisory, project managerial and technology and business strategy alliance roles. In keeping close contact with the industry developments and ICT governance bodies, he is the National Councillor representing Canterbury at Institute of IT Professionals (IITP) New Zealand.



**Milan Todorovic** is a Professor of Entrepreneurship and Innovation, Corporate Entrepreneurship and Organisational Changes at Union Nikola Tesla University in Belgrade, Serbia. He holds a MBA from Melbourne Business School and has extensive international experience across diverse industries and government enterprises encompassing lecturing, management consulting, business development, directorships and successful management of global, mission critical business systems for leading international companies. During his career he has combined his significant professional experience and leadership skills with excellent knowledge of business strategy to conduct consulting assignments and deliver strategic projects worldwide. Currently, he is involved in several research projects including how public policies impact on innovation and entrepreneurship.



**Terry Keefe** a Senior Lecturer at Sheffield Hallam University, UK. He has 6 years in Higher Education teaching Project Management, IT Professional Ethics, Business Analysis and Strategy. His extensive experience in public sector change comes from 6 years managing research and development in an innovative public e-learning service and 20 years in the UK Civil Service, much of it providing IS consultancy in IT enabled organisational change projects. Research experience includes e-government, e-learning, government strategy, social inclusion and accessibility.



**Dr Zaigham Mahmood** is a Principal Researcher and Reader in Applied Computing in the School of Computing and Mathematics, University of Derby, UK. He has an MSc in Mathematics, an MSc in Computer Science and a PhD in Modeling of Phase Equilibria. He is also a Chartered Engineer and a Chartered Information Technology Professional. Zaigham has in excess of 50 publications in proceedings of international conferences and journals as well as chapters in books. He is also Editor-in-Chief of Journal of E-Government Studies and Best Practices. His research interests are in the areas of software engineering, project management, enterprise computing and e-government.

## Biographies of Presenting Authors

**Dr. Hany Abdelghaffar** is a lecturer of Information Systems at the German University in Cairo (GUC), Egypt. He holds MSc. and PhD from Middlesex University, London, UK. He has several publications in the e-government field. Dr. Abdelghaffar taught several courses in information systems and e-business in and he is a SAP certified consultant.

**Ireni Akojam**, Scientist D working in National Informatics Centre, Govt. of India under Ministry of Communication and Information Technology. Working for eGovernance projects in Maharashtra responsible for initiation of digitization of ration card holders data for Food and Civil Supplies Department, also various other eGovernance projects such as introducing paperless offices and etendering project. MS in Computer Engineering, Tashkent State Technical University, Tashkent.

**Ibrahim Alfadli** is PhD student and researcher in the School of Engineering and Computing Sciences at Durham University. His main research focus is in the areas of e-Government evaluation and assessment. He is also been involved with areas in Quality Assurance in regards of the information technology and self services in the field of banking.

**Obaid Almalki** is a PhD candidate at BMRI/IRAC at the University of Bedfordshire, Luton, United Kingdom. In 2007, he awarded his Master of Engineering in Software Engineering from the University of Queensland in Australia. He received his Bachelor degree in computer and information systems from King Saud University in Saudi Arabia in 1995.

**Mohammed Alsaif.** PHD researcher at Inst Local Government Studies, School of Government and Society, University of Birmingham, UK. Master degree in Information System Management at University of Sheffield , UK. BCs Information Technology and Computing at Saudi Arabia. I am interesting in technology implementation and adoption of e-government, e-business and ERP systems.

**Dr. Mohammed Al-Sudairi** is currently an Associate Professor in College of Business Administration for MIS Department at King Saud University at Riyadh, Saudi Arabia. He is also holding a number of reputable, key administrative and professional positions in Saudi Arabia.

**Dr. Leonidas Anthopoulos** is an Assistant Professor at the Project Management Department of the TEI of Larissa, Greece. He has IT research, planning and Management experience within organizations, such as the Hellenic Ministry of Foreign Affairs, Information Society S.A., Smart City of Trikala etc. His research interests main concern e-Government, Smart Cities, Enterprise Architecture, etc.

**Dr. Muhammad Irfanullah Arfeen** is working as Assistant Professor, Department of Management Sciences, and Deputy Director, Board of Advanced Studies and Research (BASR) at the Virtual University of Pakistan, Islamabad Campus. He has presented many research papers in different conferences. Recently, he attended short course titled “Seminar on eGovernance for Developing Countries” sponsored by Government of China.

**Alina Badulescu** is Professor of Economics and PhD coordinator at the Faculty of Economics and Doctoral School in Social Sciences of the University of Oradea, Romania. She graduated Bucharest University of Economics and since has authored and co-authored numerous journal articles and books. Her interests include economics, but promoting young researchers' activity as well.

**Daniel Badulescu** graduated Bucharest University of Economic Studies and has a PhD in Economics. He is Associate Professor in Business Economics and Business Financing at the Department of Economics, University of Oradea, Romania. His current research interests include economics, business economics and business finance.

**Janina Banasikowska**, PhD is employed at the University of Economics in Katowice as lecturers on Faculty of Informatics and Communication, at Department of Informatics. She is taking part in the research into computer science, systems analysis and computer system design, management information systems, e-business and public informatics.

**Frank Bannister** is an Associate Professor in information systems in the School of Computer Science and Statistics in Trinity College Dublin. His research interests include e-government, e-democracy and IT evaluation. He is editor of the Electronic Journal of e-Government and Co-Director of the European Group for Public Administration permanent study group on e-government.

**Mithun Barua** is the officer in Government of West Bengal, India and PhD student at Thapar University, Patiala, Punjab, India. The research area is E- Government, Technology Management and Public Policy. The author had completed two months research visit at Tallinn University of Technology, Estonia on Estonian Government scholarship. The author has five publications in his credit.

**Iréne Bernhard** Lecturer in media-and communication studies, University West, Trollhättan, Sweden and PhD Candidate in Urban and Regional Studies, Royal Institute of Technology, Stockholm, Sweden, School of Architecture and Built Environment, Urban Planning and Environment. Researched eGovernment with a group supported by VINNOVA, the project was to support and evaluate development of municipal contact centres in Sweden. Experienced in applied organisation communication eg coordinator for international scientific symposia.

**Sanja Bogdanović-Dinić** BSc and MSc degrees in computer science at the University of Niš, Serbia. She is currently a PhD student at the Faculty of Electronic Engineering and research associate at the Faculty of electronic engineering in Nis. Her PhD research involves Sensor Web, GIS and E-systems with special attention given to Open Data and Linked Open Data applications

**Choopol Boonmee** Lecturer at Thammasat University. PhD in information and control system engineering (1998) from Na-gaokaUniversity of Technology, Japan. Research interests include eGovernment, electronic data interchange and interoperability, ICT benefit management and computer simulation. Been working as ICT consultant for many Thai ministerial departments. He is also a president of electronic data interchange promotion association.

**Roberto Boselli** is currently working as professor assistant in Computer Science at University of Milan-Bicocca. He worked in several international research projects in the field of Information Systems. His research activities focus on Semantic Web, Web2.0 and e-government services. In 2006 he took his Ph.D in Information Society at the University of Milan-Bicocca.

**Alexopoulos Charalampos** is a PhD Candidate at the University of the Aegean working on high-level policy making, research and pilot application in FP7. A computer science graduate from the University of Peloponnese with MSc in management information systems from University of Aegean he has published in scientific conferences on IS evaluation and open data.

**Yu Jui Chen** is a Graduate student in the Department of Public Administration at National Chengchi University. Chen is interested in e-government/e-governance, ICT development, and he has two years of experience for legislative assistant in Taiwan.

**Pin Yu Chu** Professor in Department of Public Administration at National Chengchi University. Research interests include technology development and management, electronic governance, and environment and conflict management. Serves on Advisory Board, Research Development and Evaluation Commission, the Personnel Policy Council, Central Personnel Administration of Taiwan, the Committee of Government Technology Program Review, the Review Expert Board of Higher Education Evaluation & Accreditation Council of Taiwan, etc.

**Dimitris Christodoulakis.** Professor, Computer Engineering and Informatics Department University of Patras. Born in Samos Greece 1952. Demonstrated and achieved national and European research and development Projects. Strong scientific background in the areas of Natural language processing and Information Systems. Extensive experience in project management. Publication of numerous scientific articles in Journals and Conference proceedings.

**Giuseppe Ciacco** works at DIBRIS, Universita' di Genova, where he holds a permanent position as a researcher. His interests are in the field of distributed systems. He is currently involved in a project concerning web, architectures and technologies for Open Data.

**Flavio Costa**, Master of Science in Computer Engineering from Politecnico di Milano (Italy), IT project leader at Henkel Italia and STMicroelectronics SA (France), CIO at NEC Italia; since 1998 at CERN – European Organization for Nuclear Research (Switzerland) and member of the Invenio Team since 2011, outreach and relationships with users.

**Michaelene Cox** is Associate Professor in the Department of Politics and Government at Illinois State University. She teaches courses in international law, international relations and European Politics, and has authored a number of publications on political participation, social capital, cultural identity and corruption. Her interest in e-Government also reflects the interdisciplinary nature of her research.

**Stephen Darlington** is a PhD candidate in the School of Politics and International Relations at the Australian National University in Canberra. His area of research is stakeholder rights in e-health systems and the potential of e-health to transform medical service delivery.

**Dr Martin De Saulles** is a Principal Lecturer at the University of Brighton where he teaches and carries out research in the areas of information management and digital innovation.

**Ameneh Deljoo** started my PhD in Delft University of technology in 2012, in Technology, Policy and Management (TPM) faculty and my supervisor is Prof.dr.ir. Marijn Janssen. My research focused on improves and evaluate public and private network by using Complex adaptive systems.

**Lesego Tshegofatso Ditibane** I am a Masters student at North West University (NWU), currently doing a research on systems development methodologies and the development of e-Government systems. I have a good communication and interpersonal skill, a fast leaner and a team player.

**Andrey Elizondo**, Eng. Is a consultant/researcher for INCAE Business School. He is interested in understanding the implications of the Internet for society and challenges associated with its governance. Master in International Business from the Monterrey Institute of Technology, Master in European Business from ESCP-EUROPE, and Computer Sciences Engineer from the Costa Rica Institute of Technology.

**Kaja Fietkiewicz** (23) from Poland, has been living in Germany since 2008 in order to study at the Heinrich-Heine-University Düsseldorf. Since 2011 she has been studying Information Science and Language Technology on Master's Degree and Law for state examination. Her main field of interest is the Informational Cities, especially the Japanese cities and information law.

**Dr. Panos Fitsilis** is a Professor at TEI Larissa, Greece, Head of School of Business and Economics. He has extensive project management experience with the development and deployment of large IT systems. He worked, as business unit manager at large software development companies. His research interests include: Project Management, Software Engineering, Business Process Reengineering, etc.

**Dr. J.V. Fonou Dombeu** received a PhD in Computer Science in 2012 and MSc. in Computer Science in 2008. His is currently a Senior Lecturer at the Department of Software Studies at The Vaal University of Technology. Dr. Fonou-Dombeu's research interests are in Semantic Web, Ontology, and Semantic Knowledge representation and development in e-Government.

**Muriel Foulonneau** specializes on semantic interoperability of digital resources, semantic data quality, and personalization. She has worked in particular in the eGoverrrment domain in the scope of the European project SPOCS. She is involved in the SEMIC working groups to create core vocabularies to support the interoperability of eGovernment applications.

**Mariagrazia Fugini** is Professor of Computer Engineering at Politecnico di Milano. She holds a Ph.D. in Computer Engineering. Her interests are in information system security and development methods and tools, environmental risk management, E-science, power grids, and Green IT. She participated in several EU Projects. She has been a Visiting Professor at University of Maryland, Technical University of Vienna, Technical University of Stuttgart, and UPC Barcelona.

**Olivier Glassey** assistant professor at Swiss Graduate School of Public Administration (IDHEAP) is in charge of research and teaching unit "Digital Governance". Within the Swiss Public Administration Network (SPAN), teaches public management, quantitative research methods, and management of information systems. Current research topics are public registers' harmonization and data governance of population registers, identity and privacy management, open access and transparency, and more generally eGovernement and eParticipation.

**Piotr Goetzen**, PhD, CCNP is the director of Operating Systems and Computer Networks Department at University of Management (Lodz, Poland). He is also Cisco Certified Academic Instructor. IT systems, their security and interoperability are his main scientific interests. He is also the Clark University teacher at European campus and the owner of Network of IT Experts (NOITE) company.

**Dr. Anastasia Golubeva** PhD, Senior Lecturer (Public Administration Department), Graduate School of Management, St. Petersburg State University. Engaged in research for over 10 years on e-government development in Russia, participated as expert and consultant in number of international projects. Teaches various courses on modern approaches to public management and government-society interaction (including course on e-government). Research focuses on innovations in public administration, e-government and public e-services.

**Kenneth Griggs** is a Professor of Information Systems at the Orfalea College of Business at Cal Poly in San Luis Obispo, California. His current research interests focus on electronic commerce, emerging technologies, collaboration systems, information systems audit and control, and the use of social media networks to optimize knowledge management within organizations.

**Kerstin Grundén** is senior lecturer in informatics at the West University of Sweden. She has also a background as a sociologist. She was participating in the research project Innoveta funded by Vinnova for the study of customer centres implementation within municipalities in Sweden 2009 – 2011. Her main field of research is e-Government and e-Learning.

**Luisita Guanlao** is a Lead Information Officer, Rapid Application Development, Innovation and ICT Directorate, World Bank Group. Experience in IT sector supporting software architecture/ development, project planning, management/IT management, business development/solution support. Focus includes enterprise architecture, information management, data management, business intelligence, identity and access management. Technical assistance to government institutions ensuring

alignment of IT investments with government strategic priorities. MSc in Technology Management and BSc in Business Administration.

**Jonas Hedman** is an Associate Professor at the Department of IT Management, Copenhagen Business School, Denmark. His research covers topics such as greening processes, business model evolution, payment, payment eco-system, and business benefits of IT. He is currently working with Copenhagen Finance IT Region to create a cashless society.

**Stefan Henningsson** Associate Professor, Copenhagen Business School, Department of IT Management. Researches managerial aspects of IT in contexts including corporate mergers and acquisitions, global IT infrastructures and international trade processes. Previously published 70+ peer-refereed papers published in journals such as Information Systems Journal, Journal of Strategic Information Systems, Communications of the Association for Information Systems and Management Information Systems Quarterly Executive.

**Paul Jackson** is Senior Lecturer in Information Management at Oxford Brooks University. He previously worked for the Chartered Institute of Public Finance and Accountancy, delivering e-Government training and consultancy for a range of public bodies. He has been a lecturer at Brunel University and has a PhD from Cambridge University.

**Kamalia Azma Kamaruddin** finished her Masters of Science in Information Technology at Universiti Teknologi MARA, Shah Alam, Malaysia, in 2006. Later, she joined the university as a lecturer in Information Systems Department. She is currently a PhD student at Faculty of Computer and Mathematical Sciences, UiTM. Her research focus is on transformational government.

**Asanee Kawtrakul** is currently the Associate Professor of Department of Computer Engineering, Kasetsart University and Deputy Executive Director of National Electronics and Computer Technology Center (NECTEC), Thailand. Her specific research interests are Knowledge Engineering and Language Engineering. Now she has also responsible for many project initiatives related to service innovation in Health Care, e-Government and Agriculture area.

**Mehmet Sinan Kılıç** is R&D and Software Development Manager, in Universal Information Technologies . Graduated from Istanbul University Business Administration Department. Stratred his carrier in Universal Information Teknologies as Project Leader in 2001. He obtained his PMP certificate in 2011. He is is specialized on ERP solutions and software applications for local governments.

**Rembrandt Klopper** interdisciplinary scholar publishing results of research focusing on aspects of research methodology, informatics, communication science and cognitive science. In cognitive science has written several papers on central role of metaphor in human thinking. Supervises masters and doctoral students at several South African universities and is special issues editor of South African interdisciplinary scholarly journal, *Alternation*.

**Luc Lagrandeur** is Professor of Marketing at Laurentian University teaching courses in marketing and consulting. Luc has 10 years of practical marketing experience for one of Canada's largest information technology outsourcing company. His research interests are on the impact of government e-services on the organization and the relationship/interaction with citizens.

**Sam Lubbe** is an associate professor at UNISA in the School of Computing. He has a PhD from Wits and he teaches SISP, SCM and other IS courses. He has published many articles, attended and delivered many conference papers as well as three books. He is also supervising many postgraduate students.

**Carolina Martín-Vázquez** obtained her BSc degree in Psychology from the University of La Laguna in 2006. She has six years of experience working on projects for social participation and appreciative inquiry. She is collaborating on the European Project "Puzzled by Policy" focused on online citizens debate. Her interests include appreciative inquiry, social participation and e-participation.

**Michele Martoni** is a Contract Professor in ITLaw at University of Bologna. She has a Ph.D. in ITLaw and Legal Informatics at University of Bologna. Professor in the Master of Law and New Technology (University of Bologna), of the Erasmus Mundus Ph.d. Program Law, Science and Technology at ItLaw Master (University of Bologna) and at the Master on eHealth (University of Bologna). Member of the Italian Association of Legal Informatics, of Italian Telemedicine Society and of the Cloud Security Alliance Italy Chapter

**Ronald Meijer** graduated in science of public administration. He worked in universities, doing policy research (Amsterdam, Leiden). He is engaged in research at the Research and Documentation Centre (WODC) of the Ministry of Security and Justice of the Netherlands. His interest is focused on information management, data archiving, open data, and privacy in the domain of Justice.

**Jeroen Meij** is a manager at KPMG Advisory N.V. in the Netherlands since 2008. With experience in design and consultancy, the link between technology and business always has his special attention. Topics include data mining, ontologies, open source and open standards. He has been involved in many Agile software development projects, often using innovative concepts.

**Adela Mesa** is a Ph.D. teacher at the Department of Political Science and Administration in the University of the Basque Country. She has directed several eGovernment research since 2002. She currently heads a research funded by the Spanish Ministry of Science and Technology titled: Barriers to electronic government and intergovernmental relations in the Spanish regional administrations system (2010-2012).

**Mohamed Ali Mohamed** is a PhD researcher at Faculty of Computers and Information, Cairo University. He has Syrian nationality, He holds BSc in Informatics Engineering and MSc in Information systems, and his research interests include: E-government, Enterprise Architecture, Software Engineering, Project Management, SOA and Cloud Computing.

**José María Moreno-Jiménez** received the degrees in mathematics and economics, and the Ph.D. degree in applied mathematics from the University of Zaragoza (Spain), where he is a Full Professor of Operations Research. He is also the Chair of the Zaragoza Multicriteria Decision-Making Group. He has published more than 180 papers in scientific books and journals.

**Ricard Munné** is Project Manager in the Public Sector Unit in Atos Research and Innovation since 2011. Previously, he had worked in Atos as Project Manager and Consultant in Public Sector projects for four years. Ricard has a degree as Telecommunications Technical Engineer and pursued a Master in Information Technology Management.

**Professor Malcolm Munro** is emeritus professor of Software Engineering in the School of Engineering and Computing Sciences at Durham University. His main research focus is in the areas of Software Visualisation, Software Maintenance and Evolution. He has also been involved with research in Web Services, protocols for fair exchange of electronic goods, and Reputation Systems.

**Fattah Nazem** is an Associate Professor. He has been vice-president of the research department for the last five years. His research interests are in the field of Higher Education Management. He has written 2 books and 94 articles. He is Chief Executive of the Quarterly Journal of Educational Science.

**Francesco Niglia** worked more than 10 years as consultant for Technology Transfer and holds focus expertise in the ICT for government solutions domain. Key assignment: manager of the NET-EUCEN network within which he is responsible for the development and validation of eGovernment indicators for measuring the application of User Centricity methodology in services to citizens.

**Paul G. Nixon** Principal Lecturer in Politics at ESCM, The Hague University, The Netherlands. Paul co-edited Understanding E Government in Europe\_(with V Koutrakou and R Rawal 2010) E-Government in Europe (V Koutrakou 2007), Political Parties and the Internet (S Ward and R Gibson 2003.) and Cyberprotest (W van der Donk, B Loader and D Rucht, 2004)

**Donald F. Norris** is a specialist in public management, urban politics, and the application, uses and impacts of information technology (including e-government) in public organizations. He holds a B.S. in history from the University of Memphis and both an M.A. and a Ph.D. in government from the University of Virginia.

**Olaseni Muritala Okunola** is a PhD student; his research focuses on the ICT user experience, user satisfaction, user experience of mandatory technology acceptance and ICT Policy, and e-inclusion. He holds a Master of Science degree in Business Information Systems and a Master of Business Administration. He is preparing a Ph.D on User Experience of e-Government Services.

**Svein Ølnes** I work as a full time researcher at the Western Norway Research Institute, in the ICT departement. My field of research is eGovernment and within that field I have worked mostly with quality and benchmarking issues as well as interoperability and the use of semantic technologies.

**Wolfgang Palka** is a research associate and PhD student at the Chair for Information Systems at the Technische Universitaet Muenchen. His research interests include open government data, e-government, and mobile commerce. He was awarded for the best research of the year in the Journal of Information Technology (2009) for a contribution on mobile viral marketing.

**Monica Palmirani** is an associate professor of Computer Science and Law at Bologna University, School of Law, Italy. She teacher of several courses since 2001 on Legal Informatics, eGovernment, Legal drafting techniques, and Legal XML. She is director of Italian Society of Legal Informatics, of the LAST-JD Ph.D programme and consultant of the government agency for Italian Digital Agenda.

**Jeroen Pastoor** Project manager Monitoring e-Government Netherlands. Jeroenworks at ICTU, an impartial and professional organisation by and for government organisations. Jeroen working experience with Dutch government organisations improving their eGovernment solutions and strategies. Jeroen was involved in coördination of ICT-related projects at national/regional level –on implementation and usage of eGovernment solutions. Jeroen is currently interested in measurement of benefits realization, big data and web3.0 solutions.

**Cristina Pérez Espés** is a Business Administration graduate in the Faculty of Economics , and Business (Zaragoza, Spain). She has participated in several international congresses, such as Asepelt 2012, WSKS 2012 e.t.c, as well as in public and private projects. Currently, Cristina is pursuing Doctoral Thesis in Effectiveness of eCognocracy from financial and economic perspective.

**Igor Pihir** is a research and teaching assistant and a PhD student at the University of Zagreb, Faculty of Organization and Informatics in Varazdin. His research interests are in business process modelling and improvement trough IT and e-business especially with focus on measurement of e-business effects in SMEs processes.

**Denisa Popescu** Senior Enterprise Architect, Office of Chief Enterprise Architect, World Bank. Led and worked on initiatives in enterprise information integration, both structured/unstructured information, Master Data Management, reference data/taxonomies management, and automatic metadata capture using semantic technologies. PhD in Business Administration, George Washington University. Researches areas of knowledge transfer/learning, technology innovation, international regulatory standards, and global governance.

**Zoran Radojičić** is an associate professor at Faculty of Organizational Sciences in Belgrade, Department of Operational Research and Statistics. He holds a B.A. in Organizational Sciences, a M.Sc. in Statistics and a Ph.D. in Statistics, all from University of Belgrade. His research interests are computational statistics, applied statistics, biostatistics, information systems, Internet and e-business.

**Rajash Rawal** Principal Lecturer in Politics at ESCM, The Hague University, The Netherlands. His publications include Politics & the Internet in Comparative Context (with P.G. Nixon & D. Mercea) and Understanding E Government in Europe (with V Koutrakou and P G. Nixon 2010) He specializes in the impact of media on political agents in the modern era.

**Arthur Riel** is the Chief Enterprise Architect at the World Bank where he is responsible for the overall architectural framework for the Bank and the management of many technology initiatives. Arthur has worked with dozens of companies over a 30+ year period and is a published author/entrepreneur with original research dating back to 1988.

**Kassandra Rothernstadt** has a BA Honours in Communication studies and an MA in the same field from the University of Calgary, Canada. She is currently a researcher at iMINDS - SMIT while also pursuing her interdisciplinary PhD degree (Faculty of Communication sciences and Faculty of Philosophy and Morals Sciences).

**Elena Sánchez-Nielsen** obtained her Ph.D. degree in 2003 in Computer Science from the University of La Laguna. Since 2003, she has been associate professor in the University of La Laguna. She has over 10 years of experience working in projects related to e-Government and eParticipation. Her interests include intelligent systems, eGovernment, audiovisual contents and social media.

**Ninoslava Savić** is a lecturer at Higher School of Professional Business Studies in Novi Sad, Department of Informatics. She holds a B.A. in Mathematics from Novi Sad University and a M.Sc. in Information Systems from University of Belgrade. Her research interests are information society, e-business, information systems and methodologies for measuring e-development.

**Laura Schina** is Consultant at the Centro Cultura Innovativa d'Impresa – University of Salento providing functional support for the development of studies focused on the implementation of the user centric approach In Public Administrations. She worked as Consultant at Innova S.p.a. and was involved in activities related to the thematic networks in the eGovernment domain.

**Shareef Shareef** is a Software engineering lecturer, University of Salahaddin. BSc Physics, Mousel University, Iraq (1990). MSc Digital Communications Networks (2005), London Metropolitan University.. Shareef worked in ICT Centre, Ministry of Higher Education and Scientific Research in Kurdistan Region, Iraq (2007).Shareef was a PhD student (2009) School of Architecture, Computing and Engineering, University of East London. Shareef researches E-government/cloud computing initiatives in developing countries. Published and reviewed conferences.

**Vjaceslavs Sitikovs** obtained Dr.sc.ing. in Technical Cybernetics from Riga Technical University in Latvia in 1982. His main research field is computer-assisted learning systems. He has thirty years experience of teaching in the field of computer science. He has participated in and has led a variety of projects related to improvement of study process.

**Aelita Skaržauskienė** is a Doctor of Social Sciences from ISM, University of Management and Economics in Vilnius, Lithuania. Applies both knowledge of management and modern leadership-correlated disciplines in her work, such as Business dynamics, Systems thinking, Chaos and complexity theories. Was the coach in Self-managing teams building project in European Parliament together with DEMOS Group Belgium

**Anna Sołtysik-Piorunkiewicz**, PhD is employed at the University of Economics in Katowice as lecturers on Faculty of Informatics and Communication, at Department of Informatics. She is taking part in the research into computer science, systems analysis and computer system design, management information systems, e-business and public informatics.

**George Sournmelis** holds a MSc in e-commerce and a BSc in Information Technologies and Telecommunications. From 2008 he works as an IT advisor at National Business Registry of Union of Hellenic Chambers. He has teaching experience in e-commerce and requirements engineering. His research interests are in the areas of e-government, requirements engineering and system development cycle.

**Dalibor Stanimirovic** is a researcher in the field of Informatics in public administration. His research work has been published in several national and international journals. His general research interests include ICT in public administration, Enterprise Architecture, e-government, evaluation models and indicators of ICT projects, e-democracy and social dimensions of ICT policy.

**Virgil Stoica**, Ph.D.: Head of Political Science Department – Alexandru Ioan Cuza University of Iasi, Romania, Faculty of Philosophy, Social and Political Sciences; Courses taught: Public Policy, Public Administration, and Political Science Research Methods; Scientific research fields: e-government, public policies, local government, and political elites.

**Klaus Stranacher** He is working at the E-Government Innovation Center in Graz. His main topics are E-Government and IT-security. During his activities he participates in several European research projects. He was involved the pilot-project STORK and he was leading work-package 2 in the large-scale-pilot SPOCS. Additional he is working on his PhD-thesis on interoperability of electronic documents.

**Sun Yueh Yun** Graduate student in Department of Public Administration at National Chengchi University. Sun is interested in e-government/e-governance, ICT development. As a research assistant, has engaged in few research projects such as "A Performance Evaluation Model and Empirical Study of E-Governance" and "A New Business Model and International Collaboration Direction for Taiwan e-Governance Research Center."

**Jakob Svensson** is Assistant Professor in Media and Communication studies at Karlstad University where he directs the MA program in Global Media and the BA program in Media and Communication Studies. He is also director of the research network HumanIT at Karlstad University. His research focuses on political communication from a participatory and civic perspective.

**Dr. Gopikrishna Vasista Tatapudi** is currently a Researcher at King Saud University, Riyadh, Saudi Arabia. He has former experiences in the field of IT as a programmer analyst in USA and as a senior Lecturer/Asst. Professor in academic field in the area of Systems and IT, E-Business and E-Governance.

**Luiza Teixeira** has a BA in Administration and M.A from Bahia's Federal University in Local Power and Organizations, a specialist degree in Distance Education from Madrid's National Distance Education University (UNED), is Assistant Professor at the State University of Santa Cruz (Bahia) and Doctorate student at Getulio Vargas Foundation's Public Administration and Government Program.

**Prof Alfredo Terzoli** is the Head of the Telkom Centre of Excellence at Rhodes University and the Research Director of its equivalent at Fort Hare (South Africa). His areas of academic interest include e-services, ICT-for-development and wireless connectivity for marginalised areas. He is the leader of the Siyakula Living Lab and of Reed House Systems.

**Slim Turki** is a senior researcher at PRCHenri Tudor. He holds a PhD in IS engineering. He has been involved in many national and international projects addressing multiple business sectors like e-government, financial and social services. He developed a solid experience in multi-actors systems modelling (goal, value, information), service analysis, design, re-design and compliance.

**Nataša Veljković** received the BSc and MSc degrees in computer science at the University of Niš, Serbia. She is currently working as a Teaching Assistant at Faculty of Electronic Engineering with the Department of Computer Science. Her PhD research is concerned with Sensor Web systems, E-systems as well as GIS.

**Konrad Walser** is a full time professor for information management at University of Applied Sciences Berne, Switzerland. He teaches in the following domains: E-Government, IT Governance, IT Servicemanagement. Konrad Walser holds a PhD in Busi-

ness Informatics of the University of Bern. His current interests are IT project governance, E-Government front offices and organizational optimization through ICT in the E-Government domain.

**Dr. Fang Wang** is a professor of Information Science in Business School of Nankai University, China. She got her Doctor's degree from the Department of Information Management, Peking University in 2004. She was a Fulbright visiting scholar (2009-2010) at the National Center for Digital Government in UMASS Amherst, Massachusetts, USA. Her research field is e-government.

**Dr. Maria A. Wimmer** is a full professor and chair of research group, University of Koblenz-Landau, Germany. Research focus: e-government and e-participation (holistic design, enterprise architecture, conceptual modelling, ontology and knowledge management, procurement, standardisation and interoperability, stakeholder involvement, evaluation and measurement, policy development). PI and coordinator of EC-funded research, co-chair of IFIP EGov

**Ewa Ziembra** is an Associate Professor of Economics at the University of Economics in Katowice, Poland. She received her Post Ph.D. in management with the specialization in management information systems. Her principal research areas are focused on information society, e-business and e-government, especially information systems and technology in knowledge-based economy.

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# Towards Adoption of Government Enterprise Architecture: The Cases of Egypt and Syria

Mohamed Ali Mohamed<sup>1</sup>, Galal Hassan Galal-Edeen<sup>2</sup> and Hesham Ahmed Hassan<sup>1</sup>

<sup>1</sup>Cairo University, Egypt

<sup>2</sup>The American University in Cairo, Egypt

[mohamed.egov@gmail.com](mailto:mohamed.egov@gmail.com)

[galal@acm.org](mailto:galal@acm.org)

[drhesham2007@gmail.com](mailto:drhesham2007@gmail.com)

**Abstract:** The development of e-Government in developing countries faces multiple challenges, including the limited coordination between various projects and difficulties of interoperability. Enterprise architecture has been considered as an efficient approach to support the implementation of e-Government, and to serve as an umbrella for explaining the relationships between various projects, reducing complexity and achieving a higher level of integration. However; although there are many successful experiences by developed countries in the adoption of Government Enterprise Architecture (GEA) as a main driver to improve service delivery and overall performance, governments of developing countries still face many challenges in their efforts to launch enterprise architecture programs. This paper analyzes the cases of two developing countries (Egypt and Syria), which have not been previously the context for such studies. We followed a qualitative research approach using semi-structured interviews with stakeholders of e-Government and analysis of their observations and available documents; with the objective to get a better understanding of the adoption of GEA programs in the two countries. The suggested approach for analysis includes the identification of strategic drivers, challenges of development and assessment of the maturity of current GEA activities; after analysis, we presented our findings and the success factors that can contribute to a successful establishment and management of GEA programs in developing countries.

**Keywords:** enterprise architecture, e-government, GEA, interoperability, developing countries, G2G, Egypt, Syria

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## 1. Introduction

In the last decade, e-Government has been at the center of attention for governments worldwide to improve the quality of service delivery, increase effectiveness and efficiency of the public sector organizations; However; e-Government today face complex challenges at the organizational, technical and semantic levels (Janssen et al., 2011), where current systems were developed using architectures that do not readily support enterprise-wide integration, without having in mind the big picture of the whole government, and this led to the existence of isolated and fragmented systems, and major problems of interoperability (Weerakkody et al., 2007).

Enterprise Architecture (EA) has been considered as a solution to facilitate interoperability, coordination between government agencies, and strategic planning. EA was adopted by many governments to provide a holistic view of systems development and to serve as a tool for public management reform and transformation (Hjort-Madsen and Pries-Heje, 2009); The role and criticality of enterprise architecture in e-Government initiatives cannot be underestimated and countries with mature and effective e-Government programs attribute their success to effective enterprise architecture programs (Saha, 2009).

### 1.1 Problem statement

A careful review of the research that addressed the role of enterprise architecture in the e-Government shows that a large percent of the published researches were conducted in developed countries, and a little was written about its adoption in developing countries. This knowledge gap is particularly apparent in the Arab world, where Egyptian government has already issued an initial document that aims to develop enterprise architecture to enhance e-Government implementation (MSAD, 2006); however, previous studies pointed that such document had no impact until now (Klischewski, 2011). In Syria, e-Government strategy also referred to the role of enterprise architecture, but there is still slow progress in such development. In a nutshell, there is no evidence that a proper situation analysis has been conducted to address the role and the challenges of enterprise architecture within e-Government in the two countries.

## **1.2 Research objectives**

We aim in this work to fill the mentioned gap in the literature and characterize the status of government enterprise architecture in the two countries, the key objectives of this research are:

- Analyze the context of e-Government in Egypt and Syria and especially G2G sector to identify the strategic drivers for GEA program.
- Identify the challenges of GEA development.
- Assess the maturity of current GEA capabilities.

## **1.3 Research structure**

The remainder of the paper is organized as follows; Section 2 presents a background and literature review, while section 3 presents the suggested research approach for analysis. In section 4 and 5 we analyze the cases of Egypt and Syria consecutively using the suggested approach, in section 6, we present our findings and discussions; finally, conclusions are presented in section 7.

## **2. Background and literature review**

In this section, we will review some issues and challenges related to e-Government; and explore the adoption of enterprise architecture in the context of government.

### **2.1 E-Government: Issues and challenges**

Many developing countries launched e-Government initiatives with the aim of improving the quality of government services delivery, and increasing the effectiveness and efficiency of the public sector organizations. However while some governments have been successful in implementing e-Government initiatives, many initiatives fail to live up to expectations (Heeks, 2003), Heeks finds that 85% of e-Government initiatives in developing countries are either total or partial failure.

There are three e-Government delivery models, which stated in much of the literatures, including G2C, G2B and G2G (AlNagi and Hamdan, 2009). This research focuses on G2G directly as it could be considered as the backbone of any e-Government program, due to its impact on integrating services offered to citizens. The development of G2G services in developing countries faces many challenges that can be classified from multiple perspectives, but for brevity, we outline the critical challenges according to (Ebrahim and Irani, 2005; Ezz, 2006; Vanka, 2007; AlNagi and Hamdan, 2009):

- Coordination challenges: each agency has its own set of procedures and projects, these projects often are not based on standards, leading to an increased complexity and weak interoperability.
- Agility challenges: e-Government today needs the ability to respond to the fast and continuous changes in the environment (new channels and technologies) to deliver more efficient services.
- Cost challenges: successful implementation is rarely shared, leading unfortunately to the duplication of effort and resources.
- Legal challenges: establishing an integrated management structure and ensuring the conditions and sustainability of collaboration among different ministries

E-Government services are classified into front office and back office service delivery; Front office services include interaction between citizens and civil servants, while the back office includes registration and coordination activities. Back office cooperation is considered a serious bottleneck in e-Government because of interoperability problems (Kliszewski and Abubakr, 2010). E-Government interoperability has three dimensions according to the e-Government guide provided by (UNDP, 2007), they are: organizational interoperability, semantic interoperability and technical interoperability, and in order to address these levels of interoperability, UNDP guide emphasizes the importance of enterprise architecture and recommends that Service Oriented Architecture (SOA) is the best underlying paradigm with which to begin to roll out e-Government services that can be used in cross-agency situations.

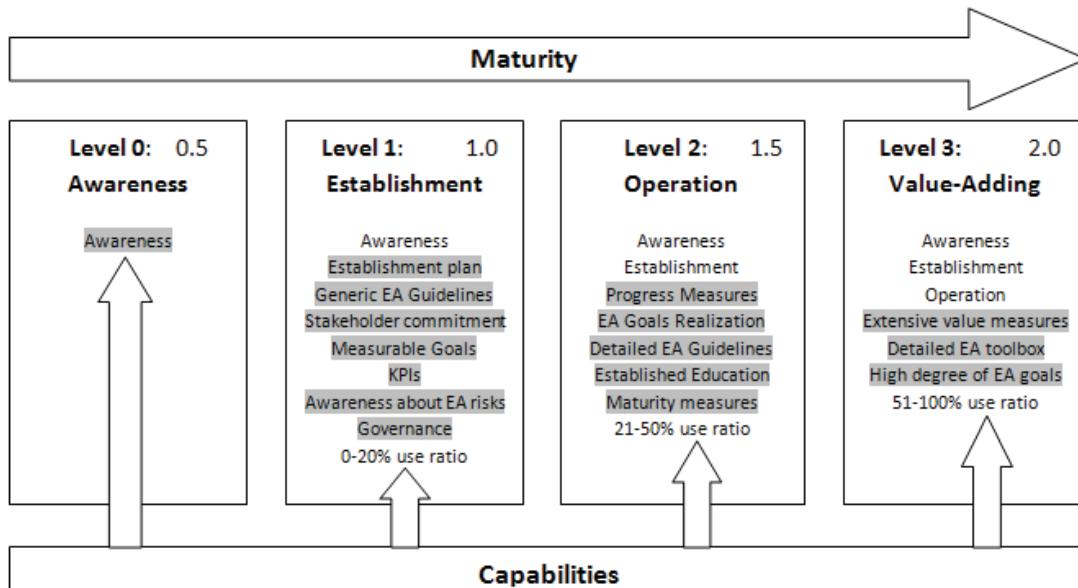
## 2.2 Enterprise architecture in the context of Government

Enterprise Architecture (EA) can be defined as a comprehensive description of all of the key elements and relationships that make up an organization (Spewak, 1993) cited in (Depalo and Song, 2012); also as a coherent whole of principles, methods, and models that are used in the design and realization of an enterprise's organizational structure, business processes and information systems (Lankhorst, 2009). EA is usually represented via four domains or layers: business architecture, data architecture, applications architecture and technical architecture (Saha, 2009).

Enterprise Architecture has come as a possible solution to address critical issues that face the development of e-Government successfully; EA was first adopted in the government context by the US government when Federal Enterprise Architecture Framework (FEAF) was published (Malveau, 2004). Later many governments worldwide used the phrase "Government Enterprise Architecture" abbreviated as GEA in their implementation strategies, and many academic studies pointed to its potential to enable interoperability, resource reuse and ability to deliver efficient services (Saha, 2009; Ojo et al, 2012).

In this research, we consider Government Enterprise Architecture (GEA) as a holistic architectural approach that aims to achieve integration and interoperability between government agencies; also to guide IT strategic planning.

Different measures were used to measure the EA maturity, including effectiveness measures, status measures, measures of different levels within the organization, or specific areas such as the EA documentation, principles and artifacts making up the EA. However one of the important models for measuring GEA maturity at national level was presented by (Gotze et.al, 2009); the model was adopted in the assessment of enterprise architecture programs in 13 nations. Figure 1 shows this model that consists of four levels: (0) awareness, (1) establishment, (2) operation and (3) value-adding; the awareness level gives only 0.5 point, the levels (1, 2, 3) includes different capabilities, and each capability in each level has a weight, the model does not require that one level of maturity be completely fulfilled before moving on the next level, we will adopt this model later in the analysis of our cases.



**Figure 1:** Government enterprise architecture maturity model adopted from (Gotze et.al, 2009)

## 3. Research approach

A case study approach was utilized because this research aimed to explore certain phenomena (adoption of EA) within a particular context like government (Yin, 2003), a qualitative interpretative approach was used to gain an in-depth understanding of the context (Walsham 1995), as well as the challenges that affect the adoption of enterprise architecture in the public sector. We analyze the cases of Egypt and Syria, as part of our analysis, we studied many documents about e-Government strategies and other related documents (plans,

newspaper clippings, schedules, presentations and reports); we also carried out semi-structured interviews with different participants in order to gather information.

Our proposed approach to analyze the cases of Egypt and Syria includes the following steps:

- Examine the current status of e-Government development depending on our qualitative study and review of previous studies.
- Collect the strategic drivers for GEA program and identify the challenges that affect the slow progress of GEA development.
- Assess the maturity of GEA according to the maturity model presented in the previous section.

#### **4. The case of Egypt**

The Ministry of State for Administrative Development (MSAD) is responsible for e-Government program in Egypt; MSAD aims to create an efficient administration that provides government services to citizens quickly, accurately, and efficiently. MSAD has many achievements that have appreciated worldwide like the organization of the recent elections that won international awards from United Nations. One of the important milestones in the development of e-Government in Egypt is the opening of the “El Bawaba” portal ([www.egypt.gov.eg](http://www.egypt.gov.eg)), this portal, meant to implement a one-stop shop solution, calls also for appropriate backend solutions enabling process integration between the various governmental agencies.

In IT the field, we interviewed the general director of G2G services and some projects managers, they have started in 2009 the implementation of the national Service Oriented Architecture (SOA) to support e-Government interoperability efforts. The program director noted that SOA has been an effective facilitator in convincing the ministries to participate in G2G projects because it ensured existing data ownership and privacy (“*we're not dealing with databases, we're dealing with web services*”). In the business field, we interviewed some of project managers who are responsible for restructuring the government agencies by analyzing their business processes and improving them using reengineering methodology; we noted that there is a weak alignment between them and IT department.

Some researches addressed G2G sector and SOA adoption in Egypt. Ezz (2006) provided a suggested framework for inter-governmental collaboration in Egypt and argued that technology adoption may be impossible unless the related organizational problems are addressed such as weak coordination, standardization and legislations; in another research conducted by (Klischewski and Abubakr, 2010), authors provided several lessons about SOA adoption in Egypt, the lessons include: sharing data is the key to e-Government interoperability, however data accuracy do not come through SOA; also SOA is not an efficient backbone for providing bulk data needed for political decision support; and legal framework is a prerequisite for establishing an integrated management structure and ensuring the sustainability of collaboration among ministries; furthermore, Klischewski (2011) criticized the technology-first approach of Egyptian government in the adoption of SOA and concluded that issues of semantic and organizational interoperability have not appeared on the agenda until now, which is expected to change when the overall complexity increased with the growing reuse of services. Klischewski argued that SOA cannot be the guiding vision for solving all problems coming up, and MSAD will be in need to promote other conceptualizations like ontologies and enterprise architecture.

Egyptian government was aware of the importance of enterprise architecture early, and in the late of 2006; MSAD released a document titled “Egyptian Government Enterprise Architecture Framework (EGEAF)”, to address the development of enterprise architecture within e-Government program (MSAD, 2006). The technical team at MSAD reviewed available frameworks in the field of enterprise architecture and tried to localize a suitable framework according to the context of the Egyptian government. They recommended adopting a customized version of Federal Enterprise Architecture Framework (FEAF); also the document included general guidelines and the main characteristics. However; previous studies pointed that this document has no impact until now (Klischewski, 2011).

#### **4.1 Strategic drivers and challenges**

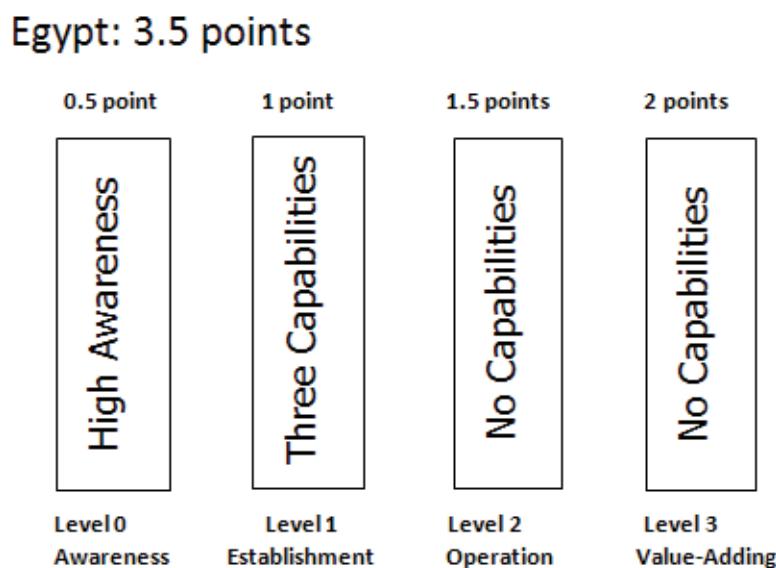
Our analysis of the implementation of SOA in Egypt and discussions with program director and project managers revealed many strategic drivers for mature enterprise architecture, we outline below the strategic drivers for government enterprise architecture in Egypt.

- Enable effective adoption of SOA especially with the increased complexity and size, it is vital to have the big picture in mind.
- Support coordination and integration between various projects.
- Address the semantic and organizational levels of interoperability that are not addressed by SOA, since the main focus of SOA is on a technical level.
- Consider the impact of new business operations, channels and technologies, and engage stakeholders from the business field.
- Plan for the development of the government cloud: EA as a comprehensive approach can help to clarify many issues that are of concern to agencies including performance, cost, and security.

Regarding the slow progress of GEA program and challenges faced, the G2G program director said “the delay in their GEA program is due to the focus on the implementation of SOA at the expense of enterprise architecture because government agencies are lacking of e-Government experience and therefore cannot initially contribute to organizational interoperability, nor follow a preset methodology, and the only way to proceed is the implementation of a well-recommended technology path such as SOA”, however they are aware that adopting service oriented enterprise architecture will be more holistic and valuable. Our discussions with the teamwork showed that most of the challenges that affect the development of enterprise architecture are related to the planning issues including weak support of top management, involving stakeholders, budget constraints, awareness among project teams, unclear ownership; finally, the lack of evaluation tools was an emerging challenge.

#### **4.2 Assessment of maturity**

Here, we will adopt the maturity model presented by (Gotze et.al, 2009) that was discussed in section 2, In Egypt, the awareness level is high and that gives 0.5 point, be reviewing the achieved capabilities with the program director, it was clear that Egypt have only three capabilities at the level 1, there is a plan for implementation, generic EA guidelines have been provided, also stakeholders commitment was legally enforced because the prime minister of Egypt in 2010 issued the decree no. 856 concerning the commitment of ministries and government bodies to exchange data between them in accordance to the national plan on integration, accordingly Egypt gains 3 points in the establishment level, and the overall weight becomes 3.5 points. Figure 2 shows a simplified view of this assessment.



**Figure 2:** Assessment of GEA maturity in Egypt

## **5. The case of Syria**

The e-Government initiative of Syria is currently administered by the Ministry Of Communications and Technology (MOCT), which issued in 2009 the e-Government strategy as a fundamental element in modernizing the public sector (MOCT, 2009). The implementation approach depends on centralized planning and decentralized implementation, by adding new e-Government services, integrating them with existing services, and progressively developing the e-Government architecture (Joukhadar and Anbar, 2008).

The academic studies that addressed the implementation of Syrian e-Government are few, but one of the recent researches was conducted by (Kanaan and Atieh, 2011), they adopted a qualitative methodology to address the importance of business/IT alignment as an enabler for e-Government in Syria. In their research, they argued that the main problem in the Syrian e-Government strategy is the focus on the technological side more than others like business and people sides. Authors concluded that there is gap between IT and business strategies/people and could be considered one of the big challenges of e-Government project and that there is a vital need for a holistic approach to close the gap.

The strategy pointed to the role of enterprise architecture in the implementation of e-Government through part two of strategy that presents orientations (MOCT, 2009: pp33), by stating that: "*The technical dimension is a heavy burden on ministries, particularly the complex technical cases that may require the participation of several ministries to provide citizens with a service at an acceptable level. This obligates the Strategy to adopt the development of an E-Government Enterprise Architecture that supports the central planning to create standards for the uniform delivery of government services electronically, and supports the decentralized implementation based on the provision of appropriate technical tools, common services and infrastructure, which eases the burden of inter-coordination on the ministries*". One expert of the implementation team added they are aware of the importance of enterprise architecture and MOCT Ministry has a plan to implement it with the support of UN-ESCWA.

### **5.1 Strategic drivers and challenges**

Depending on the previous review and discussion with stakeholders, we present below the strategic drivers for government enterprise architecture in Syria:

- Achieve better business/IT alignment;
- Support the coordination between various projects started by different ministries.
- Enable efficient outsourcing: because they plan to continue relying on outsourcing partners.
- Enforce standardization and reusability to decrease costs.

Our discussions with the responsible stakeholders revealed that they suffer from a lack of skills and sufficient funding, they also suffer from culture of change resistance; additionally, they have the recognition that EA implementation is a complex process, and that there is a need for an efficient framework for EA management.

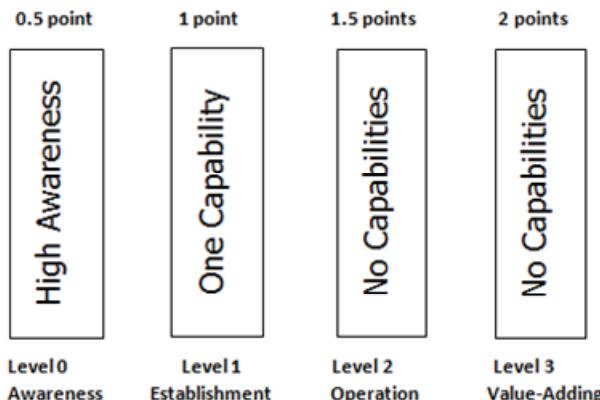
### **5.2 Assessment of maturity**

In Syria, the awareness level is high and appears clearly in the strategy and that gives 0.5 point; in the establishment level, Syria has only a time plan for implementation and is given one point, and the overall weight becomes 1.5 points. Figure 3 shows a simplified view of this assessment.

## **6. Findings and discussions**

Adoption of an architectural framework in the e-Government context can be considered as a new experience in the two developing countries, because they have just reached to the maturity level where these strategies are considered to be important. However, EA will be very valuable in the vertical and horizontal integration stages of the e-Government maturity model suggested by (Layne and Lee, 2001), due to its critical role in saving cost and increasing efficiency, so the early development of enterprise architecture is so important with the increased complexity.

### Syria: 1.5 points



**Figure 3:** Assessment of GEA Maturity in Syria

We outline below the main points that has revealed from the analysis of our cases:

- The two countries have many strategic drivers for a mature enterprise architecture program to help them in their e-Government development, Egypt has made progress more than Syria and it has the parts of the puzzle due to the implementation of SOA but not the big picture represented by GEA.
- Addressing the weak coordination between various projects that initiated by different ministries, was one of the most important strategic driver to establish GEA program in the two countries, in order to reduce cost and duplication and achieve higher business/IT alignment.
- Culture challenge was one of the most obvious challenges of developing enterprise architecture in Egypt and Syria, including lack of a shared understanding among stakeholders; weak commitment and collaboration, additionally the lack of architectural skills, so it is important to address the culture and awareness difficulties, by establishing shared understanding and knowledge base.
- The analysis of challenges that face GEA adoption reveals many correlations between them; like the link between planning and evaluation, including the problem of gaining support from top management and sufficient funding, because EA will produce long-term benefits that are difficult to measure.
- The two countries are still in the establishment level and there seems to be no capabilities achieved in operation and value-adding levels of the maturity model adopted in this research, they have really a significant amount of work to do before they will be able to raise their maturity to a higher level.
- There is a vital need for an effective framework for the management of enterprise architecture to address the specific challenges in the two developing countries.

The literature presented many other challenges relevant to adoption of enterprise architecture which have not appeared directly from our analysis including that the available development frameworks are incomplete and have many shortcomings (Depalo and Song, 2012; Mohamed et al., 2012), also the weak support of the semantic issues with the increasing complexity (Janssen et al, 2011), the absence of specific architectural principles (Stelzer, 2009), nowadays the role of enterprise architecture is challenging with the great potentials offered by cloud computing today (Mahmood, 2011 Janssen et al, 2011); the literature showed also the challenges of evaluation due to the lack of efficient methods for measurement and assessment (Liimatainen, 2008; Ojo et al., 2012).

## 7. Conclusions

Government Enterprise Architecture (GEA) has been considered as an approach to support the levels of interoperability, coordination between government agencies, and strategic planning. Many developed countries with mature and effective e-Government programs attribute their success to effective enterprise architecture programs; however there is still a knowledge gap in some developing countries in this field.

The aim of this research was to characterize the role and importance of government enterprise architecture in Egypt and Syria, where the two countries actually issued a plan for EA development; however, the progress is still slow and had no impact on the overall performance, and there is no proper situation analysis has been

conducted in this field, our suggested approach for the analysis includes the identification of the strategic drivers and challenges of development, based on the analysis of many government documents, related researches and using semi-structured interviews with the responsible stakeholders; and the assessment of the maturity of current EA activities.

Depending on our analysis, we offer the following set of success factors for effective establishment and management of Government Enterprise Architecture (GEA):

- *Sufficient planning*: by organizing a qualified team and have a clear ownership, formulate the mission and gain the support from top management and funding.
- *Stakeholder involvement*: by focusing on the early development of business architecture to engage various stakeholders, also it is important to have a legal framework for collaboration in place.
- *Localized framework*: enterprise architecture framework can serve as a guide to what enterprise architecture should contain and how to create it, there are many frameworks available today, with different contents and targets, it is important to localize a framework to suit the local requirements.
- *Change Culture*: to address the collaborative nature of the process of EA development, the cultural and institutional issues should be taken in consideration just as technical issues.
- *Agile Development*: the development of enterprise architecture does not represent a series of static artifacts but it is an ongoing process and EA artifacts (principles, models, diagrams, narratives, etc.) are continually revisited and evaluated based on their contribution to business value and feedback from stakeholders.
- *Evaluation*: establishing key performance indicators early to address the difficulties of funding, and follow up the national EA maturity models.

The previous success factors may serve as guidelines for improving the awareness among stakeholders; some of them can be treated in the future research. Finally, the development of enterprise architecture within the context of e-Government should be considered as an endless journey, not as a project. This way, the two countries can continuously capture and learn from the lessons they gain to reach a mature enterprise architecture that can help in enhancing the efficiency and interoperability of e-Government services.

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# The Effectiveness of e-Governance Experiences in the Knowledge Society<sup>1</sup>

José María Moreno-Jiménez<sup>1</sup>, Cristina Pérez-Espés<sup>1</sup> and Maria Wimmer<sup>2</sup>

<sup>1</sup>Zaragoza Multicriteria Decision Making Group, University of Zaragoza, Spain

<sup>2</sup>E-Government Research Group, University of Koblenz-Landau, Germany

[moreno@unizar.es](mailto:moreno@unizar.es)

[perezesp@unizar.es](mailto:perezesp@unizar.es)

[wimmer@uni-koblenz.de](mailto:wimmer@uni-koblenz.de)

**Abstract:** The Knowledge Society is a space for the talent, intelligence, imagination and creativity of humankind. It is characterised by deterritorialisation, interdependences between the factors, the interconnection between the actors involved in the decision making processes and the importance of the human factor, particularly with regards to learning and education. E-governance is defined as the use of ICTs in the design of public policies and, more generally, as the use of ICTs in public decision making related to the governance of society (Moreno-Jiménez, 2009). In the context of the Knowledge Society, e-governance approaches should be oriented towards the conjoint construction of a better world, as outlined, for example, in official documentation on governmental strategy<sup>2</sup>. Collaborative participatory models, tools and platforms are needed to allow the integration of the skills and opinions of all the actors involved in the resolution process to formulate public policies (Moreno-Jiménez et al., 2012; Wimmer et al., 2012). The instruments should be designed to educate (intelligence and learning), promote relations with others (communication and coexistence), improve society (quality of life and cohesion) and construct the future (evolution) in a world of increasing complexity, using the collective intelligence of the people to engage members of democratic environments in policy decision making. The assessment of e-governance experiences usually (Wimmer and Bicking, 2013) deals with the evaluation of efficiency (doing things correctly) or efficacy (achieving goals), but unfortunately, there are very few cases in which this assessment has analysed the most important of these aspects: effectiveness (doing the right things). This paper presents a framework with a set of criteria, subcriteria and indicators for evaluating the impact of e-participation experiences and collaborative democracy models in the context of the Knowledge Society and New Public Governance. The authors further present a methodology for evaluating the effectiveness (added public value) of these experiences in the Knowledge Society. The framework is currently being applied to a real-life experience of e-governance, based on the cognitive democracy known as e-Cognocracy (Moreno-Jiménez, 2003a, 2006), which was implemented in the municipality of Cadrete (Zaragoza), Spain, and it will also be applied to the set of e-participation experiences included in the Momentum project. Future studies will holistically integrate the impact of efficiency, efficacy and effectiveness.

**Keywords:** e-governance, knowledge society, evaluation, efficiency, efficacy, effectiveness

## 1. Introduction

The Knowledge Society (KS), can be understood (Moreno-Jiménez, 2003b) as a space to accommodate the creativity, imagination, ingenuity and talent of the human being, based on the development of information and communication technologies (ICT). In this context, the resolution of highly complex problems associated with public decision making related with the governance of society requires the utilisation of the creative abilities and potential of the greatest practicable number of individuals. For the resolution to be as effective as possible, advantage should be taken of the potential offered by the new context (KS) which is characterised (Moreno-Jiménez, 2003b; 2004) by: (i) the deterritorialisation of knowledge; (ii) the development of communication and learning technologies; (iii) the interconnection between the actors involved in the decision making processes; (iv) the increasing value given to subjective, intangible and emotional aspects; (v) the importance of the human factor.

Taking into account the fact that the most relevant of the these characteristics is the importance of the human factor, e-governance models in the KS should be oriented (Moreno-Jiménez, 2006) to educate people (intelligence and learning), promote relations with others (communication and social harmony), improve society (quality of life and cohesion) and facilitate the conjoint construction of the future in a world of increasing complexity. In order to educate people in the context of the KS, e-governance models should focus on the extraction and diffusion of the knowledge related with the scientific resolution of public decisional

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<sup>2</sup> Europe 2020, on smart, sustainable and inclusive growth ([http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm)).

problems. The democratisation of this knowledge is the main aim of New Public Governance (NPG). Values of a global ambit, such as discussion, dialogue, the search for and dissemination of knowledge, the strengthening of ethical and moral values, learning, accountability, freedom, cohesion, equity, solidarity and education should be promoted in new models of democracy for the KS (cognitive democracies).

The determination of the most appropriate model of e-governance (or e-participation in policy making) for addressing the needs and challenges of a given epoch is by no means an original topic of debate and discussion (García and Moreno-Jiménez, 2008). Neither is its assessment. In the last few years, more and more e-participation practices and methods (Rowe & Frewer, 2000; 2004) have been developed but there are almost no rigorous evaluation approaches ready for application in this field (Henderson et al., 2005; Janssen & Kies, 2005; Winkler, 2007); emerging frameworks are still embryonic (Macintosh & Whyte, 2008; Aichholzer & Allhutter, 2008).

Most contributions concentrate on the informational aspect of the accountability and transparency of websites and tools (Pina et al., 2007; Serrano-Cinca et al., 2009a,b) or on benchmarking approaches to e-participation (UN, 2005, 2008) but they lack an in-depth analysis of quality and neglect impacts. Others address wider ranging issues such as the quality of democracy (Coppedge & Reinicke, 1990; Diamond & Morlino, 2005) or governance (Skelcher et al., 2005; Schmitter, 2005) and offer relevant criteria that are not specifically adapted to e-participation in policy making. Existing deficits regarding evaluation are confirmed by scholars calling for more research into the effectiveness of electronic forms of public engagement (Rowe & Gammack, 2004).

According to the European Commission, impact evaluation ‘identifies and assesses the problem at stake and the objectives pursued’; it assesses the final purposes of a particular policy instrument or a package of instruments (Hamelink et al 2008). Enhanced impact evaluation further provides information as to why the performance of a policy instrument was better or worse than expected, in order to derive best practices or feedback for improving the worse cases. The evaluation results show whether the e-participation initiative has been successful.

Mamaqui and Moreno-Jiménez (2009) and Moreno-Jiménez, Pérez-Espés and Rivera (2012a,b) proposed a methodology for the evaluation of e-governance (e-participation in policy making) models, particularly for the cognitive democracy known as e-cognocracy, based on the three levels usually considered when analysing the behaviour of systems (Moreno-Jiménez et al., 1998): efficiency (doing things correctly), efficacy (achieving goals), and effectiveness (doing the right things).

The next step is the development of a framework and a set of criteria, subcriteria and indicators for evaluating the impact of e-participation experiences and collaborative democracy models in the context of the Knowledge Society and New Public Governance; more specifically, the evaluation of effectiveness (added public value). This paper presents some results of the application of this framework to real cases. The framework is currently being applied to a real-life experience of e-governance, based on the cognitive democracy known as e-Cognocracy (Moreno-Jiménez, 2003a, 2006), which was implemented in the municipality of Cadrete (Zaragoza), Spain. The methodology will be applied to a further set of e-participation experiences to holistically integrate the impact of efficiency, efficacy and effectiveness into one comprehensive method.

The paper has been structured as follows: Section 2 explores the background to the evaluation of e-participation experiences in two contexts - the Information Society and the Knowledge Society; Section 3 introduces a framework with the set of criteria, subcriteria and indicators for evaluating the effectiveness of e-participation experiences in the Knowledge Society; Section 4 describes the evaluation of a real-life experience of e-governance, based on e-Cognocracy; Section 5 discusses the conclusions of the work and the orientation of future research.

## **2. Background**

This section considers the different approaches followed in the scientific literature on the evaluation of e-participation in policy making (e-governance) models. Firstly, it examines the more traditional techniques that focus on the informational aspect (efficiency and efficacy) of accountability and transparency of websites and

tools (Information Society) and then looks at the EF<sup>3</sup> approach, proposed for the evaluation of e-governance models in the Knowledge Society.

## **2.1 The evaluation of e-participation experiences in the information society**

The evaluation of e-participation processes is an issue of relatively recent interest since it is only in the last ten years or so that real-life contrastable e-participation experiences have been implemented and documented and a variety of evaluation theories and concepts have been developed (Rogers, 2003; Venkatesh et al 2003). In 2006, the European Commission (EC) launched the 'e-Participation Preparatory Action' to spur innovation and to support pilot projects showing how the deployment of ICT may simplify the participation of people in decision-making and legislation formation processes.

According to Aichholzer and Westholm (2009), evaluation should generate information on the results of an e-participation project and its process organisation. Whether the focus is on outcomes (summative evaluation) or on process aspects (formative evaluation), both involve a systematic comparison with predefined criteria, performance standards or expectations. Motivations for evaluating e-participation projects can be quite varied. Organisational learning, management enhancement, audit, project control, assessment of tools and the enhancement of democracy are among the most important interest.

Published studies on the evaluation of e-participation applications are very small in number and, so far, only a few embryonic evaluation frameworks have been put forward (Whyte and Macintosh, 2003a, Frewer and Rowe, 2005). Anttirioko (2003) suggests that the evaluation of e-democracy should include the broad capability of technology to add value and this should be articulated through the parameters of Institutions, Influence, Integration and Interaction. Whyte and Macintosh (2003) argue that to evaluate how effective e-participation is in engaging a wide audience and thereby informing and influencing the policy process, the analytical framework has to consider three dimensions: the evaluation criteria, the analysis methods available and the actors involved; the evaluation criteria itself should consider three, overlapping, perspectives: democratic, project and socio-technical. These authors believe that any generalised evaluation framework for e-participation needs to clearly define the evaluation criteria that are being considered, the actors involved and it must also ensure that relevant research methods are matched to the appropriate actor with regards to timing, skills and the willingness to be involved. Forss (2005) identifies three functions for the evaluation of e-participation: audit; management and learning, and states that in the public sector, the emphasis has generally been placed on audit (where there is a need to monitor the spending of public money and assess the effectiveness and efficiency of the services).

Since the 2006 European Commission launch, a number of evaluation methods have been proposed (Macintosh and Whyte 2008; Aichholzer and Westholm 2009; Mamaqui and Moreno-Jiménez, 2009; Wimmer and Bicking, 2013) for the evaluation of transparency, participation, efficiency and effectiveness; most of them are focused on the evaluation of the tools and technologies of the e-participation experiences and only a few have analysed policy making and policy support.

If the evaluation of e-participation in the Information Society has concentrated on (Aichholzer and Westholm, 2009) Products (efficiency) and Processes (efficacy), the evaluation of e-participation in the Knowledge Society should deal with the third and most important 'P' of the '3P' perspective (Moreno-Jiménez, 2002): People (effectiveness).

## **2.2 The evaluation of e-participation experiences in the knowledge society**

In the Knowledge Society, ICT developments make it possible to assess the impact of people on e-governance and the impact of experiences of e-governance on the people. This allows greater political transparency and accountability and more citizen control and participation. When public funds are used in an activity, evaluation is desirable as a means for improving the system. *In general, the evaluation of e-participation is indispensable if knowledge of greater precision and objectivity on the effectiveness, the value or the success of an e-participation project, initiative or program is required* (Aichholzer and Westholm, 2009). When evaluating e-participation experiences, the objectives and goals of the experience must be taken into account. The objectives can be considered from the differing points of view associated with the actors implicated in the resolution of the problem: the Public Administration; the politicians, the citizens etc.

The first e-participation experiences were aimed at analysing the extent to which the methodology (decisional tools) and the technologies (information and communication support) were user-friendly, in other words, to determine if the products were efficient. Once the products' efficiency was evaluated, the next step was to look at the efficacy of the processes. More specifically, the work focused on aspects such as citizen participation and control, transparency and accountability of the politicians. The third and final step in the evaluation of an e-Government experience is the analysis of its effectiveness: the public valued added to society as a whole. This last question is very complex and there are almost no published works to date. The evaluation of effectiveness must be based on the mission of democratic models in every period of history.

Effectiveness (doing what is right) can be understood (García and Moreno-Jiménez, 2008) as the identification of the aspects relevant to the problem and the setting of appropriate goals for resolving it. In this case, it involves the complete development of the capacity for working with a plural, coherent, hierarchical teleological system as a support to political action and this implies (García and Moreno-Jiménez, 2008): a) the setting of aims of the highest order (subsistence, equity, liberty, knowledge, participation etc.) for the achievement of which, in the final analysis, the democratic system was designed; b) the identification of the relevant operational objectives associated with the aforementioned aims; c) the setting of precise levels (goals) for the objectives that must be achieved.

These three concepts (efficiency, efficacy and effectiveness) have been utilised when evaluating the cognitive democracy known as E-cognocracy. This cognitive democracy uses multicriteria decision making techniques as its methodological support, the internet as its communication support and the democratic system as a catalyst for learning; it seeks the creation and social diffusion of knowledge and the construction of a more open, transparent, cultured, educated and freer society - a society that is more cohesive and connected, more participative, egalitarian and cooperative. Structural equation models have been employed to analyse the relevance of the criteria for evaluating the effectiveness of e-cognocracy (Mamaqui & Moreno-Jiménez, 2009; Moreno-Jiménez, Pérez-Espés and Rivera, 2012a,b).

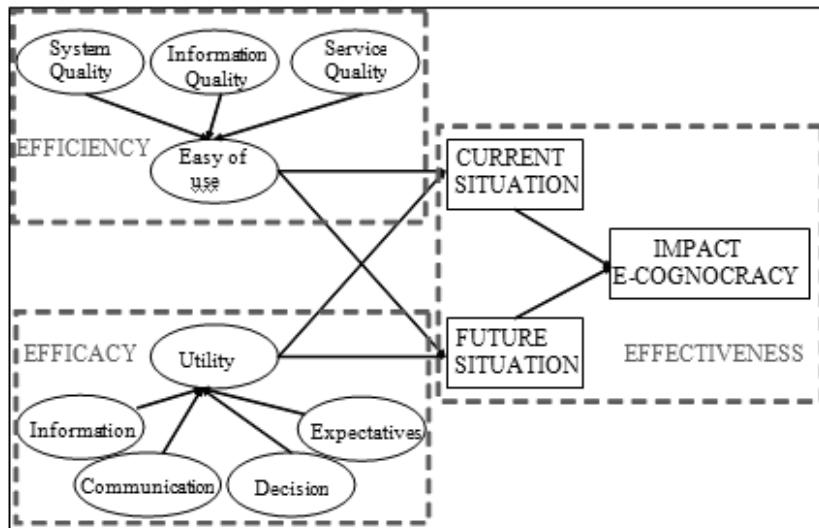
In Section 3, the ideas extracted during the evaluation of e-cognocracy are used in the presentation of an original framework for the evaluation of the effectiveness of e-governance experiences in the Knowledge Society, valid for any e-participation experience in policy making.

### **3. A framework for effectiveness evaluation of e-governance experiences in the KS**

In line with the EF<sup>3</sup>-evaluation and based on the three inputs contemplated by the model (Delone & McLean, 2003), Moreno-Jiménez, Pérez-Espés and Rivera (2012b) selected three relevant aspects as those that determine efficiency: i) the Information Technology application (*System Quality*), ii) the information that is obtained (*Information Quality*) and iii) the human resources support (*Service Quality*). There are four relevant aspects that determine efficacy: i) *Information*, ii) *Communication*, iii) *Decision* and iv) *Participation Expectation*. The evaluation of effectiveness is ideally undertaken by a group of experts that establish a 'strategic plan' (an ideal situation) which is compared with the current reality. In this case, the evaluation from this perspective is through the analysis of two scenarios as latent intermediate variables: the current situation and the ideal, and an endogenous variable that captures the idea of the creation of a better society (Moreno-Jiménez et al., 2012b).

After identifying the relevant aspects for an EF<sup>3</sup>-evaluation of e-Cognocracy, and with the aim of extending these ideas to any e-participation in policy making, the next step in the design of a general methodology was to establish a framework with a set of criteria, subcriteria and indicators for evaluating the impact of e-governance experiences and collaborative democracy models in the context of the Knowledge Society and New Public Governance.

A set of attributes and indicators for evaluating efficiency and efficacy (as defined in this work) can be seen in Wimmer and Bicking (2013), who propose a framework for the evaluation of the effectiveness (denominated as 'efficacy' in our context) of e-participation solutions in engaging a wide audience in the policy making process (a "crucial" factor, in the opinion of Macintosh and Whyte, 2008). For each of the selected attributes and indicators, different levels of impact (very high, high, medium, low, and very low) must be determined.



**Figure 1:** EF3 model for the evaluation of e-cognocracy

This paper deals with the engagement of the audience in the policy making although the effectiveness of e-participation experiences in the Knowledge Society requires measuring the value added through individual and collective learning. The next step is the establishment of a framework for evaluating effectiveness (doing the right things).

The criteria (aims of the highest order) set for the models of e-governance in the Knowledge Society deal with issues relative to the attributes of those that are implicated: *control* (co-decision), *participation* (co-creation), *learning* (training) and *liberty* (tolerance), as well as the systems in which they are integrated: *subsistence* (the selection of the best individuals for the management of the systems), *cohesion* (qualified consensus, clear majorities, and limited veto), *equity* (equality of opportunities for all) and *social wisdom* (a cultural resource of ethical values). The following criteria were established for the measurement of the *added cognitive value*:

#### A: People:

- A.1. Control (co-decision): the % of the citizens in the decision making process and the possibility of putting forward specific situations that are conjointly resolved and validate the politicians that are in power (motions of confidence in decisions).
- A.2. Participation (co-creation): participation has been evaluated in many ways; in this case, the people that follow the discussions that create content and those that vote will be measured, along with the number of arguments that can be extracted from the discussion and decision processes (Moreno-Jiménez et al., 2013).
- A.3. Learning (training): The changes in individuals' preferences between the two voting rounds and the discussion stage.
- A.4. Liberty (tolerance): the % of vetoed messages; the % of ideologically intransigent messages; the % of individuals with a change in the preference structure.

#### B: Society:

- B.1. *Subsistence*: the selection of the best individuals for the management of the systems – this should be included in the questionnaire at the end of the experience.
- B.2. *Cohesion*: qualified consensus (clear majorities) and limited veto. The number of groups that can be identified among individuals must be determined in the final decision.
- B.3. *Equity*: equality of opportunities for all. There should be no digital, economic, social or cultural divides.
- B.4. *Social wisdom*: the creation of a cultural resource of ethical values. The leaders should become a point of reference for society and, by example, engender ethical values (the social rejection of corruption, dishonest behaviour etc.).

To measure these 8 attributes, grouped in the two blocks associated to the human factor (people and society), the indicators included in Table 1 are proposed. For each indicator, a scale of five levels or categories (VG: very good; G: good; M: medium; B: bad; VB: very bad) is defined. The priorities of the attributes and those of the different levels for the scales will be obtained in the near future by means of pairwise comparison, using Thomas Saaty's Analytic Hierarchy Process (Saaty, 1980).

**Table 1:** Attributes for the evaluation of effectiveness in e-governance experiences in the knowledge society

		EFFECTIVENESS
ATTRIBUTES		INDICATORS
P E R S O N S	CONTROL (CO-DECISION)	% assigned to citizens in the final decision
	PARTICIPATION (CO-CREATION)	Clear traceability from participation to the political decisions and policy implementation
		Contribution of participation to citizen engagement in the democratic process / model / environment
		% of participation of the population contributing in the polls
		% of participation of population contributing in the discussions; number of messages emitted
		Number of political representatives engaging in the process, including meetings with the citizens
	FREEDOM (TOLERANCE)	Change in individual preferences
S O C I E T Y	SUBSISTENCE	% censored messages; % ideological intransigent messages
	COHESION	Selection of the best individuals for the management of the systems; satisfaction with political leaders
	EQUITY	Homogeneity of opinions, preferences and norms
	SOCIAL WISDOM	No digital, cultural, economic and social gaps
		Moral values and ethical behavior

#### 4. Case study

##### 4.1 The Cadrete project

In April 2010, the Cadrete Municipal Council, in collaboration with Zaragoza Multicriteria Decision Making Group (GDMZ), implemented a citizen participation project (<https://participa.cadrete.es>) aimed at giving the residents of the municipality a voice in public policy decisions. The issue in question was the design of cultural and sporting policies. There was one objective for the GDMZ: the validation of the methodological and technological tools and two main objectives for the City Council: (i) that decisions on the budget assigned to the aforementioned policies would be conjointly made by the politicians and the citizenry; (ii) that citizens would be encouraged to involve themselves in the debate and take part in the decision making process, and more specifically, that the arguments that supported the decisions would be publicly disseminated.

Participation was encouraged by the incorporation of a new group of actors: the neighbourhood associations. There were therefore three groups of actors that were given different weightings: (i) the *politicians*, with a weighting of 40%; (ii) the *citizens* - 44%; (iii) the local *associations* - 16%. The participants were local residents (on the electoral register) of over 18 years of age (politicians, citizens and representatives of the local associations). There were two voting options: with National Identity Card or with username and password. In accordance with e-cognocracy methodology, there were two voting rounds interspersed by a forum discussion which emitted 61 messages, 37 related to cultural policies and 24 to sport. After finishing the project, participants were asked to complete an on-line questionnaire. Only 24 residents responded and 4 of the replies were invalid. Questionnaires were considered as invalid if: (i) less than 80% of the questions were answered; and (ii) if there was zero variability with regards to the total number of questions (Moreno-Jiménez et al., 2012).

##### 4.2 The effectiveness of the Cadrete e-governance experience

Table 1 includes the attributes and indicators suggested for the evaluation of the effectiveness of e-governance experiences in the Knowledge Society. Unfortunately, these indicators were not available when the Cadrete experience was undertaken in April 2010. At the conclusion of the experience, participants were asked to complete a questionnaire. Based on the proposed framework, an attempt has been made to evaluate the attributes from the items used in the questionnaire – the new indicators are shown in Table 2.

The weighting for the citizens and associations (control) are 44% and 16% respectively. It is worth noting that 100% of the decisions made by the citizens and political associations were implemented. The main purpose of the experience for the City Council was the allocation of the municipal budget for cultural and sports activities. There were two voting options: with National Identity Card or with username and password. In accordance with the e-cognocracy methodology, there were two voting rounds interspersed by a forum discussion, where 61 messages (37 related to cultural policies and 24 to sport) were emitted. The percentage of weighted participation in the polling rounds was 14.96% (2.17% of the census total) in the first round and 17.60% (2.08% of the census total) in the second.

After finishing the project, participants were asked to complete an on-line questionnaire. Only 24 residents responded and 4 of the replies were invalid. Questionnaires were considered as invalid if: (i) less than 80% of the questions were answered; and (ii) if there was zero variability with regards to the total number of questions (Moreno-Jiménez et al., 2012). Finally, 7 meetings were held with all the implicated actors. The learning indicator will be studied (in greater detail) in future works. It should be mentioned that in the Cadrete experience there were no censored or ideologically intransigent messages.

Most of the indicators that reflect the items on 'Society' were taken from the survey. The data are the averages obtained in the questionnaire on a scale of 0-10. The only indicator that was not obtained from the questionnaire, due to its complexity, is 'Cohesion', which will be evaluated in a future work. Scales for the indicators will also be defined and will include five levels or categories (VG: very good; G: good; M: medium; B: bad; VB: very bad). The priorities of the attributes and those of the different scales' categories will be obtained by means of pairwise comparisons, using Thomas Saaty's Analytic Hierarchy Process (Saaty, 1980).

**Table 2:** Indicators for the effectiveness evaluation of the Cadrete's experience

EFFECTIVENESS			
ATTRIBUTES		INDICATORS	CADRETE'S VALUES
P E R S O N S	CONTROL (CO-DECISION)	% assigned to citizens to decide a policy / decision	Politicians: 40%; Citizens: 44%; Asociaciones: 16% Total Citizens: 1949 Total Associations: 15
		Clear trace from participatory endeavour to the political decisions and the policy implementation	100%
		How many people contributed of the participation to citizen engagement in a democracy process	Team research
		How many topics were proposed to implement the participation process	One topic (cultural activities and sport activities)
		% of participation of population contributing in the polls	1st Round: 14.96 % ; 2nd Round: 17.60%
		% of participation of population contributing in the discussions; number of messages	Cultural messages: 61% (37); Sports messages: 39% (24) Cultural comments: 58% (114); Sports comments: 42% (81)
		Number of political representatives engaging, including meetings with the citizens	7 meetings
S O C I E T Y	LEARNING (EDUCATION)	Change of individual preferences	Future work
	FREEDOM (TOLERANCE)	% censored messages; % ideological intransigent messages	0%
	SUBSISTENCE	Under the current system of PC, representatives defend my interests	5.45 (1~10)
	COHESION	Homogeneity of opinions, preferences and norms	Future work
	EQUITY	The Administration informs the society about the decisions made and the existing mechanisms for citizen participation	5.14 (1~10)
	SOCIAL WISDOM	This e-participation experience contributes to a better society	7.73 (1~10)

## 5. Conclusions and future work

The Knowledge Society (KS), can be understood (Moreno-Jiménez, 2003a) as a space for the creativity, imagination, ingenuity and talent of human beings, based on the development of information and communication technologies (ICT). To educate people in the context of the KS, e-governance models should focus on the extraction and diffusion of knowledge related with the scientific resolution of public decisional problems. The democratisation of this knowledge is the main aim of New Public Governance (NPG). Values of a global ambit, such as discussion, dialogue, the search for and dissemination of knowledge, the strengthening of ethical and moral values, learning, accountability, freedom, cohesion, equity, solidarity and education should be promoted in new models of democracies for the KS.

When assessing e-participation experiences, it is important to remember the goals and targets pursued (validation of technological and methodological tools, engagement with the audience etc.). If the evaluation of e-participation in the Information Society concentrates (Aichholzer and Westholm, 2009) on products (efficiency) and processes (efficacy), evaluation in the Knowledge Society deals with the third and most important 'P' of the '3P' perspective (Moreno-Jiménez, 2002): the People.

This paper presents a framework with a set of eight attributes grouped in the two blocks associated to the human factor (persons and society) and their respective indicators for evaluating the effectiveness (added cognitive value) of e-governance experiences in the Knowledge Society and New Public Governance. The attributes associated to the people are: control, participation, learning and freedom; attributes associated to Society are: subsistence, cohesion, equity and social wisdom. In order to evaluate these attributes a number of indicators have been suggested, and, in general, they are valid for any e-governance experience in the Knowledge Society. Due to the fact that the Cadrete experience took place in 2010, these indicators have been adapted to the information extracted from the survey elicited by the participants at the end of the experience.

In the near future, the authors aim to use the framework (attributes and indicators) for the evaluation of the set of e-participation experiences included in the Momentum project. At the same time, the three concepts contemplated in the analysis of the behaviour of systems (efficiency, efficacy and effectiveness) will be integrated into an Analytic Network Process that will allow the incorporation of the interdependencies that exist between them, from the perspective of a holistic vision of reality.

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# **Role of e-Government in the Realization of Knowledge Management at Universities**

**Fattah Nazem and Anahita Madankar**

**Department of Education, Roudehen Branch, Islamic Azad University, Roudehen, Iran**

[nazem@riau.ac.ir](mailto:nazem@riau.ac.ir)

[anahitamadankar@ymail.com](mailto:anahitamadankar@ymail.com)

**Abstract:** An emerging concept of information technology is electronic government (Oberer&Erkollar, 2011). Knowledge management is an important consideration in e-Government portals (Goh, et al, 2008). In addition, universities are social systems which have been known as the centers of knowledge and information, as well as, the thinking base for leading societies. In many countries, universities are centrally run and their budgets are provided by government. Therefore, the government directly interferes in the universities' affairs. In today's complex, competitive world, knowledge management is considered as a competitive advantage for universities. Therefore, in order to realize the knowledge management at universities, it should be first measured through a valid instrument. Consequently, necessary managerial actions should be taken. The purpose of the present study is to validate a scale for measuring the knowledge management of universities. The population of the study included all the employed staff members in all the branches of Islamic Azad University in Iran (i.e., 420 branches and educational centers). The research sample comprised 1906 staff members randomly selected from 86 branches and educational centers using stratified and cluster random sampling methods. The research instrument was Sallis and Jones's (2002) knowledge management questionnaire which consisted of 42 items with ten underlying constructs of vision and mission, strategy, organizational culture, intellectual capital, learning organization, leadership and management, teamwork and learning communities, sharing knowledge, knowledge creation and digital sophistication with Cronbach's Alpha of 0.97. The results of factor analysis and principal components analysis, using a varimax rotation, showed that building blocks of knowledge management include vision and mission (Items 24, 25, 26, 27, 28, 29, and 30), learning organization (Items 38, 39, 40, 41, and 42), teamwork and learning communities (Items 5, 6, 7, and 8), sharing knowledge (Items 11,12,13, and 14), organizational culture (Items 31, 32, and 33), digital sophistication (Items 18,19, and 20), intellectual capital(Items 35, and 36), strategy (Items 24, 25, 26, 27, 28, 29, and 30), and leadership and management (Items 1, and 3). Strategy index has the highest level of contribution to the formation of knowledge management in universities.

**Keywords:** e-government, knowledge management, universities, varimax rotation

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## **1. Introduction and purpose of the study**

Governments around the world usually try to follow their ambitious strategies to become, or stay, competitive (Oberer and Erkollar, 2011). E-Government is a great opportunity for every country to improve the efficiency of public administration and to gain a competitive edge (Seres and Horvat, 2011). There is much literature on e-Government portals and knowledge management, with topics such as the importance of knowledge management in e-Government (Djurickovic, 2012; Jain, 2009; Zaharova & Zelmene, 2004; Harman & Brelade, 2001), and knowledge management strategies for the public sector (Misra et al, 2003). In a rapidly changing business environment marked by globalization, hyper-competitiveness, restructuring, and downsizing, organizations are challenged to leverage the full knowledge and capabilities of their employees in order to create a sustainable competitive advantage. In an interconnected world, where information is abundant and flowing, management practices that determined success in the Industrial Age no longer apply (Skyrme, 2002). Instead of the stability evidenced in the Industrial Age, the Knowledge Age represents an economy where risk, uncertainty, and constant change are the norm rather than an exception (Williams, 2003). Knowledge, vital to an organization because of the actions and consequences to which it leads, is a fundamental key to maintaining and gaining competitive advantage (Davenport & Prusak, 1998). Increasingly, knowledge has been conceptualized as a potential source of competitive advantage for an organization (Davenport & Prusak, 1998; Leonard-Barton, 1995; Prahalad & Hamel, 1990; Schiuma & Lerro, 2008). According to Teece (1998), the importance of knowledge is emphasized as a strategic asset in order to secure the competitive power of organizations. Recognized as a valuable corporate resource, knowledge has been cited as the most valuable resource in creating a sustainable and lasting competitive advantage in the marketplace (Nonaka, et al., 2000).

In today's knowledge economy, tangible assets are clearly transient as they rarely provide a distinct competitive advantage (Frappaolo, 2006; Marr, 2003). Knowledge has become a crucial strategic resource in most organizations as it plays a more important role than tangible assets. Companies are now competing on their ability to create and utilize knowledge (Kipley, et al., 2008; Leonard-Barton, 1995; O'Dell & Grayson,

1998; Stewart 1997). Moreover, Eftekharzadeh (2008) states that effective and efficient knowledge management is a predictor for organizations remaining competitive over time. Since the success of an organization lies more in its intellectual capabilities than its physical assets, the capacity to leverage knowledge is fast becoming a critical advantage. Yet, determining the value of an organization is becoming increasingly complex.

In their book entitled “Knowledge management in education”, Sallis & Jones (2002) offer a useful knowledge management self-assessment checklist with scoring elements such as:

- Vision and mission: It refers to having vision as a knowledge-based organization and sharing it with the stakeholders and the mission as the knowledge creator and translating it into practical strategies.
- Strategy: It refers to developing modeled scenarios and applying them in the management.
- Organizational culture: It refers to the different dimensions of culture including the creating, centralizing, sharing, and recognizing organizational culture as a key competence.
- Intellectual capital: It includes recognizing the value of intellectual assets and codifying its tacit knowledge.
- Learning organization: Under learning organization, organization should create continuous learning, define skills to create new knowledge, recognize EQ and its influences encourage creative thinking, and promote action learning both for individuals and teams.
- Leadership and management: In leadership and management, organizations are required to have senior-management support, have knowledge leaders and managers with appropriate leadership styles, and develop strategies for promoting middle-managers.
- Teamwork and learning communities: Under teamwork and learning communities, organization should encourage learning communities and knowledge teams, establish trust, and recognize the need for intellectual autonomy.
- Sharing knowledge: It signifies that organizations ought to collect, record major organization events, and share new information, and understand competitors’ knowledge management system.
- Knowledge creation: It requires the organizations to recognize new knowledge, those known as experts, and turn it into service.
- Digital sophistication for the organization: In terms of digital sophistication, organizations are to develop technologies among its employees by clear technological architecture, enhancing its knowledge, and devising virtual collaborative systems and/or communities (pp.125-129).

In theory, knowledge management research is still in its infancy with related literature being primarily focused on the importance of knowledge, the rise of the knowledge worker, and the emergence of knowledge-based organizations. In practice, Gartner Group (Harris, 2005) reported that 95% of the 500 fortune organizations have initiated enterprise-wide knowledge-based projects. While organizations have recognized that employee knowledge represents a highly valued, intangible, and strategic asset (Foote et al., 2001), the successful management of this knowledge has also become one of its greatest challenges (Hinds & Pfeffer, 2003; Nonaka, et al., 2001). Henard and McFadyen (2008) indicate that the knowledge management process is increasingly seen as a key to organizational creativity and innovation. Knowledge management initiates within the evolving global business environment, necessitates that organizations shift from a rigid standardized competitive approach, to a more flexible mobilization of human resources located both inside and outside the company (Swart & Kinnie, 2003). In their study, Stevens et al. (2010) found out that knowledge management has the potential to develop strategic advantage and enhance the performance of an organization in terms of productivity and business process efficiency. For this reason, organizations are contributing significant resources to knowledge management; investing in information location and implementing knowledge management processes and systems.

Higher education system is one of the most important and complicated products of human achievements. In addition, universities are social systems which have been known as the centers of knowledge and information as well as the thinking base for leading societies. In many countries, universities are centrally run and their budgets are provided by the governments. Therefore, the government directly interferes in the universities' affaires. In today's complex, competitive world, knowledge management is considered as a competitive advantage for universities in e-Government system. Therefore, in order to realize knowledge management at

universities, it should be first measured through a valid instrument. Consequently, necessary managerial actions should be taken.

Taking knowledge management variable as a guarantee to survive and a competitive advantage for universities, and the lack of a valid measurement tool for knowledge management, and its components at universities were the main motives of the present research. We aimed at designing a valid instrument that identifies the constructs which form the knowledge management, measures the variable of knowledge management in each of the underlying dimensions, and finds a way to strengthen the knowledge management at universities in e-Government portals.

In this study, the research questions are as follows:

- What are the indexes which construct the knowledge management at universities?
- What items are included in each index?
- Which of these indexes has greater contribution to forming the knowledge management?

In other words, the researchers try to find the indexes which construct the knowledge management, investigate which index has the most important role in forming knowledge management at universities, and find a valid instrument through which e-Governments can monitor and strengthen knowledge management at universities.

## **2. Method of the study**

The population of the study includes all the staff members working in 420 branches and educational centers in 14 administrative areas of Islamic Azad University, Iran.

In order to estimate the least volume of the sample,  $n = \frac{z^2 \sigma^2}{d^2}$  formula was used. The basis in the formula was the variance of the knowledge management calculated in other research studies. Regarding the minimum sample required for the staff's group which was estimated at 1906 people, the same number of questionnaires of knowledge management was administered to the members of staff in 86 branches and educational centers. In order to select the research sample, two methods of stratified and cluster random sampling were used.

To assess knowledge management, Sallis and Jones's (2002) knowledge management questionnaire was applied. This questionnaire consists of 42 items which are answered by choosing the alternatives of "strongly agree = 5", "agree = 4", "neutral = 3", "disagree = 2", and "strongly disagree = 1". The questionnaire includes 10 subscales of leadership and management (Items 1, 2, 3, 4, 5, and 6), team work and learning communities (Items 7, 8, 9, and 10), sharing knowledge (Items 11, 12, and 13), knowledge creation (Items 14, 15, and 16), digital sophistication (Items 17, 18, 19, and 20), vision and mission (Items 21, 22, and 23), strategy (Items 24, 25, and 27), organizational culture (Items 28, 29, 30, 31, and 32), intellectual capital (Items 33, 34, 35, and 36), and learning organization (Items 37, 38, 39, 40, 41, and 42). The obtained Cronbach's Alpha was 0.97.

The researchers have used factor analysis and principal components analysis, using a varimax rotation in order to identify the underlying constructs of knowledge management.

## **3. Findings of the study**

The preliminary analysis of different indexes of central tendency, variability, and the distribution of the staff's scores obtained from the questionnaire of knowledge management, and its 10 components show that the distribution of the staff's scores in the given variables have tendency toward normality.

To answer the research questions, factor analysis procedure was applied. The first step in factor analysis process which is also its first assumption is checking the missing data. In this step, the subjects with the following numbers were eliminated from the sample : 38, 71, 185, 231, 240, 252, 438, 467, 478, 555, 606, 628, 664, 681, 758, 885, 895, 927, 1023, 1054, 1132, 1421, 1468, 1507, and 1705. They included 25 persons altogether who were eliminated from statistical analysis so that the factor analysis assumption under the heading of at least missing (0.02) could be observed in each subject. Hence, in this research no item has been

eliminated except eleven subjects. Moreover, the given situation shows that there is no need to omit some of the items and it is possible to follow the process of factor analysis while having all the items. The second factor analysis assumption denotes enough sample size. In this research, Kaiser- Meyer- Olkin (KMO) equals 0.97; consequently, the sample size is sufficient. The third factor analysis assumption is the normality of multi-variation distribution known as sphericity. As the approximate chi square equalled 27100.666 with the 861 degrees of freedom, it can be stated that the amount of the approximate chi square is statistically significant and the given statistics is significant at least at the 0.999 level of confidence ( $\alpha = 0.001$ ).

According to component matrix of items, we can determine both the specific factor of each item and its position in the related factor based on loading factor. Subsequent to studying the table of component matrix precisely, the researcher used rotation method so that loading factor of each item can be determined stressing at recognition of each item in one of the 10 factors. Reiterating that in this research, the researchers have followed exploratory factor analysis, and used principal component methods from extraction of factors, varimax method was applied (Table 1). According to varimax, the researchers were able to determine both the factor to which the item belongs after rotation, and the position of each item in the related factor with reference to loading factor. This table shows each item has been located in which factor after the rotation. For instance, Items 24, 25, 26, 27, 28, 29, and 30 have been located in the first factor (strategy). To fulfill the purposes of the study to determine the indexes of knowledge management and its components, the underlying items, and the index with the highest contribution, eventually, 8 factors have been extracted from rotation of factor analysis; in fact, knowledge management consists of 8 factors respectively as follows: strategy, learning organization, team work and learning communities, sharing knowledge, organizational culture, digital sophistication, intellectual capital and leadership and management. The table also indicates that strategy has the highest level of contribution to the formation of knowledge management at universities. The reason is that, as the first column, that is, strategy factor shows, 7 items with more than 0.5 have been located in this column.

**Table 1:** Rotated component matrix

	factors									
	Strategy	Learning organization	Team work and learning communitie s	Sharing knowledge	Organizational culture	Digital sophistica tion	Intellect ual capital	Leadershi p and managem ent	vision and missio n	know ledge creati on
x1								0.645		
x2									0.884	
x3								0.711		
x4										
x5			0.620							
x6			0.638							
x7			0.635							
x8			0.612							
x9										
x10										
x11				0.684						
x12				0.692						
x13				0.526						
x14										
x15										
x16										
x17										
x18						0.776				
x19						0.659				
x20						0.587				
x21										
x22										

	factors									
	Strategy	Learning organization	Team work and learning communities	Sharing knowledge	Organizational culture	Digital sophistication	Intellectual capital	Leadership and management	vision and mission	knowledge creation
x23									0.866	
x24	0.546									
x25	0.591									
x26	0.596									
x27	0.576									
x28	0.653									
x29	0.640									
x30	0.547									
x31					0.692					
x32					0.696					
x33					0.514					
x34										
x35							0.618			
x36							0.583			
x37										
x38		0.534								
x39		0.609								
x40		0.649								
x41		0.629								
x42		0.539								

Hence, emphasizing the eight-fold factors of knowledge management, items related to each factor have been summarized in Table 2 respectively.

#### 4. Discussion and conclusions

The present research has been a case study done in the context of universities, and the results have been used to obtain principles concerning how knowledge management should be implemented by e-Governments at universities. Nowadays, e-Governments try to implement the strategies which can be effective in the current competitive world. One of the most important strategies which have been confirmed by researchers in this regard is the implementation of knowledge management (Djurickovic, 2012; Jain, 2009; Zaharova & Zelmene, 2004). On the other side, in e-Governments, universities have been recognized as thinking headquarters, because in centralized systems, the university budgets are assigned by the government, it has direct supervision over university's affairs, among which is monitoring the appropriate implementation of knowledge management in universities. Therefore, in order to implement the knowledge management, first, it should be assessed by a valid instrument. Then, the knowledge management is implemented through applying the efficient mechanisms of management and strengthening the indexes of knowledge management.

**Table 2:** Results of Factor Analysis of Knowledge Management Construct

Factors	Index	Items
First Factor	Strategy	24, 25, 26, 27, 28, 29, 30
Second Factor	Learning organization	38, 39, 40, 41, 42
Third Factor	Teamwork and learning communities	5, 6, 7, 8
Fourth Factor	Sharing knowledge	11, 12, 13, 14
Fifth Factor	Organizational culture	31, 32, 33
Sixth Factor	Digital sophistication	18, 19, 20
Seventh Factor	Intellectual capital	35, 36
Eighth Factor	Leadership and management	1, 3

In this study, Sallis and Jones's (2002) questionnaire was employed to assess the knowledge management at universities with underlying constructs of vision and mission, learning organization, teamwork and learning communities, sharing knowledge, organizational culture, digital sophistication, intellectual capital, knowledge creation, strategy, and leadership and management. The research results are in line with findings of Salis and Jones (2002), Motallebi 2010), Dodge (2010), Lajavardi (2011) and Shirzad (2012). They also concluded that knowledge managements' underlying constructs are learning organization, teamwork and learning communities, sharing knowledge, organizational culture, digital sophistication, intellectual capital, strategy, and leadership and management. However, unlike the others, strategy has the highest level of contribution to the formation of knowledge management at universities.

Many recent business trends and initiatives discuss knowledge management and its importance in adding to organizational efficiencies and effectiveness. However, there are few pragmatic examples of how local government organizations can deliver on its strategic objectives through integrating knowledge management in their work environments (Heneghan, 2010). E-Government is concerned with creating better service delivery to citizens and businesses (Curtin & Sommer, 2004). One of the elements that can improve public service delivery is the implementation of knowledge management. In e-Government systems, knowledge management needs arise basically from the interaction with the members of the public and the need to respond to users' inquiries. When the government invites interaction, or transactions, citizens and businesses ask for faster and effective solutions for their problems that need to be handled by knowledgeable people, or by a well-informed system. On the other hand, in practice, knowledge management is required to be held for successful e-Government projects, and it is essential for government agencies to share, acquire, internalize and externalize knowledge through e-Government projects (Saracoglu, 2011). The importance of applying the knowledge management in an e-Government is demonstrated in studies carried out by Jain (2009), Manuel (2005), and Djurickovic (2012). In today's knowledge economy, tangible assets are clearly transient as they rarely provide a distinct competitive advantage (Frappaolo, 2006). Knowledge has become a crucial strategic resource in most organizations, as it plays a more important role than tangible assets. Moreover, Eftekharzadeh (2008) states that effective and efficient knowledge management is a predictor for organizations remaining competitive over time. Since the success of an organization lies more in its intellectual capabilities than its physical assets, the capacity to leverage knowledge is fast becoming a critical advantage. Yet, determining the value of an organization is becoming increasingly complex.

Higher education is an enterprise of human beings (Liebmann, 1986, p. 14) where technology and service delivery are primarily driven by human resources (Jensen, 2006). Thus, an innovative organizational climate that maximizes the potential of its members may be a viable option for an enhanced work environment where employees feel empowered to try out new ideas (Siegel & Kaemmerer, 1978), and ultimately, may become important to the long-term survival of colleges and universities in today's increasingly competitive environment (Jensen, 2006). The resource-based view suggests that the potential to transform it into skilled action provides a firm with competitive advantage (Drucker, 1999).

Since, in the present research, the factors of learning organization, teamwork and learning communities, sharing knowledge, organizational culture, digital sophistication, intellectual capital, strategy, leadership and management were shown to have an influential role in the formation of knowledge management at universities, the following recommendations are put forward:

- Knowledge management should be supported by the administrators.
- The culture of continuous learning ought to be fostered.
- Individuals abilities have to be recognized, and appreciated in all the areas through organizing knowledge team.
- New knowledge can be employed to produce goods and services.
- Shaping and preserving a culture that develops knowledge sharing, learning and innovation should be taken into consideration.
- People should enhance their knowledge using advanced technologies.
- The intellectual capital has to be fully used.

With regard to the highest contribution of strategy factor to the formation of knowledge management, it's proposed to model a scenario for the knowledge management of universities, by which effective strategies can be executed to apply the underlying dimensions of knowledge management.

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# E-Democracy at the American Grassroots

Donald Norris<sup>1</sup> and Christopher Reddick<sup>2</sup>

<sup>1</sup>University of Maryland, Baltimore County, Baltimore, Maryland, USA

<sup>2</sup>University of Texas, San Antonio, San Antonio, Texas, USA

[norris@umbc.edu](mailto:norris@umbc.edu)

[chris.reddick@utsa.edu](mailto:chris.reddick@utsa.edu)

**Abstract:** Using data from national surveys conducted in 2006 and 2011, we examine the extent to which grassroots or local governments in the United States have adopted electronic democracy (e-democracy). The results show that few American local governments have adopted e-democracy, particularly meaningful elements in which citizens can actively participate in governmental activities, programs and decision-making. These results are highly inconsistent with the claims of e-democracy advocates. Two important factors account for the lack of e-democracy at the American grassroots: lack of funding and lack of perceived demand. Another important factor may be that early predictions were incorrect. Based on these findings, we would expect that e-democracy at the American grassroots will not be substantially different in the foreseeable future than it is now.

**Keywords:** e-democracy, digital democracy, e-participation, e-Government, local government

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## 1. E-Democracy at the American grassroots

In this paper, we examine empirically whether America's grassroots or local governments have adopted electronic democracy (e-democracy). We do so because since the very early days of electronic government (e-Government), scholars and advocates have argued that e-Government has the potential not simply to deliver governmental information and services online but, more importantly, to produce e-democracy (e.g., Nugent, 2001; Garson, 2004; and Ward and Vedel 2006). Proponents have made numerous claims about the potential of e-democracy, most of which suggest that e-democracy will produce primarily if not solely positive results in such areas as democratic engagement and deliberation, citizen participation in government and politics, and voter turnout in elections (e.g., Meeks, 1997; Baum and DiMaio, 2000; Becker, 2001; Gronlund, 2001; Hiller and Belanger, 2001; and Westcott, 2001; OECD, 2003; King, 2006; Ward and Vedel, 2006; Amoretti, 2007).

## 2. Literature review

For this research, we conducted an extensive review of the e-democracy literature. The great majority of the works we found were speculative or theoretical in nature or address e-Government applications. Very few were empirical. We then reviewed the empirical works to find those that sought hard evidence (e.g., through case studies, surveys, website analyses, etc.) of the existence of e-democracy anywhere around the world. We discuss findings from this review in the following paragraphs. Our review begins with Australia and moves alphabetically to the US and then to multi-national comparative works.

A study by Gibson, et al., in 2008, reported that there was little citizen uptake of e-participation efforts in Australia. The authors also suggested that "...widespread mobilization is unlikely to occur in the near future (111)." Medaglia (2007) found that very few Italian municipal websites provided opportunities for active citizen participation (93 percent did not). In an examination of Korean government websites, Lyu, et al. (2007), discovered low citizen uptake of and demand for e-participation efforts.

Astrom (2004) found that although the elected heads of Swedish municipalities favored aspects of e-democracy, there was little evidence of these initiatives on municipal websites. "As the analysis shows, most local governments "...use the Internet for modernization rather than radical regeneration (111)." Astrom, et al. (2011), found little evidence of e-participation in municipal planning in Sweden, despite the fact that a large fraction of local planning directors said that they favored it.

In a paper about e-Government in Istanbul, Turkey, Akdogan (2010) was unable to identify any significant amount of e-democracy via governmental websites in that metropolis. Similarly, Sobaci (2010) found that the Turkish parliament website offered very little in terms of e-participation. In a web based survey of civil servants in six New Zealand government departments, Baldwin, et al. (2012), found that while civil servants generally had favorable views of e-Government (though not of e-transformation), the actual extent of e-

participation efforts among those agencies was limited. This, the authors argued, "...suggests that 'e-participation' largely remains a method of informing, keeping happy and convincing the public (116)."

After conducting an analysis for the *Local e-Democracy National Project* in the UK, Pratchett, et al. (2005), found that "Despite the existence of a range of e-democracy tools and some significant experience of using them in different contests, the penetration and take-up of e-democracy in the UK, as elsewhere, remains limited (4)." Writing about the effect of the Internet on citizen participation in politics in the UK, Ward and Vedel (2006) reported only a limited impact. Indeed, they cautioned that, based on the extant evidence, "the Internet per se is unlikely to stimulate widespread mobilization or participation... (215)." Polat and Pratchett (2009) reviewed the UK's local e-Government program that operated between 2000 and 2006, which they argued was "...arguably one of the biggest initiatives of its kind in the world (20)," and found that it largely ignored what the authors called online practices of citizenship and instead favored themes of modernization and efficiency.

Studies in the US have similarly failed to find compelling evidence that e-democracy is alive and well in governments there. Using data from a survey of residents of the state of Georgia, Thomas and Streib (2005) categorized citizen visits to government websites as e-commerce, e-research or e-democracy. E-democracy visits were the least frequent. Norris (2006) conducted focus groups with officials from leading edge local governments and found that e-democracy was not a consideration when these governments initiated their e-Government efforts. Moreover, e-democracy was not part of their future planning for e-Government.

After examining planning-related websites among US municipalities with populations of 50,000 and greater, Conroy and Evans-Crowley (2006) found little or no evidence of the use of e-participation tools. Scott (2006) reviewed the websites of the 100 largest US cities to learn if they supported public participation. He found little evidence that these websites supported "...significant public involvement in accordance with direct democracy theory (349)." Finally, D'Agostino, et al. (2011), reviewed the websites of the 20 largest American cities for their practices of e-Government (information and services) and e-governance (participation). They found that information and service delivery predominated and that "...governance applications are only marginally practiced via the Internet. (4)"

A number of comparative studies have been conducted, mostly concerning e-Government and e-democracy initiatives in the US, the UK, European nations, and by the European Union (EU) and the European Commission (EC). Among the earliest such works, Annttiroiko (2001) found that the main thrust of EC e-Government projects was e-service provision rather than active participation. Chadwick and May (2003) studied e-democracy initiatives in the US, UK and EU found that of three possible e-Government models (managerial, consultative and participatory), most initiatives followed the managerial model. They concluded that: "...achievements to date fall short of anything approaching 'electronic democracy' (296)." Certainly 2003 was in the early days in the world of e-democracy, but studies since then have echoed Chadwick and May's findings.

In a review of e-Government in the US and the UK, Needham (2004) wrote that both countries focused primarily on information and service delivery and generally neglected consultation and participation. Zittel (2004) examined the extent of e-democracy in the national legislatures of the US, Sweden, Germany and concluded that while there was evidence of movements toward what he called " more participatory schemes of representation (89)," for the most part the trends were "of a very modest nature and hardly revolutionary in scope (89)." He concluded that "technological modernization and digital parliaments in particular will not automatically push towards new forms of democracy (p. 92)."

Finally, in a broad ranging article on challenges to the study of e-democracy, Chadwick (2009) found, among other things, that most efforts to encourage online participation have drawn very small numbers of participants. He observed that: "...the reality of online deliberation, whether judged in terms of its quantity, its quality, or its impact on political behavior and policy outcomes, is far removed from the ideals set out in the early to mid-1990s (12)."

The principal conclusion that we draw from these empirical studies is that, despite much early enthusiasm, there is little evidence that governments anywhere around the world have not adopted e-democracy --

certainly not in concrete ways that would provide meaningful opportunities for citizen participation in governmental activities, programs and decision-making.

### **3. Research methods**

To produce the data needed for this study, we contracted with the International City/County Management Association (ICMA) to conduct a survey of e-democracy among American local governments. (For readers from outside of the US, the ICMA is a major and highly respected local government association that, among other things, conducts and publishes considerable research for its members.)

Of 2,287 surveys mailed in 2011, 684 local governments responded, for a response rate of 29.9 percent (Table 1). This response rate is consistent with other recent surveys recently conducted by the ICMA at around 30 percent, although lower than the response rate of 36.8 percent 2006 survey.

### **4. Findings**

We begin by examining the extent to which responding governments had implemented one or more of several possible e-participation activities (Table 1). The first and most important finding from these data is that very few local governments had undertaken any of these e-participation activities. Second, most of the e-participation activities that the governments had undertaken did not provide much, if any, opportunity for meaningful citizen participation, at least by our definition.

**Table 1:** Has your local government has done any of the following electronically within the past 12 months?

	2006		2011	
	Number	Percent	Number	Percent
<b>One-way</b>				
Enabled citizens to view a hearing or meeting	-	-	447	68.3
Enabled citizens to post comments	-	-	322	49.9
Enabled citizens to participate in a poll or survey	-	-	315	47.9
Straw polls	61	8.7	-	-
Web surveys	180	25.2	-	-
<b>Two-way</b>				
Enabled citizens to participate in a hearing or meeting	-	-	128	19.8
Formal public hearings	76	10.7	-	-
Informal public hearings	60	8.5	-	-
Public consultations	47	6.7	204	31.8
Non-narrated or guided discussion forums	49	7.0	104	16.0
Narrated or guided discussion forums	45	6.3	96	14.7
Enabled citizens to vote in an election or referendum	-	-	51	7.9
Referenda	17	2.4	-	-
Conducted electronic town halls	-	-	33	6.1
Citizen petitions	17	2.4	35	5.4
Voting for local elected officials	14	2.0	-	-
Chat rooms	9	1.3	33	5.1

Note: Blank spaces indicate that the question was not asked in that year.

Only one e-participation activity had been implemented by more than half of the governments responding to the 2011 survey (enabling citizens to view a hearing or meeting, 68.3 percent – not asked in 2006). While an adoption rate of this magnitude might appear impressive, merely viewing a hearing or meeting hardly constitutes meaningful citizen participation. Far fewer governments (only one in five, 19.8 percent) enabled active citizen participation in meetings or hearings. This does, however, represent a substantial increase over 2006, when fewer than half that number said that they conducted formal (9.8 percent) or informal (10.7 percent) public hearings electronically.

Two activities approached half of local governments reporting. The first, enabling citizens to post comments (49.9 percent), was not asked in 2006. The second, enabling citizens to participate in a poll or survey (47.9 percent), was asked in 2006, when a quarter of governments (25.2 percent) said that they had conducted web surveys. Assuming that the different wording of the questions on the two surveys did not elicit greatly differing answers, the number of governments indicating that they conduct polls or surveys nearly doubled between 2006 and 2011. Posting comments and responding to surveys or polls represents a type of active citizen participation, but it this is one-way communication (citizen to government). As such, we cannot know the extent to which comments and survey responses actually produced meaningful results. That is, did the receiving governments use the comments and survey results? Thus, even though nearly half of governments reported adopting these e-participation activities, the activities themselves do not permit two-way participation.

Next in order of frequency, nearly one in three governments (31.8 percent) had implemented online public consultations by 2011, and public consultation represents a meaningful method of active citizen participation. Moreover, the adoption of consultations increased substantially from 2006, when only 6.7 percent of governments reported them. Of the six remaining activities, none had been implemented by more than 20 percent of governments, of which three had been adopted by fewer than 10 percent.

We also asked whether local governments had future plans for undertaking e-democracy activities. If adoption rates of these activities were low, local government plans for future adoptions were abysmal (Table 2). Here, planned adoptions rose above 10 percent of governments in 2011 for only one of the listed activities (enable citizens to view a hearing or meeting, 13.3 percent). Fewer than 10 percent of governments reported plans to adopt each of the remaining activities. These data suggest that there is unlikely to be much change in the current pattern of e-participation among American local governments in the foreseeable future.

**Table 2:** Does your local government have any concrete plans for doing any of them electronically within the next 12 months?

	2006		2011	
	Number	Percent	Number	Percent
<b>One-way</b>				
Enable citizens to view a hearing or meeting	-	-	87	13.3
Enable citizens to post comments	-	-	64	9.9
Enable citizens to participate in a poll or survey	-	-	64	9.7
Conduct straw polls	24	3.4	-	-
Conduct web surveys	74	10.3	-	-
<b>Two-way</b>				
Enable citizens to participate in a hearing or meeting	-	-	30	4.6
Conduct an informal hearing	28	4.0	-	-
Conduct a formal hearing	36	5.1	-	-
Conduct public consultations	24	3.4	42	6.5
Conduct a non-narrated or guided discussion forum	31	4.4	18	2.8
Conduct narrated or guided discussion forums	38	5.3	32	4.9
Enable citizens to vote in an election or referendum	-	-	11	1.7
Conduct referenda	12	1.7	-	-
Conduct town halls	-	-	15	2.8
Permit or facilitate citizen petitions	12	1.7	8	1.2
Facilitate or operate a chat room	11	1.6	9	1.4
Voting for local elected officials	14	2.0	-	-

Note: Blank spaces indicate that the question was not asked in that year.

Next we inquired about why local governments engage in e-participation projects and activities (Table 3). We did not ask this question in 2006. The great majority (82.5 percent) responded that it was “the right thing to

do." Although the survey instrument did not delve into the meaning, we suspect that doing the right thing is driven by both professional norms and a public service motivation.

**Table 3:** Local government engagement in e-participation projects and activities (2011 only)

Why does your local government engage in e-participation projects and activities?	Number	Percent
Demanded or required by local elected officials	236	43.3
Demanded or required by top administrators	238	43.8
Demanded by citizens	176	32.3
Demanded by local interest groups that have clout in the community	54	9.9
It is the right thing to do	449	82.5
To keep up with other local governments in our area or peer local governments elsewhere	179	32.9
Other	80	14.7

Slightly more than four in ten governments said that both top local administrators (43.8 percent) and local elected officials (43.3 percent) demanded e-participation. About one third (32.3 percent) said demand by local citizens.

Next we asked (in the 2011 survey only) whether these governments' e-participation projects were mostly one-way from governments to citizens or mostly citizen to government (Table 4). The great majority of governments (71.0 percent) said mostly one-way, from government to citizens. Only 2.9 percent said mostly citizen to government, while about one-quarter (26.0 percent) said a combination of one- and two-way.

**Table 4:** What best describes the extent to which your local government's e-participation projects and activities today mostly involve communication from the local government to citizens or mostly involve communication from citizens to the local government? (2011 only)

	Number	Percent
Mostly government to citizen	183	33.3
Somewhat government to citizen	207	37.7
A mix of both, about half and half	143	26.0
Somewhat citizen to government	7	1.3
Mostly citizen to government	9	1.6

To help understand why so few local governments had adopted e-democracy, we asked about barriers to adoption (Table 5). The top four barriers, all of which were reported by greater than a majority of governments, were lack of funding (83.5 percent – up eight percent from 2006); need to upgrade technology (69.6 percent – up seven percent); lack of technology staff (60.7 percent – down nearly three percent); and concerns about the digital divide (55.7 percent – up nine percent). The second and third of these barriers are directly related to the first, funding.

The survey also asked about whether local elected officials and local administrators promoted e-participation (Tables 6 and 7). Answers here could also be important to understanding why local governments have adopted so few e-participation activities. We asked the respondents to answer based on a scale of 1 to 5, with 1 meaning no promotion of e-participation and 5 meaning active promotion. For ease of analysis, we collapsed responses 1 and 2 to mean little or no promotion, 3 to mean some promotion, and 4 and 5 to mean very active promotion.

Three in 10 respondents (30.9 percent) to the 2011 survey said elected officials actively promoted e-participation (up 8.7 percent over 2006); a similar fraction (31.1 percent) said that elected officials promoted it some (up 2.9 percent); and 38.0 percent said these officials did not support e-participation (down 11.5 percent). More than four in 10 respondents (43.6 percent, up 8.6 percent over 2006) said that appointed officials actively supported e-participation; one-third (32.2 percent) promoted it some (up 3.2 percent); and one-quarter (24.1 percent) did not promote it (down 11.6 percent).

**Table 5:** Barriers

	2006		2011	
	Number	Percent	Number	Percent
Lack of funding	504	75.7	515	83.5
Need to upgrade technology infrastructure	408	62.2	403	69.6
Lack of technology staff	419	63.3	359	60.7
Concerns that the digital divide would prevent participations by some citizens	290	47.2	299	55.7
Concerns that unrepresentative groups would dominate e-participation channels	188	31.4	263	49.3
Difficulty justifying the cost of e-participation applications	-	-	259	48.2
When we have provided opportunities or mechanisms for e-participation, few citizens participated	173	30.9	247	47.8
Issues around security	335	53.9	262	47.1
Lack of demand by citizens	396	60.3	257	45.8
Lack of technology expertise	265	41.7	240	42.9
Issues around privacy	267	44.1	227	42.5
Lack of demand by elected officials	377	57.7	233	42.1
Lack of demand from elected officials	169	27.7	190	36.5
Lack of information about e-participation applications	-	-	169	32.9
Inadequate bandwidth	-	-	142	27.0
Lack of support from top administrators	-	-	68	13.0

Note: Blank spaces indicate that the question was not asked in that year.

**Table 6:** Do elected officials in your local government actively promote or give attention to e-participation?

	2006		2011	
	Number	Percent	Number	Percent
Don't promote, give little or no attention to	363	49.5	243	38.0
Promote some, give some attention	207	28.2	199	31.1
Actively promote, give great attention	163	22.2	198	30.9

**Table 7:** Do top appointed officials in your local government actively promote or give attention to e-participation?

	2006		2011	
	Number	Percent	Number	Percent
Don't promote, give little or no attention to	260	35.9	152	24.1
Promote some, give some attention	210	29.0	203	32.2
Actively promote, give great attention	253	35.0	275	43.6

Finally, we wanted to know whether these local governments perceived any citizen demand for e-participation (Table 8). This, too, could be important to an understanding of why so few local governments had adopted e-participation. Here we asked whether citizens or grassroots organizations actively pushed for e-participation opportunities. We asked the respondents to answer based on a scale of 1 to 5, with 1 meaning no citizen demand and 5 meaning significant citizen demand. For ease of analysis, we collapsed responses 1 and 2 to mean little or no citizen demand, 3 to mean some citizen demand, and 4 and 5 to mean significant citizen demand.

The data suggest a slight trend in the direction of greater citizen demand, but the trend is so small that it could be an artifact of the survey, rather than an indication of anything substantive. The percentage of governments indicating the existence of significant citizen demand nearly doubled between 2006 and 2011, but only from

4.4 percent to 8.2 percent (still minuscule). Those indicating no citizen demand diminished slightly (from 79.8 percent to 72.5 percent). "Some" citizen demand remained at around three in 10 respondents (29.0 percent in 2006 and 32.2 percent in 2011).

**Table 8:** Are citizen grass-roots groups or organizations actively pushing for e-participation opportunities within your local government?

	2006		2011	
	Number	Percent	Number	Percent
No grassroots demand	583	79.8	464	72.5
Some grassroots demand	115	15.8	124	19.4
Significant grassroots demand	32	4.4	52	8.2

These results are highly consistent with results from previous questions in the survey – only 32.9 percent of governments said that they adopted e-participation activities due to citizen demand; 45.8 percent of governments said that lack of citizen demand was a barrier to the adoption of e-participation; and 47.8 percent said that lack of citizen uptake was a barrier. This finding is also consistent with other studies, as reported in our literature review that found that few citizens actually participate in e-participation programs and projects.

## 5. Conclusion

Perhaps the most striking finding from this study of e-democracy at the grassroots is that few American local governments have adopted e-participation and those that have been adopted, for the most, have not involved meaningful citizen participation. These findings are highly consistent with the results of other empirical studies of e-democracy around the world that we reported in our literature review.

Data from the 2011 survey strongly suggest two explanatory factors: lack of funding and lack of demand. Evidence from other research suggests yet a third possible explanation – the early writings that suggested that e-democracy would evolve naturally from e-Government were wrong.

First, the responding governments cited lack of funding as the most frequently barrier to their adopting e-participation. This was also the most frequently cited barrier in the 2006 survey. Respondents also cited the need to upgrade technology, lack of technology staff, difficulty justifying costs, and lack of technology expertise as barriers – all of which are directly related to lack of funding. This finding is also consistent with surveys of e-Government at the American grassroots, where lack of funding nearly always tops the list of barriers to adoption (e.g., Coursey and Norris, 2008).

A second important reason for the lack of local e-democracy in the US may well be lack of demand – from local officials and citizens. When asked specifically about barriers to e-participation, 42.1 percent of local governments cited lack of demand by elected officials. When asked if local appointed officials promote e-participation, a plurality of governments (38.0 percent) reported that elected officials do not support or promote e-participation, and a slightly smaller fraction (31.1 percent) said that these officials provided only "some" support. Only 30.9 percent said that elected officials actively promoted e-participation. Nearly equal proportions of respondents said that local appointed officials did not promote (47.3 percent) or did actively promote e-participation (43.6 percent), while one-third (32.3 percent) said that appointed officials provided some support.

When asked about barriers to adopting e-participation, 47.8 percent of governments said that when they had provided opportunities for e-participation, few citizens had participated. Nearly as many (45.8 percent) cited lack of citizen demand specifically as a barrier. When asked about citizen demand for e-participation, nearly two thirds (72.5 percent down only 7.3 percent since 2006) said there was little or no grassroots demand, while only 8.2 percent said that there was significant demand.

Third, the literature on e-Government increasingly points to the probability that early predictions for e-Government were simply wrong. In part, they were based on a lack of or an incomplete understanding of the prior relevant literature related to this subject (Coursey and Norris, 2008; Kraemer and King, 2006; and Danziger and Andersen, 2002). Another reason why these predictions were incorrect is that they were technologically deterministic (Coursey and Norris, 2008).

Whatever the causes, the reality is that there is very little e-democracy at the American grassroots. Based on the available evidence, we suspect that the state of e-democracy at the American grassroots it is not likely to change much in the foreseeable future (see also, Norris 2010). Moreover, based on our reading of the empirical studies of e-democracy, we strongly suspect that the state of grassroots e-democracy in the US is more similar to than it is different from the state of local e-democracy elsewhere in the world. Clearly, however, further study will be needed to support or reject these suspicions.

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# **Dimensions of the User Experience of e-Government Services: The Nigeria Immigration Service Website**

**Olaseni Muritala Okunola and Jennifer Rowley**  
**Manchester Metropolitan University, Manchester, UK**  
[muri297@gmail.com](mailto:muri297@gmail.com)  
[j.rowley@mmu.ac.uk](mailto:j.rowley@mmu.ac.uk)

**Abstract:** The user experience of e-Government is regarded as important for e-Government adoption and effectiveness, yet there is no agreement as to the dimensions of the user experience. Hence, this study seeks to develop a scale for the measurement of the perceptions of the users' experience of e-Government services. Since there is particular concern regarding the success of e-Government in developing countries, the e-services offered by the Nigeria Immigration Service (NIS) were chosen as the focus for this study. Drawing on various strands of previous research related to the user experience of e-Government and other websites, including research on technology adoption, customer satisfaction and service quality, a broad based research instrument was developed to capture perceptions of the user experience with the NIS website, as well as other key demographic data. In order to facilitate access to service users located in different countries an on-line questionnaire-based survey was conducted, using a snowball sample; 351 completed questionnaires were collected, and analysed using SPSS. All respondents identified themselves as having used the NIS portal, with 50% reporting their main place of residence as being Nigeria, and the remainder being resident in various other countries. Whilst the questionnaire design was informed by previous research in the fields of customer satisfaction and technology adoption, the exploratory factor analysis generated an e-Government user experience scale that both confirmed the importance of some dimensions identified by other researchers, and identified new factors. Factors identified were: security and support, content and information, ease of use, benefits, barriers, convenience, trust and website quality. Findings are discussed with reference to previous research and recommendations for practice and further research are offered.

**Keywords:** e-government; Nigeria; immigration services; citizen satisfaction; security and support; user experience

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## **1. Introduction**

Governments worldwide have introduced e-Government and e-service practices in order to reduce costs and make their operations more efficient, and to provide prompt service, improve quality of service, remove barriers to government services, tackle social exclusion, and provide local access points (Praeg and Spath 2010). Typical applications include information provision, downloading of forms, interaction, service delivery, and e-democracy (Ajeeli and Al-Bastaki 2010). The need to encourage citizen adoption of e-Government services has led to an increasing interest in the evaluation of e-Government services, and the development of a body of research and practice and instruments and tools that support the examination of the factors that influence the user experience. This research is informed by a variety of prior theories, including the Technology Adoption Model (TAM), Roger's diffusion of innovation theory (DOI), and work on service quality and customer/citizen satisfaction that builds on models such as SERQUAL, and its variants for e-services, such as E-S-QUAL, SITEQual, and .comQ. This research aims to draw on research within these various traditions to develop a holistic scale to measure the e-Government user experience. In addition, this study also contributes to the limited research into user engagement with e-Government in developing countries.

The next section of the paper outlines previous research in the area of the evaluation of e-Government services, with specific reference to the factors identified by previous researchers as contributing to the user experience. The methodology section next explains the design of the data collection instrument, and the processes associated with the online survey and data analysis. The Findings section reports on the Exploratory Factor Analysis conducted to develop the E-Government Experience Scale, and the Discussion section considers this scale with respect to earlier research. Finally, Conclusions and recommendations summarise the contribution of the research and make recommendations for further research.

## **2. Literature review**

### **2.1 Previous factors identified as contributing to the user experience of e-Government**

The need to encourage citizen adoption of e-Government technologies has led to an increasing interest in the evaluation of e-Government services, often in terms of citizen or customer satisfaction and notions of e-

Government service quality and impact (Colesca and Dobrica 2008; Yaghoubi et al. 2011). Halaris et al (2007) classify the approaches to measuring the quality of e-Government into three categories concerned respectively with: the quality of traditional public service (e.g. balanced scorecard and six sigma); the quality of e-Government services (e.g. the American Customer Satisfaction Index (ACSI); and the quality of e-services (e.g. E-S-QUAL, E-Qual, E-service quality). Halaris et al. (2007) suggest the following criteria as being commonly, but not always used in the studies that they reviewed: service reliability, personalisation, information/content, navigation/accessibility, security, and system performance. Similarly, Rowley (2006) identified the feature that researchers have identified as contributing to e-service quality as being: site features, security, communication, reliability, customer support, responsiveness, information, accessibility, delivery and personalisation. Others have used TAM and/or DOI as the basis for their study. For example, Carter and Belanger (2005) based their study on TAM and DOI, and found that the following factors were important in e-Government adoption: perceived ease of use, compatibility and trustworthiness. Together, these approaches to research on the user experience and response to e-Government have generated a wide range of different variables for consideration for inclusion in this research.

In addition to grounding our research on previous measurement scales we have also drawn on the literature on the benefits or and barriers to the adoption and intention to use e-Government services. Gilbert, Balestrini and Littleboy (2004) argue that it is important to consider both the positive and the negative factors that influence adoption. Previous literature suggests that the major benefit of developing an e-service strategy both within businesses and the public sector is that it enables the organization to communicate with the customer according to their preferences and environments needs (Reddick 2010 p.97). Indeed, several authors have discussed user empowerment and control (Meuter et al. 2000; Liao and Cheung 2002; Zhu et al. 2002). However, there is also some evidence that users believe they benefited from savings in cost (Liao and Cheung 2002) and time (Liao and Cheung, 2001, 2002; Meuter et al., 2000). On the other hand, according to Idowu et al (2009), there are some major barriers to successful e-Government related to availability of technology. In addition, another important barrier is citizen's reluctance to trust e-Government services, and associated concerns regarding privacy, information quality and financial security concerns (Dibbell 2012; Gilbert et al. 2004; Parker 2011).

## **2.2 E-Government in developing countries**

Grigoroudis and Siskos (2009) identify one of the possible reasons for the variations between the different customer satisfaction and e-service quality models when they suggest that each model has arisen in and is most suited to a specific context. This suggests that context is important, both in terms of the characteristics of potential users and in terms of the specific systems being measured. Lindgreen (2010) argues for more exploration of e-Government in different contexts. In addition, there is evidence that more research is needed on e-Government in developing countries. For example, Dwivedi (2009) recognizes the importance of e-Government to developing countries and its potential impact on the rate of development, whilst, on the other hand, Reddick (2010) argues that governments within developing countries have failed to provide e-services effectively due to a lack of achievement of pre-defined goals and benefits. Hassan et al (2011) in their recent review of e-service on the public sector, suggest that '*Little work has been done to offer helpful and practical guidance for e-service in the public sector/e-Government in the developing countries*' (p. 538).

## **3. Methodology**

### **3.1 Research context**

This study is conducted in the context of the e-services offered by the Nigeria Immigration Service (NIS). This context has been chosen because there is a dearth of research on e-Government in developing countries, which have been recognised to face both implementation and adoption challenges with regards to e-Government (Hassan et al 2011; Reddick 2010). The NIS e-services are of particular interest because they are accessed by both citizens and non-citizens and people whose main abode may be either inside Nigeria or elsewhere. In addition, the web site both offers information and supports transactions and unlike some other e-Government services, if the user wishes to move in and out of Nigeria, there is no choice as regards adoption, so evaluation can only be conducted in terms of satisfaction with the user experience. Importantly, whilst there is evidence that Nigeria is facing significant challenges in the implementation of e-Government, the NIS is acknowledged to be one of the few successful e-Government implementations in Nigeria. The Nigerian Immigration Service (NIS) controls and monitors the entry and exit activities in Nigeria. It has

developed the e-services to support information distribution among citizens, form processing and financial transactions, including online payment for new passports, passport renewal, visa application and processing and the processing of various other entry permits (Kanat and Ozkan 2009).

Despite the potential importance of e-Government to Nigeria, there is very little research that considers the user experience of e-Government in Nigeria. One exception is the study conducted by Kazeem (2011) which raises some serious concerns regarding personal privacy, possibility of fraud and crime, insecure cookies, and unauthorized access to personal information.

### **3.2 Research approach**

This study adopted a quantitative, survey-based research design, in order to identify the factors that contribute to the user experience of e-Government services and to develop a measurement scale of the user experience of e-Government. A quantitative approach is regarded as useful for profiling a situation and investigating the relationships between variables (Oppenheim 1992). In addition, an online questionnaire based survey was particularly appropriate for this study since potential respondents are scattered across the globe and given the potential diversity of the population a reasonably large sample was judged to be necessary (Cresswell 2009).

### **3.3 Questionnaire design**

A questionnaire is a research instrument that contains a series of systematically placed questions in order to extract the desired responses from the respondents and to measure the research variables (Oppenheim 1992). In order to identify the key factors to be included in the questionnaire for this study and their associated items, a database of items used by a wide range of previous studies, including those in the technology adoption, diffusion of innovation, customer satisfaction and service quality traditions was collated. Duplicates of items were eliminated and minor variants consolidated. The process was made easier by the extent of re-use or adaption of items from earlier studies, by previous researchers. Items were clustered under factors. Items were selected and adapted in accordance with the context of the study, the NIS. Table 1 shows the variables included in the questionnaire, together with the number of items included to measure each variable and the prior research that has informed the inclusion of the variable and the design of the items or questionnaire statements. These items were framed as statements with accompanying 5-point Likert scales (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). Closed questions, with categories to suit the research and where appropriate, taking into account previous research were developed to collect demographic data including gender, age, education, income, employment sector, abode (country of permanent residence), and localisation (rural or urban dwellers). Questions were also included on previous experience with information technologies and with e-Government services.

The online survey was designed in such a way that respondents could not proceed to other pages of the questionnaire without completing all of the questions on the current page; this helped to minimize any potential problems with missing data. In addition, the questionnaire screened out the participant if they have never used the NIS e-services. The questionnaire was piloted to remove any inconsistencies and to confirm the wording, structure and design of the questionnaire. Piloting also offered insights into the responses to the questionnaire and its comprehensibility (Oppenheim 1992).

### **3.4 Data collection and profile of respondents**

A questionnaire-based online survey was conducted using an online survey website to capture data. The online survey was made available for nine weeks and respondents directed to the survey by e-mail. An initial and two reminder e-mails were sent to each identified respondent. Respondents were identified and contacted via snowball sampling. 351 completed questionnaires were returned.

All respondents confirmed that they had used the NIS website. The sample was split 50:50 with regards to gender and place of residence (Nigeria v Other). Of the respondents not living in Nigeria, the largest groups were living in United Kingdom (22.5%), United States (9.1%) and Canada (4.3%). All respondents were in the age range of 18 to 65 years and were fairly evenly distributed between age categories. Education levels varied, but the sample was relatively well educated, with 67% having a Bachelor's degree or above, 17% having a Higher Diploma and 9% having a Diploma. In terms of employment status, the distribution was: public sector

(16.5%), private sector (32.8%), self-employed (23.9%), unemployed (6.3%), retiree (0.9%) and students (19.6%). Respondents classified themselves in terms of income as: low income earners (44.2%), medium income earners (33.3%) and high income earners (22.5%).

**Table 1:** Key variables included in the questionnaire

Questionnaire variables	Number of Items	References
Ease of Use	10	Davis et al. (1989), Hung et al. (2006), Wangpipatwong et al. (2005, 2008), Mohammed et al. (2009),
Information Quality	10	Eldon (1997), Aladwani and Palvia (2002), Hung et al. (2006), Barnes and Vidgen. (2007), Wangpipatwong et al. (2005, 2008), Mohammed et al. (2009), Karunasena, and Deng (2012)
Benefits	11	Parasuraman et al. (2005), Wangpipatwong et al. (2005, 2008), Shareef et al (2011)
Barriers	11	Sweeney et al. (1999), Zhang and Prybutok (2005), Udo et al (2008)
Trust	11	McKnight et al., (2002), Hu et al. (2009), Shareef et al (2011), Papadomichelaki and Mentzas (2012)
Website Quality	10	Yoo and Donthu (2001), Wolfinbarger and Gilly (2002), Zeithaml (2002), Parasuraman et al. (2005), Zhang and Prybutok (2005), Udo et al (2010), Shareef et al (2011)
Satisfaction	9	Davis, (1993), Olorunniwo et al. (2006), Zhang and Prybutok (2005), Udo et al. (2010), Hu et al (2009)

### 3.5 Data analysis

Data was loaded into SPSS 19.0 for analysis. First, data was cleaned to remove any incomplete or inaccurate responses. Next, negatively worded items were re-coded. Descriptive statistics were then generated both to profile the sample in terms of demographic data and to generate descriptive statistics for inspection prior to undertaking further analytical data analysis. Finally, data relating to the statements designed to collect perceptions of user experience with the NIS website were subjected to Exploratory Factor Analysis, using Principal Components Analysis, in order to eliminate items from the measurement scale and to identify the dimensions of the user experience in the context of the NIS website

### 4. Findings

Exploratory Factor Analysis was chosen for the creation of a measurement scale as this tool is suitable in complex sets of data for identifying the correlation among variables (Pallant 2010). The user experience statements were subjected to Principal Component Analysis (PCA).

Prior to conducting the PCA, the suitability of the data for this test was assessed through various means. Pallant (2010) recommends that Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be above .6 and Bartlett's Test of Sphericity value is significant and should be .05 or less to show that data set is suitable for factor analysis. In this analysis, Kaiser-Meyer-Olkin Measure of Sampling Adequacy value is .917 and Bartlett's Test of Sphericity value is significant at .000 and which confirmed the data set used is suitable for factor analysis.

Kaiser's criterion was applied and only the factors that have eigenvalues of 1.0 or more were retained; the scree plot test was used to validate the number of retained factors. The Cronbach's Alpha for each factor was calculated to ensure that scales are reliable and consistent and to ensure all the items measured the same underlying construct (Pallant 2010). The factors' Cronbach's Alpha coefficients range from .931 to .859 which shows each factors' scale to be either very good to excellent; Hair et al. (2007 pg. 244) recommends that Cronbach's Alpha coefficients should be at least .7. Once the number of factors is decided, the next step is to rotate the factors. In this study the rotation used was Varimax with Kaiser Normalisation. The Pattern Matrix showed a clear structure with meaningful strong loadings of variables onto only one component for most of the components. However, we have removed ten items because they do not load sufficiently strongly onto any specific factor. We have then named the factors in accordance with the items that load onto them and in Table 2 present the user experience scale developed by this research.

**Table 2:** E-Government user experience scale

Security and Support	PBr5	I worry about my financial details being stolen
	PBr6	I have no negative reason not to use NIS website
	PBr7	I worry about safe transactions online
	PBr8	I worry about my personal information being used by others
	WSQ3	The NIS website well designed compared to other e-Government websites that I have used
	PBr10	There is lack of technical support while using NIS website
	WSQ2	Technical support available at the NIS website is as good as other e-Government website used
	PTr3	The NIS website security policy is clearly stated and accessible to the users of the website to read
	PBr3	It is difficult to seek technical support from NIS website team
Ease of Use	EoU2	I find that using e-services at the website of the NIS is easy
	EoU4	I find that navigating around the NIS website is easy
	EoU5	I find that the NIS website is user friendly
	PIQ4	The NIS website layout makes it easy for me to find things at first sight
	EoU7	I feel comfortable using the NIS website
	EoU8.	I find that obtaining information from the NIS website for my needs is easy
	EoU9	I find that completing transactions on the NIS website is easy for me
	EoU10	I do not consider the NIS website to be user friendly
Content and Information	PIQ1	There is adequate information on the NIS website for me to process any transaction
	PIQ2	The content of the NIS website is useful for my purpose
	PIQ3	The information on the NIS website is up to date
	PIQ5	The NIS website provides detailed information on the services available
	PIQ6	I do not consider the information on the NIS website as accurate
	PIQ7	The information on the NIS website are reliable
	PIQ8	The NIS website provides information in an appropriate format
	PIQ9	There is sufficient information on the NIS website for me to make a transaction decision
	PIQ10	The information on the NIS website meets the needs of both citizen and non-citizen
Perceived Trust	PTr1	The NIS website is safe to conduct financial transactions
	PTr2	The NIS website provides adequate measures to protect my financial details (credit or debit card)
	PTr4	I am happy to provide my personal information at the NIS website
	PTr5	The NIS website protects my disclosed personal information
	PTr7	The information that I give on the NIS website is only used for the reason for which it is submitted
	PTr8	My information is only accessed by the authorised person
	PTr9	The NIS website has a good reputation
	PTr10	I feel confident that I can rely on transactions conducted through the NIS website
	PTr11	I feel confident that the NIS will meet their obligations for transactions conducted through their website
Perceived Benefits	PBn4	Making use of the NIS website reduces my travelling expenses
	PBn5	Making use of the NIS website reduces my queuing time
	PBn6	I do not consider NIS website of any benefit to me
	PBn9	Making use of the NIS website improves the effectiveness of my visa / passport application
	PBn10	Making use of the NIS website simplifies my visa / passport application processing time
Perceived Barriers	PBr1	It is costly to have internet access in order to use government e-services
	PBr2	An intermittent electricity supply makes it difficult for me to use NIS e-services
	PBr4	Lack of access to a computer results in extra cost in using NIS website e-service
	PBr9	Using NIS website to apply for passport or visa may cost me more
Convenience	PBn1	I am able to use NIS e-services at a time that suits me
	PBn2	I am able to use NIS e-services from anywhere in the world

	PBn3	I am able to accomplish tasks more quickly using NIS website compare to face-to-face service
	PBn11	Making use of the NIS website reduces the time associated with my initial enquiry
Website Quality	WSQ4	I always have problems using the NIS website
	WSQ5	It is a very pleasant experience using the NIS website
	WSQ6	The NIS website adequately meet my needs of interaction with the government agency
	WSQ7	I feel adequately informed when using the NIS website
	WSQ10	I feel empowered when using the NIS website

## 5. Discussion

Our scale demonstrates the value of taking a holistic perspective to the user experience of e-Government, in that our scale embeds factors from the different perspectives on the evaluation e-Government websites. For example, the factors, barriers and benefits, have primarily been discussed previously in the context of the technology adoption literature. On the other hand, factors such as ease of use and website quality, typically associated with the service quality literature are also shown to be important. However, we also surface two new and one re-affirmed dimensions of the e-Government user experience: security and support, convenience and content and information, the first two of which have drawn items from item sets previously associated with other factors. In each case, there is some previous evidence to suggest that these factors are important, but these factors have not previously consistently been included in scales for measuring the user experience.

In the case of security and support, there is previous evidence that technical support provided by e-Government websites can significantly affected the user experience of the e-Government website (Kotamraju and van der Geest 2011; Law and Sun 2012). More specifically, the provision of the technical support effects the perception of credibility of citizens related to the use of services (Bertot et al. 2008) and may therefore have links to trust and perceptions of security. Support may be another incarnation of service reliability, which is identified by Halaris et al. (2007) as being present in many of the scales associated with e-Government or e-service quality. Security is also identified by Halaris et al (2007), and Rowley (2006) as being included in a number of existing scales. Colesca (2009) also suggests that security and privacy issues have hindered the user experience concerning the e-Government websites. Others have also commented on users of the e-Government websites concerns that arise form their perceptions that of risks in online financial activities (Dibbell 2012; Parker 2011). Perhaps the most interesting outcome from our study is that security and support load onto one factor. In addition, security and privacy would appear to be of particular concern in the context of Nigerian e-Government services (Kazeem 2011).

The other new dimension is that of convenience. Convenience emerges as a separate dimension, but composed entirely of items that have previously been clustered under the more general dimension of benefits. Again, others have commented on the importance of convenience and the ability for the users to be able to use the e-Government services how, when and where they want it (Cabinet Office 1998; Meuter et al. 2000; Zhu et al. 2002; Szymanski and Hyse 2000). According to Kim, Kim and Lennon (2006), convenience has a significant effect on customer satisfaction with the e-Government experience and should not be ignored.

Finally, Content and Information is grounded on items previously associated with information quality in our study, but given the focus of the remaining items, it was felt that they reflected wider issues around the presence of information and content than is suggested by the term 'information quality'. This stance is consistent with earlier work by Delone and McLean (1992) who highlighted the importance of content and information to the user of e-Government services and others who comment on the desirable features of web sites content (e.g. Bertot et al. 2008; Yoon et al. 2008). In addition, Halaris et al. (2007) and Rowley (2006) note that some studies include this as a criterion in their scales. Accordingly, we have viewed this dimension as an adaptation of the information quality dimension that has appeared in other models, and a re-affirmation of the importance of information and content.

## 6. Conclusion and recommendations

This research has identified the dimensions of the user experience of e-Government services and developed a measurement scale for evaluating user experience with e-Government. Dimensions identified include: security and support, content and information, ease of use, benefits, barriers, convenience, trust and website quality. E-Government providers can use the validated scale to measure and improve the user experience of e-

Government services, to identify areas of weakness, and to explore the relationship between user experience and user satisfaction. In addition, they should note the importance of the dimensions of security and support, convenience and content and information and take this into account when designing their systems.

However, this research has a number of limitations and there is scope for further research to address these limitations. The researchers are currently undertaking further analysis of the data, including confirmatory factor analysis and structured equation modeling. This will further validate the scale and provide a basis for testing the relationship between the user experience and user satisfaction, and a range of demographic variables. In particular, both in the context studied in this research and in any replication studies in other contexts it will be useful to understand the effect of variables such as age, gender, level of education, job role, prior experience e-Government specifically and of the Internet more generally. Also, of specific interest in developing countries is the impact of level of access to technology on user experience of and satisfaction with e-Government services, which in turn can be affected by the place of domicile of e-Government users. Finally, this research focuses on an application that can be used both inside Nigeria and outside; this offers opportunities for exploring the difference between the perceptions of residents and non-residents of Nigeria.

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# **Small is Beautiful or Bigger is Better? Size of Municipalities and Quality of Websites**

**Svein Ølnes**

**Western Norway Research Institute, Norway**

[sol@vestforsk.no](mailto:sol@vestforsk.no)

**Abstract:** This paper looks at the results of several years of benchmarking of public websites and asks how the size of the municipalities, in terms of population, affects the quality. The paper is based on a quantitative study of data from the last five years' benchmarking of public websites. In addition, data from a survey of web administrators is analysed to shed light on the results from the benchmarks. Finally, the results are compared with a user survey measuring citizens' satisfaction with public services. Size does matter and bigger is better, that is the short story. The larger the municipality, the better the quality of their website is according to the benchmarking results. The survey to web administrators of the evaluated websites gives us some explanation for the differences in measured quality. The survey shows that differences can be explained by resource allocation for the work with websites, knowledge about the evaluation system and the heuristics behind it, and the fact that larger municipalities having more collaboration with other municipalities on the subject of maintenance and development of public websites. The larger the municipality, the more likely it also is to have a formal cooperation with other municipalities in this area. The paper shows that a heuristic based quality evaluation is an effective method of assessing the quality of public websites. The results show that the benchmarking system does improve the quality of public websites and that a good understanding of the heuristic principles behind the system is one of the key factors behind good quality. Of course, resource allocation to the work and development of the websites is also an important factor. However, the survey of citizens does not confirm the differences in quality observed in the expert evaluations. We therefore have to ask what quality is measured in the benchmarking system and quality for whom? How can we measure quality that really affects the end users, the citizens? Heuristic based evaluation systems for public websites are probably necessary to raise the awareness of common design principles but not enough to assure quality to the end users. The paper thus argues for multi-dimensional approach to evaluation of public websites and calls for more research where different methods of quality assessment are used and combined and the effects ultimately measured on real users.

**Keywords:** heuristics, benchmarking, evaluation, websites, municipalities

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## **1. Introduction: Benchmarking systems for evaluation of public website quality**

The public sector plays a very important role in Europe's social and economic model in supporting high levels of welfare for citizens, ensuring socio-economic cohesion and supporting the functioning of a competitive market environment. Within the public sector, public administrations are facing a challenge of improving the efficiency, productivity and quality of their services. Public services provision is expected to be digital if possible, and in most European countries "digital first" is now the rule. Internet based services have come of age and the phase of trying and failing is mostly over. Digital service provision is serious business also for public sector.

Given the high priority of digital public service provision the quality of public websites in general is important. Several benchmarking systems have been tried and some of them are still in use and of great importance. Most notably the EU's benchmarking of public websites (Cap Gemini et al. 2010) have had quite an impact and is an important tool for evaluating the effect of both EU initiatives and the different ICT policies throughout the member countries. However, critics have also argued that the EU benchmarking system has hit the ceiling in many ways and needs a thorough rework (Grönlund 2010).

Norway is among the countries with a long history of benchmarking public websites. The groundwork was laid in 2001 and evaluation of public websites has been carried out annually since then. The number of websites evaluated has risen from around 500 to more than 700, of which approximately 430 are municipality sites and the rest various governmental agencies' websites. The Agency for Public Management and eGovernment, Difi, is responsible for developing the benchmarking system and carrying out the evaluations based on this.

The Norwegian benchmarking system is built on a set of general indicators common for all websites. This is in line with the EU benchmarking system, but different from e.g. the Danish benchmarking system where domain specific indicators have been tried out (Videnskapsministeriet 2002). The Danish web evaluations have been heavily modified since the start in 2001 after starting with the same expert evaluation approach as the Norwegian system. In fact the Norwegian benchmarking system was modelled after the Danish. After the start with a

common indicator set for all public organisations, the Danish system was changed to domain specific indicators, then to self evaluations by the public organisations themselves, and for 2012 the evaluation is reduced to an accessibility screening based on W3C's WCAG recommendations (W3C 2008) and the main weight is put on a user survey (Digitaliseringsstyrelsen 2012).

The Norwegian system, however, has been fairly consistent with the overall approach remaining the same and with only modest changes of indicators from year to year, at least the years 2007 – 2011 which is the actual period for this paper's investigations. In that respective the Norwegian evaluations system resembles the EU benchmarking system where the evaluation of the 20 basic services, 12 public services for citizens and 8 public services targeting businesses, has been the norm the last 10 years (Cap Gemini et al. 2010).

This paper looks specifically at the Norwegian evaluations of municipality websites. The first research question is whether the quality of the website as measured by the benchmarking system varies with the size of the municipality and if so, which underlying factors determine the variation in quality. Of course, the sheer size of a municipality in terms of citizens cannot explain differences in website quality in itself, but the bigger the municipality the bigger resources it also has, most likely also for the work with the website and the digital services.

To be able to explain the observed differences in quality, data from a survey to the administrators of the evaluated websites is used as well as the results from a general user survey where the users were asked to give their opinion and satisfaction with different public services, both physical and digital provided.

In chapter 2 the quality issue is discussed as well as different heuristic models and different evaluation models. Results from the expert evaluations and the web administrator and user surveys are presented and discussed in chapter 3. On the basis of this discussion the more general problem of measuring quality is raised again in chapter 4 and the paper concludes with a suggestion of a broader approach to measuring quality of public websites. The work is thus based on an inductive approach where we start off with the experiences gained so far before moving to explanation of differences in score and ultimately raising the discussion on how to best measure quality of public websites.

## **2. Can we measure quality?**

Few words have been more used and misused than *quality*. Public as well as private companies emphasize the importance of increased quality of services but very often they fail to define what they mean by quality. Some simple definitions can illustrate this (Dahlbom and Mathiassen 1993, Braa and Øgrim 1995):

- a system's capability to satisfy needs, expectations and requests
- the proportion between expected and experienced yield of a system

These definitions emphasize different aspects of quality. The first one looks at measuring the difference between what is specified and what is measured or registered through 'objective' criteria while the other is based on experienced properties, that is, '*a subjective evaluation from the individual user concerned*'.

ISO-8402 of the ISO-9000 standard is guidelines for quality management and quality assurance and uses this definition of quality (despite the number the ISO-8402 is part of the ISO 9000 standard): "*Quality is defined as the total sum of properties a unit carries and that concerns its ability to satisfy explicitly expressed or implied needs*". The ISO-9126 definition of quality for software products, which websites after all are, is along the same line: "*The totality of features and characteristics of a software product that bear on its ability to satisfy stated or implied needs*".

Although these definitions are used much and are relatively general, they are like most ISO-standards directed to processes and evaluation and the quality assuring of these. In the quality assessment of public web sites in Norway, a similar definition has been used: "*The quality of web sites in this project is defined as that public information and services on the Internet must meet a predefined standard or level that can satisfy some central user needs*".

The central guidelines for the development of quality indicators for public web sites in Norway have been:

- the Governmental ICT policy as expressed by the Ministry of Government Administration, Reforms, and Church Affairs, especially the Government's recent new digitalisation programme (Ministry of Government Adm. 2012)
- Relevant laws, regulations and principles for public administration
- Publicly accepted standards and guidelines on the Net, formulated by the W3C, especially their recommendations for web accessibility, expressed through the recent Web Content Accessibility 2.0 Guidelines (WCAG) (W3C 2008)

Sørum et al. (2009) analyzed 10 Scandinavian frameworks for website quality evaluation, among them the framework discussed in this paper, and mapped them to Delone and Mclean's Information Systems Success Model. The IS Success Model consists of the following quality dimensions: *systems quality*, *information quality*, and *service quality* (Delone and McLean 2002). The main quality dimensions influence the *use* and *user satisfaction* of the system and the result will be the *net benefits* of the system. The proposed metrics are therefore divided in these six categories.

Sørum et al. found that most of the frameworks covered the systems quality dimension best, with emphasis on accessibility issues, and that the coverage of the two other quality dimensions was weaker.

In the information systems literature SERVQUAL is a well known model for measuring service quality. The original SERVQUAL model had 10 dimensions of service quality, but this was later reduced to five: *Tangibles*, *Reliability*, *Responsiveness*, *Assurance*, and *Empathy* (Parasuraman et al. 1988). With more than 20 years of use the model has withstood a number of "attacks" and critics (Ladhari 2009). In order to better capture the specific characteristics of the web the model WebQual has been developed on basis of the SERVQUAL model (Barnes and Vidgen 2000).

Although the SERVQUAL and WebQual models were developed for businesses and the private sector, they have also been used for public sector services, despite the obvious differences between the sectors (Boulter and Bendell 2010). Both support for the SERVQUAL model and caution against using it for public sector has been put forward (*ibid*).

## **2.1 Heuristic models for measuring quality**

Measuring quality of websites often rely on using heuristic methods and models. It has become the most used method for expert-oriented evaluations (Donker-Kuijzer et al. 2010). Kahneman (Kahneman 2011) gives this (technical) definition of heuristics: "A simple procedure that helps find adequate, though often imperfect, answers to difficult questions. The word heuristic has the same root as eureka "I found it!"". A more practical definition concerning the use in website evaluations is "all the sets of process guides, principles, criteria, tips and tricks, and guidelines that are available to support web designer" (De Jong and Van der Geest 2000). It should be added that in the ongoing process of developing and broadening the scope of public website evaluation the focus has shifted from almost solely assessing usability issues to add more and more governmental policy based issues such as the provision of digital services to the citizens.

The heuristic method for evaluating website quality was developed by Nielsen and Molich in the early 1990s (Jakob Nielsen 1994). In a heuristic evaluation, one or more experts check a given website using a predefined set of evaluation criteria, the heuristics (Donker-Kuijzer et al. 2010). The heuristics developed by Nielsen and Molich were primarily aimed at evaluation of user interfaces and consist of ten basic principles derived from studies of problems found in dealing with user interfaces. This basic set has since been applied to a wide variety of ICT applications including websites (*ibid*).

However, although the heuristic model involving an expert evaluation is much used, we do not know very much about how heuristics function (Donker-Kuijzer et al. 2010). Donker-Kuijzer et. al analysed five e-Government heuristics with respect( to a) context of use, (b) the information they cover, (c) their validity, and (d) their presentation format (*ibid*). Their conclusions were that the government heuristics are very complex documents difficult for (end) users to read and comprehend. Also information about the foundations of the heuristics is often missing making it difficult to judge the quality of the heuristics. Compliance with the heuris-

tics is also in many cases difficult to check because it requires an extensive amount of automated and (manual) expert evaluation techniques. All in all the authors seriously doubt if the examined heuristics aid the experts in their work.

De Jong and van der Geest (2000) distinguish between these four foundations for heuristics:

- Standards-based heuristics
- Theory-based heuristics
- Research-based heuristics
- Practitioners' heuristics

Moving to the practical implementation of testing heuristics Preece et al. (2002) distinguish between four major types of evaluations in regard to websites:

- “*Quick and dirty*” – a quick and fairly unsystematic feedback from users, colleagues and others
- *Usability testing* – user tests where users are placed in controlled environments and observed when using the service that is to be evaluated
- *Field studies* – studies where users are observed in their natural environment
- *Predictive evaluations* – evaluations based on heuristic principles to find usability problems. The main principle in this method is that the user needs not to be present – in fact the user should not interfere! We also call these evaluations *expert evaluations*.

Heuristic models have their weaknesses and limitations, but for large scale screening of website quality there are hardly any alternatives. For measuring the usability aspects there are methods like user testing (Nielsen 1993). But user testing is a laborious task and would require far more resources than most governments are willing to spend given the number of websites to evaluate. On the other hand, usability testing of a limited number of websites would probably give valuable feedback to the development of the heuristics.

The results in this paper are derived mostly from the heuristic based expert evaluations of municipality websites in the period 2007 – 2011. In addition, results from a survey targeting web masters of municipality websites and a survey targeting citizens in general have been added to try to explain the differences observed in the expert evaluation results.

## 2.2 Usability

In his book *Usability Engineering* (1993) Jakob Nielsen discusses the usability of a system and refers to concepts like *user friendliness*, *usability* and *usefulness* which can all be viewed as different dimensions of *system acceptability*. He chooses to use *usability* and associates it to these properties:

- *Learnability*: easy to learn
- *Efficiency*: easy to use
- *Memorability*; easy to remember
- *Errors*: Low error rate
- *Satisfaction*: Pleasant to use, users are subjectively satisfied

One of his main arguments is that different categories of users, different user situations and individually different preferences make *usability testing* difficult. He points to three main dimensions:

- *experience with computers and relevant computer systems in general*
- *experience with the actual system (novice – expert)*
- *knowledge and competence in the actual domain where the system is used*

The heuristic methods are especially suited for evaluating usability and Nielsen has formulated 10 heuristic principles for usability (1993). Nielsen therefore points to problems with user testing in general where the results will differ because of different user categories as mentioned above. We agree with Nielsen and think that it is necessary that user tests take into account all the three dimensions.

User testing, as Nielsen describes it, could have been an alternative method for assuring a real user perspective to the existing evaluations. This had to be rejected due to lack of resources. It would, however, be very interesting to compare the results of user tests to the expert evaluation of the same web sites. Such a comparison was done in connection to the Danish quality evaluations and showed that the expert evaluation was not necessarily in accordance with the user test of the same site<sup>1</sup>.

### **3. Method**

The main part of the data underpinning this paper has been derived from several years of benchmarking public websites. Datasets from the years 2007 – 2011 have been used and a subset of data from the municipalities. The quality evaluations of public websites in Norway are mainly based on a heuristic evaluation principle. A set of indicators have been formulated by using a combination of different heuristics, technical requirements, and governmental policy guidelines for accessibility, usability, and useful services. Each indicator is given a score in terms of points. A yes/no type of indicator will have to possible values. An indicator with several possible results is given a range of values. The number of points for each indicator is also the weight put on this indicator. There are no other weighting in the indicator set.

The method for assessing the quality of a website is an expert evaluation process involving a group of experts; all together 5 – 10 experts from 2-3 different organizations. Before the annual evaluations start, the group of evaluators are trained using the set of indicators. They all evaluate the same websites and discuss eventual differences in scoring and try to harmonize the understandings of the indicators and the way they should be tested.

The actual evaluation starts with the expert looking up the municipality's home page and goes through the website with the list of indicators in hand (or rather: on his/her pc). The evaluation is a combination of observing and technical validation using different HTML testing tools. The expert is given 75 minutes to evaluate the site according to the 32-33 indicators, which means there will be a little more than 2 minutes for assessing each indicator.

The survey of web administrators was a quantitative method using a questionnaire of 16 questions mainly about the benchmarking system. The online questionnaire was sent to all the 429 municipalities in Norway and 245 of them responded, giving a response rate of 57 %.

The third data source used in this paper is a survey to around 30 000 citizens above 18 years, drawn from the Norwegian census database. The first part of the survey was done in 2009 and a second part in 2010. The plan is to conduct this survey on a biannual base. 42 % of the population responded. Surprisingly, as much as 83 % of the respondents chose to deliver the answers on paper, the rest delivered the answers online. Part one of the survey asked how satisfied the citizens were with the municipality they lived in, and their satisfaction with various municipality and governmental services. Part two of the survey was undertaken in 2010 and asked more detailed questions about a set of predefined public services. The questionnaire for the second part was sent to those of the respondents of part one that had any experience with the selected services during the last year. That turned out to be 11 135 of the 12 659 citizens. Of the 11 135 a total of 6 646 citizens answered (60 %). In this paper mostly results from the second part of the citizen survey have been used.

### **4. Results from Norwegian benchmarks and surveys**

Here the results from the three different studies are presented; (a) the results from the expert evaluation of public websites 2007 to 2011, (b) the survey of web masters of public websites, and (c) the user survey targeted at the users of public websites.

#### **4.1 Expert evaluations of websites 2007 – 2011**

The set of indicators used for expert evaluation of public websites in Norway has only modest changes from 2007 to 2011. The set of indicators is divided in subsets. The following table lists the subsets together with the number of indicators and the maximum score in points.

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<sup>1</sup> A user test was conducted of the municipality web site which scored among the highest in the expert evaluation. The user test, however, showed that the site was poor in terms of usability as observed by the users.

**Table 1:** Indicator sets in 2007 and 2011

Subset	2007		2011	
	No. of indicators	Max. points	No. of indicators	Max. points
Accessibility	11	27	11	28
Usability	14	37	12	30
Useful services	7	28	10	35
Total	32	92	33	93

The indicators for measuring accessibility are mostly derived from W3C's WCAG recommendations. The usability indicators are mostly based on the heuristic principles for usability formulated by Nielsen (1993). The last set of indicators, useful services, looks at the service provision from a user's point of view and are derived from different governmental policy guidelines and goals.

The only weighting in the set is in the maximum number of points for each indicator. The table above shows that useful services have been given priority over accessibility and especially usability over the period of five years. This reflects the strategy at the national level where provision of digital services to the citizens has been given an increasingly higher priority. The weight on accessibility has remained almost constant and it is usability that has been loosing weight.

The following table gives the results for the 2007 and the 2011 evaluations and the change in percentage points for this period. The municipalities are divided in three groups after their population: up to 5.000, from 5 – 20.000, and more than 20.000 people. This is Statistics Norway's way of grouping the municipalities in Norway after size (Langørgen and Aaberge 2011). The labels 'medium' and 'large' must of course be seen with respect to the general size of Norwegian municipalities. Most of them are small by any measures.

**Table 2:** Total score for municipality websites after size (percentage of max. points)

Municipality group	2007	2011	Change (perc. points)
Small municipalities (< 5.000) (N = 226 (2007) and 229 (2011))	46,6	58,4	11,8
Medium sized mun. (5.000 – 20.000) (N = 148 in 2007 and 2011)	50,7	66,1	15,4
Large mun. (> 20.000) (N = 52 both in 2007 and 2011)	58,4	72,0	13,6
Average, all municipalities	49,5	62,7	13,2

Significant differences both between municipality sizes and years (95 % confidence interval), using regression analysis

The results in the table above show that the large municipalities scored better than small and medium sized municipalities and they have also had the greatest improvement the last five years in terms of quality of websites as measured with this evaluation system. The difference in quality of websites between small, medium sized, and large municipalities is increasing. Part of this increasing difference can probably be attributed to the increasing weight put on useful services, which in 2011 counted for 37,6 % of the maximum score in 2011 compared to 30,4 % of the 2007 indicator set. But for the overall differences in quality we need to look further than the expert evaluations to find an explanation.

## 4.2 Survey of webmasters

The Agency for Public Management and eGovernment, Difi, conducted a survey to the administrators of public websites in 2012<sup>2</sup>. The results shown under are from the administrators of municipality websites. The questionnaire was sent to all 429 municipalities and 237 of them responded (55 %).

The most interesting questions from the survey seen from this paper's view are the ones dealing with the respondents' knowledge of the evaluation system, how the indicators are perceived, and whether the respondents find the evaluation criteria useful in their constant work to improve their municipality's website. Also

<sup>2</sup> The results are not yet published. The results shown here are from a preliminary report.

important for analysing the results in 3.1 is the degree of cooperation with other municipalities and the amount of resources dedicated to work with the website.

**Table 3:** The knowledge of the system for evaluation of public websites (small, medium sized, and large municipalities – percentage of N)

	Small	Medium	Large
No knowledge or little/very little knowl.	36	0	0
Fair, good, and very good knowledge	59	15	3
Don't know	5	85	97
Total	100	100	100

**Table 4:** How difficult/easy is it to understand the quality indicators (percentage of N)?

	Small	Medium	Large
No response	4	0	0
Difficult/Very difficult	37	34	13
Easy/Vey easy	58	66	87
Don't know	0	0	0
Total	100	100	100

**Table 5:** Do you regard the quality indicators as useful or not in your work with improving the website? (percentage of N)

	Small	Medium	Large
No response	4	0	0
Not useful or little usefulness	24	12	13
Useful/very useful	58	77	83
Don't know	14	11	3
Total	100	100	100

**Table 6:** How much resources are allocated to website information and administration?

	Small	Medium	Large
No response			
<= 1,0 man year	98	90	53
> 1,0 man year	0	7	47
Don't know	2	3	0
Total	100	100	100

The tables in 4.2 show that small municipalities in general have less knowledge of the evaluation system, thinks the indicators are more difficult to understand and do not perceive the indicators as useful as the medium sized and large municipalities (significant difference at 95 % confidence interval between municipality groups in all tables 3 – 6, using T-tests). These are good explanations for why the small municipalities' overall score in the website evaluations are lower than the medium sized and large municipalities.

Even more interesting as an explanation of the difference in quality between small and larger municipalities, is the resources allocated to website administration and digital information, as shown in table 5. The larger municipalities of course have more resources allocated to this work than the smaller ones. With more labour also comes more knowledge and less reliance on only one person as is often the case in small municipalities. Even if larger municipalities also mean larger websites, the administrators seem capable of handling the increased amount of information and at the same time develop better quality.

#### **4.3 Survey of public services users**

Difi undertakes a comprehensive user survey of public services with 3-4 years intervals. The last published survey is from 2009/2010 and comprises questions from a range of governmental bodies and municipalities (Difi 2010). It is a large survey with questions from many sectors and services.

Of special relevance for this paper is the question of satisfaction with digital municipality services grouped after size of municipality. The results from 2009/2010 show that there are no significant difference in satisfaction between citizens from small municipalities and citizens from larger ones. In services like planning and building permissions and care for elderly people, citizens from small municipalities give higher score than citizens from larger municipalities. But in services like kindergarten and primary school the result is opposite; citizens from larger municipalities are more satisfied than citizens from smaller municipalities. All in all the users' satisfaction with digital services cannot help us explain or confirm the differences in quality observed in the expert evaluations of the websites. This could very well be an example of what Jakob Nielsen calls the first rule of usability: "Don't listen to the users, watch them work".

## **5. Better quality for the users?**

The objective for the evaluation of public websites has been to stimulate the quality improvement of these. The results presented in chapter 3.1 show that there have been improvements from the evaluation in 2007 to the last one undertaken in 2011, in terms of overall score on the quality indicators. Analysis of the same benchmarking system for the first years 2001 – 2003 also show a significant improvement in quality (Jansen and Ølnes 2004). As such, the main objective of the benchmarking project has been met. Also when it comes to knowledge about the benchmarking system and the perceived usefulness of it, the survey shows that at least for the larger municipalities this has happened. For the smaller municipalities there is clearly a job to be done in order to get better knowledge and better understanding of the benchmarking system.

We may ask, however, if this really is an indication of better digital services for the users? The results from the user survey described in 3.3 do not confirm this and especially give no support for the observed difference in quality between small and large municipalities. So what have we measured in the evaluations of public websites? The problems with the heuristics which the evaluation system builds on, is that it does not necessarily correspond with actual user needs and behaviour. An important aspect missing from the expert evaluations is context. The evaluations are all done in the same context, the context of testing, which is clearly different from the context of an actual user. Usability testing would be a natural answer to the problems of the heuristics and the context problem. But given the number of websites and the enormous amount of information on them, regular usability testing would not be feasible. Expert evaluations continue to be a good number two in order to try to say something about quality of public websites. Of the three main categories of indicators used in this benchmarking system, the accessibility category is the the least difficult to assess given the general and widely used heuristics derived from W3C's WCAG work. The more we approach the usability and usefulness of the websites, the more difficult it gets because our heuristics have a problem of capturing the needs and the behaviour of a real user.

There is no perfect solution to the problem of evaluating the quality of a public website, at least with the means and resources normally available. Compromises are needed in order to find a practical way of evaluating. As the results of the evaluations of public websites have shown when combined with results from other studies, there is a need to approach the quality issue with different methods.

## **6. Evaluation of public web sites – what answers do we really get?**

In the above discussion we have included different approaches to quality assessment, arguing that one single method or approach cannot be applied for all purposes. We argue that many perspectives and dimensions have to be included in such work. This is illustrated by the multi-functional character of a municipal website, both to serve the democratic ideals, to focus on customer-orientation in the service provisions as well as to include the efficiency perspective. Furthermore, the evaluations have to include many criteria, like technical characteristics, architecture, functionality, usability or user friendliness, aesthetics etc. This requires different approaches including formal methods as measurements based on well-defined metrics along with more heuristics evaluations and user testing etc. Important in this work is to design detailed user scenarios and different user settings in which the web-site is to be evaluated. These different perspectives do have important implications for how we define the quality requirements and not least how international benchmarking is being conducted.

We do agree that the kind of "mild standardisation" in the benchmarking approach is an efficient way of improving the quality of public web sites and it can also be an efficient instrument to ensure that public bodies follow standards; either formally approved standards or recommended standards.

However, we emphasize that the indicator sets should include more criteria than those that the existing evaluations are based on. We furthermore claim that these evaluations should be supplemented with other types of testing in order to get a more comprehensive picture of a web site. The experiences from such testing can then be used to further develop these indicator sets. Usability tests of a few of the evaluated websites would give valuable feedback to the development of indicators. User surveys and surveys to those responsible for the work with the websites are also valuable methods that can give a richer picture and complement the overall quality issue. Finally there is need for more research where several methods are combined. This paper has suggested some of the reasons for the observed differences in quality of municipality websites. But the paper has also shown that this difference is not perceived by the real users of the websites. There is a need to combine heuristic methods (expert evaluations), usability tests, and user surveys to try to find a link between these.

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# Governmental Incentives for the Application of the Developed e-Services

Igor Pihir, Katarina Tomičić-Pupek and Darko Andročec

Faculty of Organization and Informatics, Varazdin, Croatia

[ipihir@foi.hr](mailto:ipihir@foi.hr)

[ktomicic@foi.hr](mailto:ktomicic@foi.hr)

[darko.androce@foi.hr](mailto:darko.androce@foi.hr)

**Abstract:** The introduction of e-Government has been a priority for the development of information society in many countries. In order to achieve these goals governmental institutions encourage initiatives for defining e-Government strategies and aid the implementation of those strategies by endorsing projects in e-connectivity of the state administration, e-Government infrastructure and services. However, the common beneficiaries do not bother themselves with strategies or infrastructure; they care about something else. The beneficiaries from business as well as citizens have a different perspective and they want to know: Is it easier or/and cheaper for me? Would that fix the problem of public administration inefficiency? Would that speed up my processes? Implementation of new technologies often implies additional costs for beneficiaries. Two paradigms which may hinder the anticipation of e-business benefits among beneficiaries are lack of appropriate IT knowledge and cost awareness. This makes the introduction of e-Government or e-services difficult and slow. The similar situation is in all countries. Our work is inspired by an event which marked the beginning of 2013 in Croatia. Namely, Croatia had legally obligated all businesses, retailers especially, to implement retail “fiscalization” e-service. All contractors must have solutions that govern secure e-communication with the tax authorities, public web services, electronic signature procedures, electronic certificates (this is the infrastructure that serves as a prerequisite for usage of services in e-Government) to adjust to the legally prescribed process. This paper will explore the possible impact of these legislation changes on the creation of knowledge and competencies that these measures implies for small software companies and entrepreneurs at all levels especially and particularly for small businesses that have previously never or rarely used e-Government services in Croatia. A similar strategic model could stimulate usage of e-Government services in other countries, because the knowledge and awareness as the potential for adaptation of e-services/e-Government is the most important driver of its spreading at a large magnitude. The work brings experience from Croatia and surrounding countries. This paper will present incentives made by government in non e-Government projects that are mandatory by the law and indirectly help in faster introduction of e-Government services in practice assuring the basic prerequisites for e-business at beneficiary side.

**Keywords:** e-government, e-services, implementation spreading, strategy

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## 1. Introduction

The introduction of e-Government services has been a priority for the development of the information society in many countries. In order to achieve these goals, governmental institutions encourage initiatives for defining e-Government strategies and endorse projects in e-connectivity of the state administration, e-Government infrastructure and services. The European Commission (EC) has made various efforts to ensure development of information society such as: the *eEurope strategy - An Information Society for All* - European Commission EC (1999), *Lisbon strategy of EU* - EC (2000), *i2010 - A European Information Society for growth and employment* – EC (2005) and the *EC A Digital Agenda for Europe* – EC (2010). The aforementioned strategies and frameworks have promoted the positive contribution of information and communication technologies (ICT) to the economy, society and personal quality of life of all citizens and enterprises in the European Union. In Croatia, development and implementation of information society was encouraged by *Strategy for development of e-business RH 2007-2010*. – Government of Croatia (2007). Development and implementation of e-business and especially government e-services is a theme in many related governmental projects EFZG (2008), FER (2009), FOI (2009).

In this paper we propose following research question: What is the possible impact of obligatory e-Government projects such as our case study project “fiscalization” on beneficiaries’ readiness to embrace e-services? We conducted an extended SWOT analysis of the “fiscalization” project as a method to identify strategies and their possible reusability as impact factors to the implementation of other government e-services. Also, we want to know how these legislation changes impact the creation of knowledge and competencies for small software companies and entrepreneurs at all levels especially and particularly for small businesses that have either never or rarely used e-Government services in Croatia.

Our paper is organized as follows. Firstly, we examine related work of other authors in this field, the implementation of e-services and their usage in EU and Croatia. We also analyse the strategy for increasing the readiness of population to use the provided e-services. We try to focus on some events that may lead the mayor role in rapid increase of government e-services usage and growth of e-business in Croatia. On the end we present SWOT analysis and conclude our paper.

## **2. Related work**

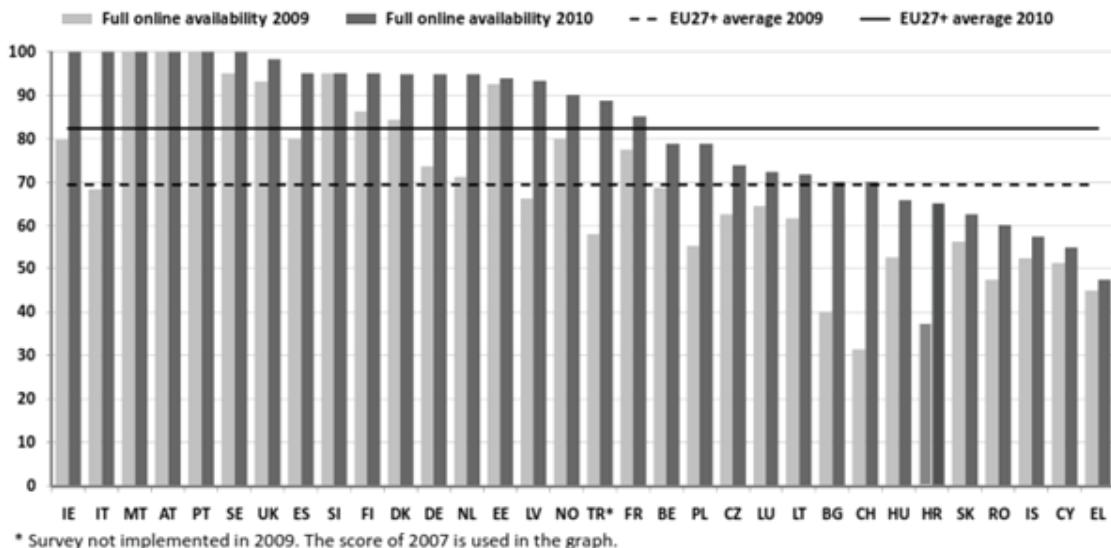
A great number of papers deal with factors that influence adoption of e-Government services among citizens and businesses. Tung and Rieck (2005) developed a theoretical framework and proposed that perceived benefits, management readiness, sensitivity to cost, external pressure, and social influences are positively related to the e-Government services adoption decision among business organizations in Singapore. They tested the proposed framework using survey data from 128 Singaporean business organizations. Chan, Lau, and Pan (2008) presented macro perspective of the various activities involved in the implementation of e-Government. They did an interpretive analysis of the various e-Government-related initiatives by the Singaporean government. The four main components in the implementation of e-Government were identified: information content, ICT infrastructure, e-Government infrastructure, and e-Government promotion. Lean (2008) investigated the factors that influence the intention to use e-Government services among Malaysians. Structured questionnaire was used to collect data from 195 respondents from Malaysia. Lean concluded that trust, perceived usefulness, perceived relative advantage and perceived image has a direct positive significant relationship towards intention to use e-Government service and perceived complexity has a significant negative relationship towards intention to use e-Government service.

Horst, Kuttschreuter, and Gutteling (2007) designed a study which aims to identify the role of risk perception and trust in the intention to adopt government e-services in The Netherlands. The questionnaire on a sample of 238 persons measured perceived usefulness of e-services, risk perception, worry, perceived behavioural control, subjective norm, trust and experience with e-services. Structural equation modelling was used to analyse the data and this analysis showed that the perceived usefulness of e-services is the main determinant of the intention to use these services. Gilbert, Balestrini, and Littleboy (2004) examined the reasons individuals would choose electronic self-service delivery methods over more traditional methods of service delivery for government services. The main result of their study is that willingness to use the e-services will be present if organisations can develop trust relationships with users, assure them that their financial details are secure, provide information that is relevant, accurate and up-to-date, and save individuals time and money. Carter and Weerakkody (2008) compared e-Government adoption in the U.K. to adoption in the U.S. to determine if the same factors are salient in both countries. There are cultural differences in e-Government adoption in the mentioned countries, e.g. ICT adoption barriers such as access and skill vary by culture.

AlAwadhi and Morris (2009) investigated the factors that influence the adoption of e-Government services in Kuwait using an amended version of the UTAUT model. Lee, Kim, and Ahn (2011) concluded that the willingness to adopt e-services increased when business users perceived high quality service provision in offline service channels. Shareef, Kumar V., Kumar U., and Dwivedi (2011) found out that e-Government adoption behaviour differs based on service maturity levels and indicated the critical factors that enable the adoption at different service maturity stages.

“United Nations proposed a methodology for measuring e-Government development index (EGDI) as a comprehensive scoring of the willingness and capacity of the national administrations to use online technology in the realization of government functions” (Matei and Radulescu 2011). Comparing the EGDI of Balkan countries (in this research Croatia is classified into the aforementioned group of countries) with EGDI for EU 15 EU 25 and EU 27, it results that all Balkan countries should improve their index to provide better e-Government services to both citizens and businesses (Matei and Radulescu 2011). In 2010 EGDI of Croatia was 0.5858, and EGDI of EU 15 was 0.7042. Other researches and statistical analysis (e.g. Eurostat data) also show that Croatia can in many ways improve e-Government services and should motivate end users to use e-services.

Croatia started late in e-services implementation, and has not yet reached a state of maturity. Croatia’s full online availability is below the EU average, because Croatia now ranks 27th out of the 32 measured countries (EC 2010b). See Figure 1.



**Figure 1:** Full online availability of e-services ranking, 2009-2010 (in %) (EC 2010b)

In Figure 1 we can see overall index of fully accessible online governmental e-services in EU countries and some new possible member states like Croatia. Services in this EC research was divided in four clusters: (i) income generating, for government; (ii) registration e.g. births, company, moving; (iii) service returns e.g. health, social, libraries; and (iv) permits and licences e.g. building, education and passport. In the past decade, countries have given priority to the improvement of services which generate income for government (such as taxation) which, with an average score of 98%, remain the most advanced service cluster. (EC 2010b).

***Namely the taxation and related e-services are now the focus in Croatia and also in our research paper.*** Accordingly to survey of EC (EC 2010b) Croatia has not yet enabled: E-Safe, Secure e-Delivery, Single Sign-On, Catalogue of Horizontal Enablers and E-Payment, but our country rapidly progress in these fields.

### 3. E-Services in Croatia and triggers for growth

Electronic services and e-business in Croatia are mainly supported from government side by the national academic network CARNET and Financial Agency (FINA). FINA is the leading Croatian company in the field of financial mediation and the application of information technologies and several other state-owned IT companies. It runs main government services, develops, and maintains governmental IT infrastructure. FINA is a key government partner in the sphere of public finances, the pension reform, the calculation, payments and control of obligatory contributions, taxes and surtaxes. It offers services for keeping records of payments for all public contributions and functions as a state statistics service. It also manages many important e-services (FINA 2012.): RGFI, WEB BON, Registr Koncesija, e-REGOS, e-Mirovinsko and e-Racun B2B.

RGFI is the registry of the annual financial statements. Clients of the aforementioned service can submit annual financial statements of the entrepreneurs and business owners, download their annual financial statements, and upload the statistical reports and financial statements of non-profit organisations.

WEB BON e-service allows you to download up to date information on the creditworthiness of businesses. The creditworthiness information is provided in the BON-1 form that is based on information from the mandatory statistical reports. The business's performance is compared against performance of all organisations in the class and all businesses of equal size in the class. This form includes two main groups of indicators (FINA 2013): financial stability, indebtedness and liquidity indicators (coverage of fixed assets and inventories by capital and long-term sources, share of capital in sources of funds, indebtedness factor, total assets turnover coefficient, overall liquidity coefficient, time of collection of short-term claims from customers, and inventory turnover); and business performance indicators (ratio of total income and expenditure, share of profit in total revenue, share of profit in assets, profit per employee).

Registr Koncesija is a unique electronic record of contracts and a central source of information about all the concessions agreed on Croatian territory. Concession grantors are required to submit data on the register

about the agreed concessions and eventual changes in the concession contract within 10 days from the signing of the contract. The register is public; everyone can have access to these data.

The service e-REGOS provides an easier, faster and more modern way of submitting R-Sm form ("Specification of calculated and paid compulsory contributions, income tax and surtax to the income tax for insured persons"). REGOS matches data on calculated contributions for the second pillar of the pension insurance, collected by R-S Form, with the payments made by insured persons, and forwards them to the compulsory pension funds. The Central Registry of Affiliates (REGOS) is an institution founded by a regulation of the Croatian Government with the aim of providing technical support for the second pillar of pension insurance. Via e-Mirovinsko it is possible to handover the electronic forms to the pension system.

e-Racun B2B is a service for the electronic exchange of invoices between suppliers and customers. It manages the entire business process of issuing, receiving and archiving invoices. Electronic invoice is completely identical to the standard paper invoice. It is also possible to attach various documents (electronic or scanned), such as side letters, appendices, forms, contracts and other documents. Standardized and structured e-invoice contains all the required items prescribed in the regulations, and it is compliant with recommended standards and e-Invoice directive.

We have made an inside survey in the FINA and interview their leading ICT experts to get the information about users of e-services provided and supported by this agency (FINA interview, 2013). Accordingly to the number of held electronic certificates for secure internet infrastructure PKI (Public-key infrastructure), current number of FINA e-services users could be seen in Table 1. The number of current certified users could be good indicator for growth of these services through the years because one company is mainly obligated to register just once to use all services.

**Table 1:** User of e-services in Croatia by number of certificates 2008-2012 (FINA interview, 2013)

e-Service/Year	2008	2009	2010	2011	06/2012
Certified users	6.520	10.161	34.531	41.381	85.925
RGFI	6.946	6.974	12.918	19.453	-
WEB BON	6.724	6.446	10.767	14.827	-
Registrar Koncesija	6.050	5.378	7.227	8.934	-
e-REGOS	6.814	6.857	13.001	19.871	-
e-Mirovinsko	1.341	1.502	2.159	2.646	-
e-Račun B2B	0	31	265	430	-

Close examination of these numbers and data from Croatia chamber of economy (Biznet, 2013) show that currently in Croatia there are 170.254 active companies and legal subject e.g. governmental institutions hospitals, schools (Biznet 2013) etc. Number of companies are for now relatively small, but there is potential growth triggered by some recent events and law changes in last two years.

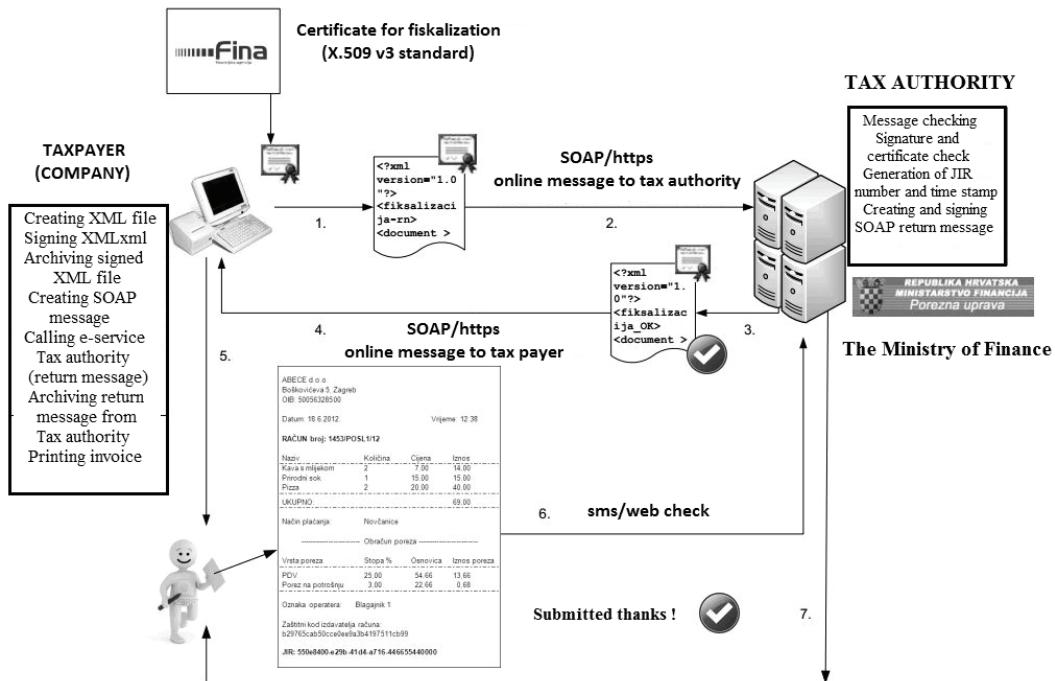
### **3.1 Obligatory reporting and financial statements e-service**

First trigger was made in 2010 where all large and medium size companies were obligatory to use RGFI and e-REGOS services as mandatory in year 2011. We can see growth for + 48% from ~13.000 (2010) users to 19.500 (2011) users. These results can be seen in year 2011 because the reports are mostly annual. Namely, all large companies (currently active 449) and medium size companies (currently active 1481) were in the system and must deliver their financial reports to governmental bodies online through web service provided by FINA. Other changes could be seen in number of certificates in first half of 2012. The number of certificates grow for approximately +100% and that's mainly due to new legislation that obligate all small enterprises to use e-service if they have reached certain point of revenue in year 2012 and further. All these changes are made in Regulation of the structure and content of the notification and delivery period financial statements (NN 148/10, 2013).

### **3.2 Obligatory fiscalization**

The second trigger is the new law in the field of taxation. It obliges all retail cash payments bills to be checked, registered and certificated after verification with a unique invoice code online by tax authority in real time. The process is called "fiscalization" and it is in use from 1<sup>st</sup> January 2013. It was active with ~ 2.000 users at 1<sup>st</sup>

January 2013, currently after one month of use there are ~ 15.000 users and until 31. In July 2013 it is expected to count about 20.000 – 50.000 users. This number is an approximation from legislation specifications of obligated companies and from the number of companies in the sector of services and retail. Triggered by law changes the new legislation from 23/11/2012 named "Zakon o fiskalizaciji u prometu gotovinom" (NN 133/12, 2013) is in use from 1<sup>st</sup> January 2013. It makes significant changes in the enterprise usage of e-services and it represents a great potential for usage growth of current e-services for many enterprises in Croatia in a year or two from now. Fiscalization makes a prerequisite infrastructure at the end user side by owning an electronic certificate, owning an Internet connection, usage of electronic XML message to web-service in government agency, digital signature and secure PKI infrastructure. This is very important because this is an obligation for almost all enterprises in the country (except for companies that do not use cash registers and do not have a retail bills). Figure 2 show how this process works in practice.



**Figure 2:** Fiscalization process (Programi.net, 2013)

Research made by GfK (2006) on N = 102 companies, show that main obstacles in implementation and broader usage of government e-services are lack of information about the available services online (25%), habituation to traditional way of doing business (20%), lack of knowledge about Internet (14%), complicated online procedures (13%). This all can be made easier as enterprises need to implement the government e-service (it is enough just one) as mandatory by government to gain knowledge and implement the technology for the first time. This is also a great opportunity for companies of all sizes to use, learn to use and understand electronic services. It forces the end users to gain experience in dealing with ICT.

#### 4. Strategic analysis for the fiscalization project

In this section we have explore the possible impact of fiscalization on small businesses that have either never or rarely used e-Government services in Croatia. Fiscalization is a project for assuring control over the release of bills for cash payments by the tax administration in Croatia. It includes legislation changes, creation of new e-services and assurance of necessary infrastructure for real-time verification of issued bills for cash payments. In its first phase this e-service is imperative for retail stores, retail chains and catering industry.

In as much as we welcome new e-services, no detailed strategic benefit analysis was made to promote these new services. Therefore, we will evaluate the impact that this project has on small software companies and entrepreneurs at all levels. The impact analysis will be performed with the extended SWOT analysis comprising the identification of possible strategies for achieving broader goals of implementing e-services.

This service has a monopolistic owner i.e. the Croatian tax authority and many end-users i.e. businesses that use their own applications at the client side to connect to the service. The main purpose of the service is to assure an overview of issued retail invoices in order to supervise the tax collection from trading. The service is based on exchange of e-messages containing data about invoices to be issued delivered by applications on the client side and a certified e-message with invoice verification code on the tax authority side. The exchange of messages is defined by business and XML protocols which have been published by the service owner. The end users must adapt their applications to the new expected feature by their own.

The procedure of evaluation is conducted via extended SWOT analysis. First we must identify SWOT elements for the fiscalization project. We will estimate the priorities of each of SWOT elements then sort them by priority (S1 to Sx, W1 to Wy, etc.) and define strategies for possible strategic benefits (which can be equalized to strategic goals). Strategies that can be identified have different signification, they can be corrective, shape-up-the-future strategies, and implicit strategies. Each type of strategy significance brings different resource allocation options (these resource allocation options could be explored separately with more input data).

**Table 2:** Strategic analysis for the fiscalization project

Strategic analysis for the fiscalization project	
Strengths	Weaknesses
S1: Available XML and other protocols and schemes for data migration, gathering and retrieval S2: Existing application infrastructure with appropriate functionalities at the tax administration bodies S3: Fiscal benefits are visible in a short time	W1: Perception of "tax big brother" by fiscal obligation subjects W2: Additional operational costs for fiscal obligation subjects for end-user infrastructure W3: Lack of readiness of other e-services that would lean on fiscalization
Opportunities	Threats
O1: Possible new e-services upgrade (i.e. towards other e-services in communication with governmental bodies or authorities) O2: Infrastructure at the end-user side is developed and can be reused (fiscal obligation subjects, i.e. small businesses that otherwise would not embrace new technologies without motivation) O3: Readiness of small software companies and entrepreneurs to develop new e-services	T1: Monopolistic e-service provider at the central point T2: No alternative infrastructure are presented (when default infrastructure i.e. internet connections are unavailable) T3: New "business models for tax avoidance"
Corrective strategies (S,W), (O,T), (S,T), (O,W)	
O3-T1: Avoid monopolistic position of e-service provider (central point of service) S1-W3: Achieve higher level of interoperability by using appropriate protocols and schemes for data retrieval for other e-services O2-W2: Offer new services to reuse infrastructure at the end-user side for other services to achieve cost effectiveness S3-W1: Promote benefits in order to assure transparency and motivation	
Shape-up-the-future strategies (S,O)	
S2-O1: Use existing application infrastructure for possible new e-services in communication of fiscal obligation subjects with other governmental bodies or authorities	
Defensive strategies (W,T)	
W1-T3: Use end-user perception to decrease the development of new "business models for tax avoidance"	
Uncovered weaknesses and threats	
T2: Develop alternative infrastructure Partially T1	

Corrective strategies: O3-T1: Avoid monopolistic position of e-service provider (central point of service), S1-W3: Achieve higher level of interoperability by using appropriate protocols and schemes for data retrieval for other e-services, O2-W2: Offer new services to reuse infrastructure at the end-user side for other services to

achieve cost effectiveness and S3-W1: Promote benefits in order to assure transparency and motivation could have impact on *creating or increasing trust in applying contemporary technologies for good practice* as well as on *creating demand for new e-services at the end-user side in order to trigger of offers by small software companies and entrepreneurs*.

Shape-up-the-future strategy S2-O1: Use existing application infrastructure for possible new e-services in communication of fiscal obligation subjects with other governmental bodies or authorities impacts the *enhancement of the readiness of end-users to shift towards other e-services in communication with governmental bodies or authorities and increasing the number of end-users with IT usage knowledge and competencies*.

Defensive strategy W1-T3: Use end-user perception to decrease the development of new “business models for tax avoidance” should result in *assuring expected level of trust in functionality and non-selective control*.

Finally, efforts in resolving remaining uncovered threats T2 and partially T1 should contribute to *dealing with this threat has impact on the quality of IT infrastructure in terms of reliability and availability*.

## **5. Conclusion**

In this paper, we have analysed state of growth and reasons for the growth of e-services usage and examined the case of Croatia by focusing on recent legislation changes and mandatory usage of e-services in taxation. We collected data about the current state in Croatia from FINA. We also have strategically analysed the impact of fiscalization on readiness of end users to use other governmental e-services. The analysis shows how the first implementation of e-service that has been implemented mandatory by the government, can have a positive impact like increase of awareness, readiness and knowledge in enterprises of any size to the level at which the company could implement another e-services faster.

A similar model of strategic options could stimulate usage of e-Government services in other countries, because the knowledge and awareness as the potential for adaptation of e-services/e-Government is the most important driver of its spreading at large magnitude. In order to evaluate the impact that this project has on small software companies and entrepreneurs at all levels especially and particularly for small businesses, the extended strategic SWOT analysis illustrated possible benefits. Our proposed strategy is to use existing application infrastructure for possible new e-services in communication of fiscal obligation subjects with other governmental bodies or authorities and it impacts the enhancement of the readiness of end-users to shift towards other e-services in communication with governmental bodies or authorities and increasing the number of end-users with IT usage knowledge and competencies.

We would like to see new research in the near future that will show real benefits of this new legislation changes. We are sure that the new knowledge and current investment in the small companies will push the usage of other e-services and by that ensure better efficiency of their current investment in new mandatory technology and certificates. This area will be a relevant issue for our future research.

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# A Practical Perspective on the Developing e-Government Interoperability Frameworks: A Case Study

**Denisa Popescu, Arabela Sena Aprahamian, Luisita Guanlao and Arthur Riel**

**The World Bank, Washington, DC, USA**

[dpopescu@worldbank.org](mailto:dpopescu@worldbank.org)

[aprahamian@worldbank.org](mailto:aprahamian@worldbank.org)

[lguanlao@worldbank.org](mailto:lguanlao@worldbank.org)

[airiel@worldbank.org](mailto:airiel@worldbank.org)

**Abstract:** As governments around the world are increasingly faced with rising demand for openness and transparency in their actions, they give higher priority to the sharing of information and linking their business processes and independent information systems through interoperability frameworks. Implementing interoperability in government is not a simple task and requires more than just the existence of a common technical standard to enable technical integration. Over the past decade, many countries have implemented interoperability and frameworks policies, some with more success than others. The challenges of reaching these objectives, many of which relate to information and business process integration, technical integration, organizational interoperation, and demonstrated support from political leaders remain significant. The literature to date has pointed out a variety of challenges and needed capabilities for improving government interoperability, but has done little in the way of providing practical models on the foundational aspects needed to be in place to support interoperability, such as a common government information strategy and framework. The goal of this paper is to propose a practical architectural framework based on the World Bank's own experience with enterprise information integration efforts. Special focus is given to describe a reference architecture to support the foundational aspects of a government-wide information management policy, protocols and standards, common shared services platforms, and the benefits and implementation issues for shared service governance models. Further, the related issues and challenges that arise in implementing such a framework to support interoperability initiatives are illustrated based on the authors' experience with ICT initiatives in the Government of Romania.

**Keywords:** e-government interoperability, intergovernmental information integration, enterprise information management, enterprise architecture, common shared services

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## 1. Introduction

The elements of effective management of information, secure exchange of information, and active collaboration have increasingly become essential components in the effective and efficient delivery of government services to citizens and business. The availability of high-quality, authoritative information to decision makers supports the delivery of a comprehensive e-government services program facilitated by G2C (Government to Citizens), G2B (Government to Business) and G2G (Government to Government) initiatives.

According to the World Bank, e-government refers to the use by government agencies of information technologies that have the ability to transform relations with citizens, businesses and other arms of government. Broadly speaking, e-government refers to attempts to modernize and streamline the activities and services of public administration by using Information and Communication Technology (ICT). It not only refers to the provision of better services for citizens and businesses through the so-called "one-stop shops" (e.g., birth and marriage certificates, passports, visa, online tax, customs declaration, unemployment benefits, etc.), but also the efforts to streamline public administration processes through process reengineering.

To achieve this, governments give higher priority to the sharing of information and linking their business processes and independent information systems through intergovernmental information integration efforts, where enterprise architectures and interoperability frameworks emerge as a "tool" of helping government stakeholders to achieve this (Chen, Doumeingts, and Vernadat, 2008:647).

Interoperation in e-government has been defined as the ability of independent or heterogeneous information systems or their components, controlled by different jurisdictions/administrations or by external partners, to inter-operate in a predefined and agreed upon fashion (Scholl and Klischewski, 2007: 900). Interoperability is often used to refer to the purely technical aspect of interoperability (Scholl and Klischewski, 2007:901) while constructs such as the intergovernmental information integration refers to the broader aspects of sharing governmental information across distributed information sources and organizational boundaries, taking into

account social, political, and organizational factors that impact intra- and inter-governmental collaboration (Pardo et al, 2004; Scholl and Klischewski, 2007; Scholl et al, 2012). However, in this paper, we take a broader definition of interoperability, which follows the European Interoperability Framework (EIF), such that we have included the organizational domain (legal, organizational, and policy elements that facilitate interactions between agencies), the semantic domain (data dictionaries, metadata repositories, and taxonomies and processes), and the technical domain (interconnection, data integration, metadata, etc) (European Commission, 2010).

## **2. Current realities in public sector**

An interoperability framework in the public sector must take into account current realities. Some of the challenges experienced in managing and accessing information in the governmental institutions are discussed below.

Information systems in public sector have been developed over years to primarily support the mission of each ministry or agency. As such, each information technology (IT) system is optimized to support the information needs of a vertical, i.e., government ministry, with minimal consideration on the broader needs of the government as a whole. Consequently, government, ministries or agencies have a silo approach in producing information and data only for their own use.

Identity management of citizens or business is one relevant example in this regard. Citizens and business are identified by multiple definitions relevant to each silo-based government services (civil status information, tax administration, pension, firm registration, etc), even in countries where there are single identity identifiers. The silo approach leads to the development of multiple registries and inconsistent identity verification processes. Information is scattered throughout different technology platforms and multiple systems. These in turns leads to major inconveniences to the citizens and business entities when they have to deal with multiple agencies.

Moreover, there are very poor correlations between similar information hosted in various ministries and agencies. For instance, there are discrepancies between the number of employees and the number of contributors to various insurance funds. The number of properties and the numbers of property tax payers differ. Tax systems cannot leverage court data since the personal identifier of an individual is not captured in the court system. These types of problems come from the initial definition, design and system implementation, and the lack of collaboration among different ministries or agencies.

Information, data, and systems interoperability are not a real priority for ministries or agencies. Moreover, information sharing occurs mainly within individual agencies and, on an ad hoc basis, through individual employees. Structured information exchanges beyond identified projects are very difficult to establish and sustain. When a ministry or agency wants to answer a question, it often initiates a new, specific data collection or exchange exercise.

Overall, there are no vertical or horizontal connections, and the IT resources are not applied in a synergistic way towards the fulfillment of strategic objectives of the ministry or the government as a whole. Uncoordinated information practices and supporting systems have led to very costly IT investments and delays detrimental to internal operational work. Most importantly, they have led to the limited ability to easily integrate data, which is needed in providing quality e-government services.

## **3. Literature review**

Implementing interoperability in government is not a simple task; it requires more than just the existence of a common technical standard to enable technical integration (Saekow and Boonmee, 2009) and economic and political factors are just as important when implementing interoperability programs in government. Over the past decade, many countries have implemented Government Interoperability Frameworks (GIFs), some with more success than others. The challenges of attaining these objectives, many of which relate to information and business process integration, technical integration, organizational interoperation, and demonstrated support from political leaders, remain significant (dos Santos and Reinhard, 2012; Guijarro, 2009; Landsbergen and Wolken, 1998; Scholl and Klischewski, 2007; Vernadat, 2010; Pardo et al. 2004, 2012). The possibility of legal and privacy restrictions on sharing information should be also addressed by ensuring that its

operationalization is built upon a secure and trusted information-sharing protocol (Pardo et al, 2012; dos Santos and Reinhard, 2012; Hellberg and Grönlund, 2013).

At the same time, the use of enterprise architecture frameworks has been seen as a practical approach to implementing interoperability, in both the private sector and public administrations, by providing a holistic view of looking at an enterprise (Janssen, 2012; Pardo et al, 2012; Vernadat, 2010; Guijarro, 2006; Hjort-Madsen, 2006). Broadly speaking, an enterprise architecture framework is simply defined as a blueprint defining the structure and operation of an organization based on a number of work streams, also commonly referred to as architecture views, for the analysis of the unique views of the architecture pertaining to specific disciplines (e.g., performance, business, information, and applications). There are many formalized enterprise frameworks available, such as the Zachmann EA framework, TOGAF, and the US Federal Enterprise Architecture.

Extant literature has pointed out a variety of challenges and the needed capabilities for improving government interoperability. It, however, has done little in providing practical models of the foundational aspects that should be in place to support interoperability, such as the need for a government-wide information strategy and common shared services to support the technology aspects of information management across the government. In the next section, we will discuss some practical aspects we learned from our own experiences at the World Bank, which are relevant to intergovernmental information integration efforts.

#### **4. Enterprise architectural framework**

As discussed above, the current literature on interoperability extensively discusses the need for using enterprise architecture frameworks to address intergovernmental information integration. Interoperability is not just a technical issue. Political, organizational, and informational factors are also important. Today, most organizations have an ‘as-is’ enterprise architecture which describes primarily the underlying technologies and applications of a vertical institution, e.g., one government ministry. This is one of the reasons why the core aspect of current Enterprise Architecture (EA) frameworks start with the analysis of the business, the non-technology aspect of the organization, as the basis for designing and implementing systems. As such, the usual trend we have seen in the private sector is to first ensure that the organization has a comprehensive Business and ICT strategy followed by an EA framework and program that integrates the business processes, information, and technical resources into a cohesive whole. Implementing an EA program is not an easy endeavor. Operationalizing and embedding EA practices in the applications development lifecycle requires high-level management commitment and the requisite architecture skills within an organization. Documenting the current architecture must be done at a good-enough level as the focus should be in defining the target state architecture. IT Investment programs must be reviewed in light of achieving the envisioned target state architecture. EA practices should also address the relational capabilities, and social interactions among the stakeholders vis-à-vis the adoption and acceptance of EA where the pervasive role of EA should be in “communications instead of creating frameworks and blueprints” (Janssen, 2012:34).

Further, the use of EA frameworks to address information integration needs is not an easy process. The assessment process requires interacting with diverse organizational structures that may not be willing, in the end, to “collaborate” in both the definition and the implementation of the solution. From our point of view, this problem is more exacerbated in the government because the ministries and agencies have their own organizational structure, culture, incentives and IT budgets. Countries that have been successful in enabling cross ministry collaboration have instilled in place management mechanisms (e.g., presidential decrees, budget controls, government chief information officer position, technology boards) to facilitate cohesive whole of government architectures.

#### **5. Government interoperability frameworks, enterprise information management and common shared services**

E-government interoperability frameworks are a more effective way of addressing problems in sharing information across government institutions. To attain interoperability, government institutions need to improve its internal capability in managing information and developing an integrated enterprise information management policy and reference architecture. Further, they need to operationalize such frameworks by centralizing provisioning of common shared services. They need to transition from the traditional technical infrastructure support (i.e., networks, servers, software platforms) to facilitating cross-government

information integration. This will allow the ministries and agencies to better manage information and share good practices. The landscape of enterprise information management, access, and integration has been steadily evolving in both the public sector and the industry. In the public sector, such integrated implementation approaches have been reflected in frameworks such as the European Interoperability Frameworks (EIF), which are the conceptual models for delivering public services. In the private sector or industry, the latest trend is referred to as the Enterprise Information Management (EIM) reference architecture.

The EIM reference architectures and the EIF conceptual reference architecture for European public services refer to the semantic and technical aspects of integration. These reference architectures aim to integrate enterprise data, both structured and non-structured information, and the technical domains such as information management, enterprise information and application integration into one framework.

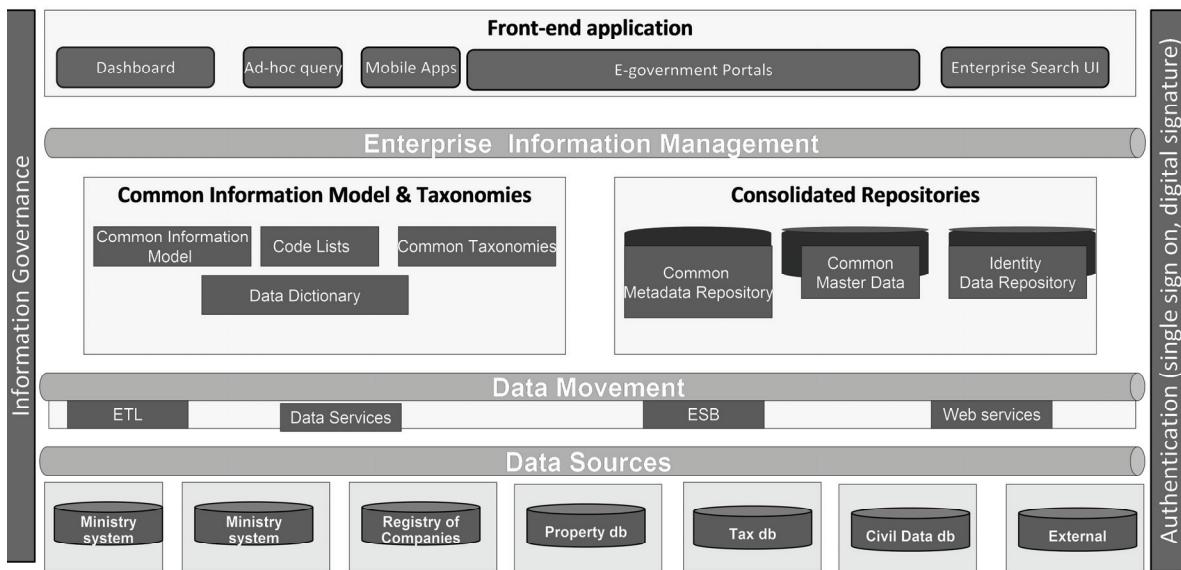
These are multi-layered architectures consisting of a common set of enterprise information services that can address data source heterogeneity, metadata mapping, master data and reference data identification, and information governance based on understanding the information models and usage patterns across the various government and user community domains.

An EIM Reference Architecture is presented in Figure 1 and its domains and components are briefly described below:

- Information Strategy and Governance domain focuses on overall information strategy, information management policy, principles and architecture, specific processes that deliver information governance and staff competency framework.
- Common Information Model & Taxonomies domain focuses on establishing a common, standard nomenclature to facilitate communication between different entities. Key functions in this domain Corporate Information Model, Enterprise Taxonomies, Code Lists, and Enterprise Data Dictionary.
- Common Metadata Management domain focuses on definition and implementation of a common metadata standard and the implementation of Metadata Repository that can assist in providing standardized, single-source semantic definitions for an enterprise.
- Common Master Data domain focuses on the methods used to consolidate and synchronize the master data across an enterprise.
- Information Access and Presentation domain focuses on the common methods used to ensure secure access to information across business capabilities and functions. Key functions in this domain include delivery devices (e.g. mobile devices, desktops), delivery environments (internet and intranet) and delivery mechanisms (dashboards, portals, alerts/notifications, application GUI's and feeds and subscriptions).
- Security & Identity Access Management domain focuses on the processes, policies, and technologies that protect an organization's data and allows access to only those users authorized to view/edit the data. Key functions in this domain include access & authorization management, identity store, authentication/authorization, remote access.
- Enterprise Application/Information Integration domain focuses on platforms and other software for integrating information, applications and systems within and outside an organization. Key functions in this domain include messaging, APIs, web services, enterprise service bus (ESB).
- Business Information Analytics domain focuses the processes and solutions required to support internal and external business information analytics. Key functions in this domain include Integrated Reporting, Text & Social Media Analytics, Structured & Unstructured Data Analytics.

To implement enterprise information integration, it is commonly recommended to start by defining and adopting a formal enterprise information management (IM) practice at the whole of government level. Pardo et al (2012) identified information management as a core e-government interoperability capability, where IM refers to the application of disciplined and consistent practices related to planning, creation, capture or collection, organization, use, accessibility, dissemination, storage, protection and disposition of information. Establishing enterprise wide information management processes is a process whereby organizations evolve and develop competencies over time. Table 1 presents the functional building blocks to establish an Enterprise

Information Management (EIM) program. These can be applied to enable information integration in government.



**Figure 1:** EIM conceptual reference architecture

**Table 1:** Enterprise information management roadmap with representative components and actions

Building Block	Description	Actions
Vision & Strategy  How is information perceived across ministries and agencies? How is information managed: ad hoc, departmental or enterprise wide?	Government Leadership recognizes information as a strategic asset, sponsors and champions the Enterprise Information Management strategy. There is high-level sponsorship for an EIM program with the appropriate level of funding.	1. Define, communicate and adopt an Enterprise Information Policy and Strategy. 2. Clearly define, communicate and adopt the data management roles and responsibilities of all staff and custodians of institutional information assets. 3. Increase internal awareness of data management. 4. Formalize and fund an EIM Program to address the needs of all stakeholders in a coordinated fashion.
Governance  What are the decision rights and accountabilities for managing information? What is the service model for delivering common shared services?	Policies and standards are defined to achieve standardization and consistency. Governance councils and steering committees work together to resolve cross-functional management issues. Common Shared Services arrangements are defined and implemented. Data stewardship is mainstreamed.	Information Management Policy, Guidelines and Procedures Periodic review and updates  Information Stewardship Program Information Stewardship role formalized in relevant job accountabilities across Ministries and Agencies Add responsibilities for information and data management to business and IT roles.
Process  How are the information lifecycle processes, such as stewardship, formalized?	Guidelines for archiving data and data retention periods are enforced. There is a process to collect metadata as part of a project reuse strategy. Policies and mandates are well documented and understood. Standards for information quality are defined and there are procedures in place to monitor quality on a regular basis. Content Management policies are defined and enforced at the time of document creation.	Mainstream IM in SDLC Data Management Plan developed for each project. Formalized data change management processes with clear accountabilities for QA, sign-off and hand-off. Provide training on data management to all staff. Mainstream change management processes with clear points for processes in place for hand-off, sign-off and QA. Audit and reporting tools in place to monitor compliance to standards and process deviations.

Building Block	Description	Actions
Metrics  What is the impact of EIM on the bottom line?	Define citizen and business related metrics to measure client satisfaction, time savings, etc. Define standards for information quality and incorporate ways to measure and monitor information quality as part of project management tasks. Use metrics to identify and support productivity goals. Use a balanced scorecard to chart data quality levels of institutional systems.	Information Quality Assessment: Build in routine data quality procedures to identify root causes of poor data quality. Collect and use data quality metrics to support improvements in business processes and productivity goals. Produce a periodic data quality index for institutional processes and systems
Enabling Infrastructure  What is the role of technology in EIM?	Implementation of foundational aspects of EIM as common shared services. The information architecture is extensible and distinguished from the application architecture. Distinct architectures for analytics, master data and unstructured content are unified at a logical level. An authoritative and managed source of master data supports transaction processing, document/information/web management and information delivery. A metadata management and semantic reconciliation infrastructure resolve inconsistencies and support service-oriented architecture objectives. A current, valid Common Information Model is published and maintained. Data models are maintained by key systems but aligned to enterprise information architecture. A data service layer with published metadata and business rules is in place to achieve integration.	Data and Information Architecture Rationalized data architecture for analytics, master data, structured and unstructured content. Mandate adoption of enterprise wide taxonomies for institutional applications such as base registries. Metadata Management Integrated Metadata Repository across electronic document and records management systems. Standardized document and records classification standards as it relates to retention scheduling and disposition. Drive data retention and disposition through metadata. Integration of automated metadata extraction into document lifecycle management. Common Information Model (CIM) Maintain and publish CIM. Review project data models and analyze impact on CIM; data models are maintained locally but aligned with CIM. Document existing data flows and architectures for analytics, master data and unstructured content. Establish naming conventions and a Enterprise Data Dictionary. Formalize semantic reconciliation to resolve inconsistencies. Master Data Management On-line metadata definitions/business rules. Subscription services. Workflow/alerts for master data management. Data Services Layer and Technical Interoperability Standards Data Service layer Data sharing standards across government and with external parties Information Security Corporate service for an electronic identity. Authoritative source for employee data.

Further, the implementation of the technology aspects of enterprise information management, such as the metadata repository, reference data and taxonomies, data services, and identity registry, can be addressed through common shared services. Shared services are now considered to be a building block of interoperability in e-government as they can be shared and re-used among different governmental entities when developing new systems (Janssen, 2012). Implementation of EIM through common shared services needs to be supported by a management structure that expands the standard definition of IT shared services offerings from technical infrastructure services and ERP platforms (Human Resources, Financial Management) to a broader range of

services, which include the foundational aspects of enterprise information management. The service delivery model needs to address the process and functional relationships across different ministries, as well as the funding strategy. The following management issues and questions will need to be investigated in designing an effective implementation model for common shared services:

- Understand and document the needs of the user for specific products and services that can best be developed, delivered, and supported centrally as a shared service.
- Determine and clarify how each Ministry can maintain its fiduciary role when another organization/IT Department delivers the shared service.
- Leverage a centralized management structure to address investment priorities for shared services.
- Define and clarify funding mechanisms, service levels for shared services, and adherence/compliance actions.

## **6. Case study: Practical challenges in applying the proposed framework to e-government integration efforts**

The implementation of the enterprise information management framework to support information integration is a complex and difficult challenge, especially when considering the fact that many existent interdependencies between ministries and IT components must be coordinated to achieve success. Based on literature and practical experience, most of these challenges are actually related to the overall issues of management of information technology in the public sector (Landsbergen and George Wolken, 1998; Guijarro, 2009, 2011). The lessons below are derived from our current involvement in several ICT projects supporting the Romanian government. Most of these lessons can be found in other middle countries' experiences. First, there is a need for a comprehensive e-Government Strategy that places the citizens, business and other stakeholders at the center of its focus. Having an e-government strategy means more than just writing and agreeing on a common set of objectives. It involves building a coherent enterprise architecture framework to align the mission, objectives, processes and capabilities within and across the Government organizations for delivering efficient services to citizens and business through IT systems. Without such a coherent framework systematically implemented by ministries and agencies, the strategy will just stay on the shelf and/or the implementation of technology will continue to evolve in silos.

Second, there is a need for high level leadership and commitment to make e-government a real priority on the government agenda. This is critical for developing and owning a coherent enterprise architecture framework and principles for the "whole of the Government" and individual ministry or agency levels. With no overall coordination of different e-government initiatives, agencies have no economic and/or immediate political incentives to share data and business functionality with other organizations. This has a direct impact on the ability of the whole government level to develop and implement shared platforms and standards as execution of e-government projects is usually spread across various government organizations (Porumbescu et al, 2012). Third, there is need of business and ICT competencies in enterprise architecture in almost all Government organizations. Compared to private sector, this is a major challenge as the public sector has difficulty in attracting and retaining skilled and talented professionals, mainly due to low wages. Government officials, as well as general ICT staff have limited knowledge of enterprise architecture frameworks, ICT portfolio management, shared services, and interoperability frameworks. Fourth, there is a need for a medium to longer term view in reforming the business architecture of the Government and implementing e-government solutions. Mostly triggered by ad-hoc legal or political needs, many e-government projects automate existing business processes in the absence of streamlined business architecture, leading to a sclerotic, often rigid and inefficient service delivery. Very often driven by vendor interests, such projects that deal with sharing and integration of information place emphasis on the implementation of the technical aspects of interoperability and are not concerned with the efficiency of service delivery. In addition, the various political and financial constraints often disrupt the long-run planning and implementation of e-government projects, especially those that involve more than one ministry or agency. We should also be aware of external pressures where e-government projects may become a priority on the public policy agenda mostly due to the politicians' interest to address the demands made by European Union officials at a certain point in time (Porumbescu et al, 2012). Lastly, there is a need to improve the trust of the officials and beneficiaries of e-government services by organizing appropriate security functions that meet the business and technical interoperability requirements. One of the main concerns we heard from many government officials, even within the same ministry, relates to the fact that they believe that sharing the same infrastructure with other departments' or ministries means

that they might have access to their data. Therefore the attempts to enable cross-organizations efficiency in service delivery are often met with resistance and mistrust. This perception among top government officials could be addressed by developing appropriate security architecture, in line with interoperability and openness principles. This is part of the architecture work and should be based on common standards and solutions and common/shared agreements on reliability, legitimacy and administrative procedures.

## **7. Conclusion**

In this paper, we provided practical advice on the steps and reference architectures that may be useful in addressing information integration that is needed to support public services across government ministries. In line with the literature, we argue that enterprise architecture is a useful tool to align business and operational processes in public administration. Secondly, using an Enterprise Information Management (EIM) reference architecture, we argue that technical interoperability standards are important; however, you need to go an extra mile to address the overall information management issues and operationalize its technical implementation through common shared services. As explored in this paper, there is a need to manage and prioritize e-government initiatives across government ministries, especially when moving towards a shared services model. Finally, we summarized some lessons which were learned from the authors' experience in Romania on what might be the core challenges when implementing the proposed structures.

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# (Brook, 2011) Verifying Viral Veracity?

Rajash Rawal and Paul Nixon

Academy of European Studies & Communication Management, The Hague University, The Netherlands

[R.Rawal@hhs.nl](mailto:R.Rawal@hhs.nl)

[P.G.Nixon@hhs.nl](mailto:P.G.Nixon@hhs.nl)

**Abstract:** Rumour and gossip have always been part of political life. The pages of history are littered with incidents where rumours and half-truths have changed the political landscape. New technologies, concomitant applications and the rise of the citizen journalist have exponentially increased the scope, reach and spread of such rumours. Viral messaging is maturing and we will give examples of how rumour based video clips made by individuals have affected government and political life. We will also examine the rise of social networks as alternative spaces for political discourse. How are governments and politicians to respond? The recent paedophilia scandal in British politics and the use of social media, Twitter in particular, to spread the gossip has brought the issue of journalistic ethics to the fore. Government and democracy thrive on trust. The advent of 24-hour news and 24 hour politics places great pressure on institutions and individuals to manage their own image via structured information outputs. Rumour rebuttal is a key component of a successful campaign. This paper questions the root of our information sources. Social media has allowed rumour and gossip to take on new lives. Information can be spread (globally) at the click of a mouse. The danger, of course, is that there is no form of journalistic ethics or standards applied to such communication and this leads to a rise in misinformation. Journalists are forever on the hunt for a novel and exciting story, on occasion the source is the Internet and their verification of the story is debatable. We aim to explore the impact this has on government and democracy and stress the importance of due diligence by journalists and society alike. Misinformation is a political tool like any other, and its use must be carefully considered by all.

**Keywords:** rumour/gossip, viral, social-networks, politics, and citizen-journalism

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## 1. Introduction

Rumour and gossip have always been part of political life. The pages of history are littered with incidents where rumours and half-truths have changed the political landscape. New technologies, concomitant applications and the rise of the citizen journalist have exponentially increased the scope, reach and spread of such rumours. Such rumours whilst seemingly fleeting can have considerable longevity of life (Sunstein, 2009) and may, after a period of subsidence of interest, resurface as supporting evidence to subsequent rumours concerning the same ‘target’. This can be viewed as the modern day online social media expression of behavioural contagion, whereby a number of human beings can act together quickly even when they have very little else in common.” (Shibutani, 1966) It is what we know, in this context, as viral politics. Viral messaging is maturing and we will give examples of how rumour based video clips made by individuals, as well as other online material have affected government and political life. We will also examine the rise of social networks as alternative spaces for political discourse.

How are governments and politicians to respond? The paedophilia scandal in British politics erupted into the mainstream media in November 2012, following a concerted whispering campaign via social media platforms, whereby a senior Conservative politician Lord McAlpine was wrongly accused of involvement by an individual who had been a victim of said abuse at a children’s home in Wrexham, North Wales. The furore around the allegations and the BBC’s conduct in their reporting and editorial decision making processes relating to the issue led to the resignation of the BBC’s Director General. The rumours were transmitted over varying social media both in terms as a news reporting mechanism but also as a touch paper for the development and exposure of multi media resources that sought to stoke the fires of public unease and disgust. As an emotive issue it is ripe material for the rumour mongers. A prime example is that of the you tube video produced by the far right British National Party which sought to implicate other political figures both at national and local levels in the wider context of child abuse (<http://www.youtube.com/watch?v=fQ5pUZ4RDds>)

Such uses of social media, Twitter in particular, to spread similar notions of political gossip on numerous topics has, in this age of citizen journalism brought the issue of journalistic ethics to the fore.

Government and democracy thrive on trust and there can be no doubt that this dependency is amplified in an information age (Nixon, 2010). The advent of 24-hour news and 24 hour politics places great pressure on

institutions and individuals to manage their own image via structured information outputs. Rumour rebuttal is a key component of a successful campaign. This paper questions the root of our information sources. Social media has allowed rumour and gossip to take on new lives. Information can be spread (globally) at the click of a mouse. The danger, of course, is that there is no form of journalistic ethics or (Campbell, 2012) standards applied to such communication and this leads to a rise in misinformation (Berinsky, 2013). Journalists are forever on the hunt for a novel and exciting story, and increasingly instead of relying on first hand sources they are recycling rumours, innuendo and unsubstantiated report from online social media sources and the journalist's verification of the story is debatable. We aim to explore the impact this has on government and democracy and stress the importance of due diligence by journalists and society alike. Misinformation is a political tool like any other, and its use must be carefully considered by all.

## **2. Background**

Emotion is a centrepiece to politics. Without emotion, connection and involvement, albeit on a mainly passive level, politics would be insignificant as it relies on the passionate cry of idea and opinion to be forwarded in the advancement of whatever cause. Political scandals can have a negative effect upon trust in a political system (Castells, 2007) and it would seem likely that the emergence of social networks are only increasing the potential for those scandals to spread more quickly and more widely than ever before. Politicians thus need to counter the negativity centering around notions of trust in the political systems, and indeed in themselves as individuals, and re-engage people in the political process around an agenda based upon notions of individualism and emotionality (Hendriks, 2009). Politicians thus need to engender the build-up of emotion and the expression of such emotion in order to mobilise society in pursuance of a particular political outcome. What we have witnessed over the last few years is that the manner of this mobilization has changed and the tools used to stimulate have developed with this trend. An example of this is the growing impact of the entertainment industry on politics and the infiltration of media actors in politics (one need only consider the rise of Reagan, Berlusconi, Schwarzenegger, Campbell, etc. as examples) (Street, 2001).

Rumour or political gossip has been with us throughout history, with commentaries upon political actors taking the form of graffiti in early societies and can be evidenced at such sites as the Roman ruins of Pompeii. The most apposite way to define them is to use Sunstein's definition as "claims of fact - about people, groups, events, and institutions- that have not been shown to be true, but that move from one person to another and hence have credibility not because direct evidence is known to support them but because other people seem to believe them." (2009, p. 6) As Berinsky notes "the lines between true information and misinformation becomes blurred. Second, rumours are not mere fringe beliefs. They acquire their power through widespread social transmission and repetition." (2013, p. 3) Individuals process the same information differently (Chong & Druckman, J.N, 2007) It is also useful to note that the framing of such messages not only have an immediate impact on an individual but can also have an effect, indeed a potentially significant one, on the way in which those individuals interpret further information upon the topic and also impact upon their interpretation of information on subsequent differing topics (Pan, Z & Kosicki, G.M, 1993)

Politicians seek endorsement and support. The Internet age has multiplied their reach and scope in such a way that the boundaries of policy, personality and persona have become blurred. Indeed one could blame the personalization of politics (Stanyer, 2007) as being responsible for making us consider our political actors becoming media stars (Combs, 1984). Given Combs forwarded this argument in 1984 one can imagine how much this has been extended knowing that US President Barack Obama has some 35,081,476 likes on his official Facebook page. (Obama, 2013)

As a consequence, political gossip has also grown in its influence and impact. Gossip is a form of interaction "that in most societies variously provokes scorn, derision and contempt" (Besnier, 2009, p. 2) but also generates enormous interest. It is here where the quandary lies for political actors. On the prowl for media attention politicians seek to be part of what people are talking about and want their actions to be on everyone's lips. However, gossip is difficult to manage and has a long reach which can affect important events and determine biographies in such a way that careers can be propelled or jettisoned (Besnier, 2009). A recent example of government action on online rumours has been the shutting down of many online blogs and the restricting of online comments by individuals taken by the Chinese government (Guardian, 2012)

Therefore we could argue that gossip has two consequences; one political which is to mobilise and stimulate; the other social which may result in ridicule and ostracisation (Besnier, 2009, p. 17).

## **2.1 Gossip in the internet age**

As we have moved forward the realms available for gossip and rumour have abounded. The Internet has afforded new luxuries and freedoms which were previously inconceivable. One need only consider work of Dutton and his presentation of the Internet as “the fifth estate” (Dutton, 2009) in modern politics to see its impact.

However, the authors of this paper would like to warn of the pending dangers that this has on democracy and democratic development. As identified by Stanyer, there is a growing trend to use gossip-based websites as source material for not only journalists, but also watchdog investigations (Ken Starr covered a dearth in his evidence by using gossip websites as source material (Stanyer, 2007)). Berinsky (2013) gives us numerous examples of how gossip has been spread using online means and the ways in which such gossip is believed by some people, particularly in times of national stress. See for example his outline of people’s understanding of where Barak Obama was born as a salient political issue (*ibid* p.5 )

The ways in which news organisations have sought to provide information mixed with the notion of entertainment or infotainment is a growing trend. This juxtaposition of politics with popular culture is an ongoing trend and has also spawned a rise in videos which seek to parody politicians or political views and can be a useful tool to challenge campaign rhetoric. (Tryon, 2008) Thus this is a further example of the democratising nature of online communication as it affords an individual with relatively limited resources the ability to subvert the communicative hegemony of powerful candidates during campaigns. A seminal example of this was “Vote Different” in which Phil De Vellis used his skills to created mash up of a Hilary Clinton 1998 Presidential Campaign video and the 1984 American Football Superbowl advertisement. The subsequent you tube clip (<http://www.youtube.com/watch?v=6h3G-IMZxjo>) alludes to Clinton as a ‘Big Brother/Sister figure and, by linking with that pre-existing cultural connection, demonises her in the mind of the viewer.

Whilst Allport and Postman (1946) argue that rumours tend not to make people adopt new political standpoints but to be used as a mechanism to confirm existing attitudes, more recent evidence (Rainee, L. & Smith, A, 2012) seems to suggest that this is a changing perspective. With the plethora of media messages bombarding the citizen growing there is the question of how much influence does it actually have on people? Certainly information is viewed differently by different individuals and that media consumption affects people’s political attitudes (Hetherington, 1996)with education levels and media literacy being important determinants of how they do so (Miles, 2013). Also the ability to become not just a consumer but as producer of information is changing the landscape of political discourse.

Richardson, Parry & Corner (2013), have alluded to a rise of so called ‘mischievous blogging’ which is based on pure speculation and has allowed responsible journalists to use ‘private’ blog space to air their rumour and gossip and personal opinion. An example of this was the emergence of the Gordon Brown ‘Bullyinggate’ in 2010. Where evidence which in a court of law would be dismissed as hearsay was levelled at the then Prime Minister in all media forms (Richardson, Parry, & Corner, 2013).

Specific online sites are set up to transmit stories prior to their possible adoption by and emergence in the more traditional forms of media news outlets. Examples of such platforms are Before It’s News (<http://beforeitsnews.com/>), The Spin Doctor Section of Wales Online (<http://www.walesonline.co.uk/news/columnists/2011/03/13/spin-doctor-politics-news-views-and-insider-gossip-91466-28326479/>) and London spin online (<http://www.londonspinonline.com/>)

Another of this type of website that has sprung to global prominence is the Drudge Report. This site, started by Matt Drudge, focussed initially on Hollywood and Washington D.C. and aimed to provide an insight into events before they hit mainstream news. Drudge broke for example, albeit unverified, the first stories on the Clinton-Lewinsky scandal. He has openly admitted that his stories may be based solely on rumour and many are later dismissed as having little or no foundation. (Harris, 2009). Drudge depicts his website to be a news aggregator and, according to some, thus helps shape the media’s political coverage (Halperin, 2006).

Moreover, it has been suggested that this scandal syndrome we have encountered in the modern era is down to the gossip fed and gossip led rise of tabloid news. (Street, 2001). Stanyer refers to this as being the advent of ‘revelatory journalism’ (2007). Somewhat interestingly Stanyer explores how stories of yesteryear may be treated today, for example Abraham Lincoln’s depression, FDR’s handicap and LBJ’s idiosyncrasies, notwithstanding the countless affairs (Stanyer, 2007).

## **2.2 Casualties of truth?**

As the number of such websites swell, so does their influence. A non scientific poll taken among 18-24<sup>1</sup> years over a three month period spanning December 2012 and February 2013 illustrates this.

We asked the following three questions:

1. “Do you think that there is any truth in political rumour and gossip?” (Yes/No)
2. “Does political rumour and gossip influence your decision making?”(Yes/No)
3. “Do you believe what you read in journalists’ blogs?”(Yes/No)

The answers were

Question 1:	Yes	65%	No	20%	Not Sure	15%
Question 2:	Yes	75%	No	10%	Not Sure	15%
Question 3:	Yes	55%	No	35%	Not Sure	10%

These results seem to vindicate the idea that there is no smoke without fire and that journalists and bloggers need to make sure their stories are watertight and hold firm under scrutiny given their influence. Indeed “false accusations and rumours are unfairly tarnishing reputations” (Campbell, 2012).

However, there are a series of examples where this is not the case and either the information is totally false or at least in part. The aforementioned Paedophilia scandal in the UK is one example, as are some of the wilder accusations that abound surrounding the case of Daniel Strauss Kahn who’s sex life was brought to the attention of online audiences in such a way that he was discredited as a serious candidate for high political office in France with films such as [http://www.dailymotion.com/video/xkmnda\\_strauss-the-managing-director-of-imfing-you](http://www.dailymotion.com/video/xkmnda_strauss-the-managing-director-of-imfing-you) news or <http://www.youtube.com/watch?v=24a-Qb327ok>

Further examples include the spread of rumour on Twitter that US Congresswoman Gabrielle Giffords had died from shots to the head, where indeed she was very much alive and has since made a remarkable recovery, or the news that Governor Nikki Haley of South Carolina was facing tax indictments, based on malicious lies spread by a blogger. (Campbell, 2012).

Even the news surrounding the Newtown shootings in the United States in 2012 seemed to be inaccurate. Conflicting reports are inevitable when news breaks (Kayyem, 2012), but the speed with they are printed without any verification is potentially damaging credibility of information.

## **2.3 Conclusions**

There can be little doubt that the impact and effect of political rumour mongering is made worse by the rapid pace of technological change that we are experiencing today. As the ability to transmit messages across the globe in the blink of an eye is allied to the spread and diffusion of the technological capability to do so , this aids the rise of citizen journalism. This a method of reporting that is often without even the most basic checks on the veracity of the information being posted or, perhaps most saliently in the modern age, prior to it being reposted in a viral sense. Thus, despite the efforts of people such as Lord McAlpine who have sought to bring some form of responsibility and ownership of the information transmitted at each stage of its publication it would appear that with the spread of mobile technologies and our increasing dependencies upon social networks and micro-blogging platforms which are ever more fully integrated into our social lives that the proliferation of such damaging material is set to continue. As the notion of film and clip production and

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<sup>1</sup> Sample size 200

manipulation becomes more widespread we can expect to see this as an increasingly popular form of political comment, particularly among the young who are increasingly more visually literate.

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# **Management Structures and Strategies for Successful e-Government Deployments**

**Arthur Riel, Denisa Popescu and Luisita Guanlao**

**The World Bank, Washington, DC, USA**

[ajriel@worldbank.org](mailto:ajriel@worldbank.org)

[dpopescu@worldbank.org](mailto:dpopescu@worldbank.org)

[lguanlao@worldbank.org](mailto:lguanlao@worldbank.org)

**Abstract:** There is a considerable body of research that has been published in the areas of e-Government prerequisites, e-Government deployments, Interoperability models and Enterprise Architecture frameworks/approaches. One important facet of successful e-Government adoption, e-Government management structures, has not been well researched, analyzed or explored. This paper establishes a baseline discussion on the current strategies for management structures from both a theoretical as well as pragmatic viewpoint. An analysis of the advantages and disadvantages of each strategy is presented against a backdrop of case studies relevant to the various management structures. The analysis continues with theoretical, optimal strategies for various e-Government initiatives. Three main management strategies are examined, including centralized management/centralized funding, decentralized management/decentralized funding, and decentralized management/centralized funding. The advantages, disadvantages and challenges of each are presented alongside illustrative case studies.

**Keywords:** e-government management structures, e-government management strategies, e-government cio, e-government policy, e-government case studies

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## **1. Introduction**

Governments around the world are defining, architecting and executing e-Government strategies. The motivations for government interest in this exciting area are varied but invariably include one or more of the following: better governance, more efficient government service to a country's citizens, more efficient government service to business (particularly small business), reduced bureaucracy especially between various government ministries, trade facilitation, and enhanced transparency. There is a considerable body of research that has been published in the areas of e-Government prerequisites, e-Government deployments, Interoperability models and Enterprise Architecture frameworks/approaches. One important facet of successful e-Government adoption, e-Government management structures, has not been well researched, analyzed or explored. This paper establishes a baseline discussion on the current strategies for management structures from both a theoretical as well as pragmatic viewpoint. An analysis of the advantages and disadvantages of each strategy is presented against a backdrop of case studies relevant to the various management structures. The analysis continues with theoretical, optimal strategies for various e-Government initiatives and concludes with a blueprint to match management structures with various types of e-Government initiatives.

Three main management strategies are examined, including centralized management/centralized funding, decentralized management/decentralized funding, and decentralized management/centralized funding. The centralized management/funding model is presented as the most efficient, and most elusive, of the three models. Unlike the private sector in which such models are the most prevalent, government ministries/facets tend to gravitate towards autonomy of technology management and budgeting (i.e. decentralization). The most common government organization is a decentralized management and funding model in which each government ministry/facet has its own IT department, data architecture/implementation and management hierarchy. In this most common management structure the research focuses on techniques such as virtualized central control and "coalition of the willing" techniques to establish a consistent vision, data architecture/implementation and interoperability model.

The third management strategy (decentralized management/centralized budgeting) is viewed as the most useful structure as it accomplishes many of the efficiencies of a centralized model while being pragmatic in avoiding disruptions to the typical decentralization of government ministries/facets. A separate group is created outside of any government ministry/strategy and given a budget of which only 5 to 20 percent is available for that group's administration. The remaining budget must be dispersed to other government ministries/facets or returned to the general fund. This provides maximum incentive for the outside group to

involve the ministries in creating a holistic vision and incentives for ministries to deploy the e-Government initiative in a timely fashion. The ability to provide an outside budget for ministries serves as a powerful incentive for government facets to follow the common vision.

There are many measures of success when analyzing management models of eGovernment deployments and their impact on national strategies. The most important measure is the increased efficiency of government as seen by a nation's citizens and business entities. The interoperability of government ministries/departments is another important metric that can be examined. While uninteresting in isolation, interoperability is a measure for future success in the eGovernment space. Indicators of IT innovation and management effectiveness, such as data center consolidation can also be useful indicators of IT management arrangements on eGovernment success (Markus et al, 2012). Efficient disbursement of budget is often examined as a metric because it tends to be easier to measure than more qualitative forms of performance indicators. However, movement of money is no guarantee of improved efficiency as seen by the key stakeholders and beneficiaries of an eGovernment deployment, and therefore not particular useful in this context.

## **2. Centralized management/centralized funding**

The first, and arguably the most efficient management model consists of a government structure where the country has a government CIO to whom all IT resources report in a hierarchical structure. The management of the e-Government initiative is run by a single facet of the government (e.g. Prime Minister's Office, President's Office, Ministry of Finance) with the other facets taking their lead from the primary lead facet. This model allows for a central point of control to define the strategy and manage its execution. E-Government initiatives are often slowed down, or even fail, due to the dismal state of core data in most countries (or any large organization). The data requirements for a set of government services is often created and maintained by several ministries. For example, information necessary for an electronic passport application might require birth certificate data from the Ministry of the Interior, a criminal background check from the Ministry of Justice and clearance of tax liens from the Ministry of Finance. The silo-based structures so prevalent within government ministries make this task arduous at best and nearly impossible at worst. In most cases each Ministry will use a different identification for citizens making cross referencing data very difficult. Having centralized management allows for a rationalization of data entities across the ministries thereby making it much easier to roll out e-Government services.

By centralizing the funding model, the country CIO can ensure that his or her policies are executed properly by withholding funding from ministries that do not standardize on data, technology stack or any other IT related facet. The IT heads of each ministry operate much like department heads in private organizations, each reporting to and receiving their funding from, the CIO. This optimizes the IT spend and provides a mechanism to ensure that a central strategy is executed uniformly across the organization.

Given all the benefits of a centralized management and funding model one might wonder why we need examine any other models. As efficient as this model is, it is also extremely rare. In fact, the case study for this model is not a pure centralized model, but the closest example of a country with such a model. The reasons are varied but a common thread is the silo-based nature of government which is exasperated by multiple political parties sharing power concurrently. These parties often have very different visions of country development and their debates can be rigorous. These differences spill over into the national development plan and its associated IT strategy.

Our case study focuses on Moldova where there was a decision to strategize and execute on an e-Government program ('E-Government to have positive effects for Moldova', 2010). The Prime Minister centralized the management of the program delivery under his office and created a national CIO, placing the program team under this new central role. The first phase of the project, a \$22MM project to create a Moldovan government cloud is currently underway. The strategy for rolling out the e-Government services is to first define and prioritize a list of required services. A subset of high priority services with a common set of underlying data requirements is selected. This underlying data model can then be architected, refined and populated from various ministry databases, data marts and other sources. In this way, heterogeneous data sources can be normalized in a productive manner, with e-Government services developed on top of the resultant gold data source ('Moldova E-Government Workshop', 2012).

While the case study has been relatively efficient, it is not a pure centralized model. The IT heads of the various ministries do not formally report to the government CIO, but there is strong support from the Prime Minister's office to encourage their collaboration. As such the program has been successful, but is not without complications due to various IT heads not participating or collaborating optimally. With nearly four years left in the project there is considerable study to be conducted on how closely this case study will mirror the theoretical benefits, but the initial results are very promising.

The Austrian government has a similar variant to this model where overall strategy, coordination and cross-cutting projects are centralized under a single CIO in the State Secretary in the Federal Chancellery. Ministry specific and local projects are not actively managed by the CIO, but handled within the local IT organization ('Austria eGovernment strategy', 2013). Switzerland is another example that closely follows the Austrian model ('Framework Agreement on eGovernment Cooperation in Switzerland', 2013).

The United Kingdom attempts to support a centralized management model but opts for a CIO council made up of the six CIOs representing the largest government departments as ranked by IT delivery. While there is a government CIO to chair the council, the individual CIOs are responsible for ICT delivery within their respective areas ('UK Government ICT Strategy', 2013).

Empirical literature on IT arrangements for e-government in US state governments also supports our findings. The quasi-centralized models seems to be prevalent where a formal authority as the government Chief Information Officer (CIO) position supported by IT governing bodies and IT governance processes (e.g. enterprise architecture, portfolio management, technology standards) exert tighter central control over shared projects and services and looser central control via standards and guidelines over local IT activities (Markus et al, 2012). Tolbert, Mossberger and McNeal (2008) also found that states with higher levels of e-government implementation have such IT management structures that span departmental boundaries (chief information officer, technology boards, shared services).

### **3. Decentralized management/decentralized funding**

The most common model of e-Government program management is a decentralized management and funding model in which each ministry has its own IT management, team, technology stack, and data model. Unlike the private sector, where centralization is the norm, government management structures tend to be problematic. Where centralizing the management structure is not feasible there are two main methods for injecting order into the silo-based nature of the typical government structure: virtual central control and a "coalition of the willing".

Governments in which all or most of the ministries recognize the inefficiencies/pain points of a heterogeneous environment tend to benefit from the creation of a virtualized central control. This normally sees one of the more powerful ministries (or a prime minister's or president's office) taking the lead to coordinate e-Government program efforts. Each ministry assigns staff to the common goal of architecting gold data models, technology standards and an e-Government services program. In addition, each ministry pools a percentage of its budget for this effort. Under leadership of the guiding ministry or other government body, the virtual team and its budget create the e-Government strategy and then executes on it. The prerequisite of success for this strategy lies in having a government in which most or all ministries are motivated to create a homogeneous IT environment from their disparate architectures.

Many governments do not have the luxury of Ministers that share a common vision for technology or an e-Government strategy. An attempt to create a virtually centralized management structure is met with cynicism and finding a lead Ministry that can develop a consensus among the other branches of government becomes very difficult. In these cases, which are the most common scenarios found when developing e-Government strategies; the creation of a "coalition of the willing" becomes the best chance of moving the country's e-Government agenda forward.

The goal of a willing coalition strategy is to find several ministries where the lack of homogeneity and/or an e-Government strategy is especially problematic. To find critical mass, one or more powerful ministries need to be aligned. The Finance, Communications, Interior, Trade and Justice Ministries are often the best choices for such a coalition. The representative ministries are then joined by smaller, weaker ministries that hope to

benefit from cleaner data sources and e-Government services. The coalition then works very similar to a virtual centralized structure in defining prioritized list of services with common underlying data models. One key difference is that services are typically restricted to those that can be developed on data available within the coalition. For this reason, data rich ministries such as the Interior (for citizen facing services) or Trade/Commerce (for business services) tend to be popular choices for the coalition. The coalition defines the e-Government program, cleanses the required data and implements the services. Early success is critical for attracting the recalcitrant ministries to join the effort. A belief that “success breeds success” is of great importance for this strategy. When the remaining elements of government see the success of the coalition, it becomes much easier to recruit them for their own successes as well as to receive staff and budget to support the ongoing efforts. This bootstrapping approach is not near as efficient as a centralized model, but is often the only way to execute a successful e-Government program in many countries.

The Romanian Government has established the Ministry of Communication and Information Society to set e-Government strategy. While some progress has been made in that area, several of the larger Ministries are planning for a “coalition of the willing” variant to the decentralized strategy ('Romania Ministry CIO Workshop', 2012). In Romania, each ministry is autonomous with its own IT strategy, leadership, data models, technology stack, etc. The government recognizes the need for some homogeneity if e-Government services are to be deployed to the citizenry and businesses within the country. The data required for interesting e-Government services spans multiple ministries and is often indexed in very different ways. The goal is to start with several powerful ministries together with several looking to benefit from a common e-Government strategy, picking up the less motivated sectors once a number of successful services can be deployed ('Romania Foreign Investors Council Workshop', 2012).

Portugal is another country where decentralization is the rule. Individual ministries carry out their own projects. A loosely defined coalition of the willing is collected around the Secretary of State for Administrative Modernization which is authorized under the Minister for the Presidency (Reddick, 2010). France divides responsibilities to various government departments. Political responsibility for eGovernment is with the Minister for the Budget, the State Secretary for Advanced Planning of the Digital Agenda, and the Council for Modernization of Public Policies controls the use of public funds used to improve the quality of public policies (Reddick, 2010)

#### **4. Decentralized management/centralized funding**

The third management strategy is to accept the fact that within most governments there is a natural decentralization of authority and control. That, however, does not mean that budgets cannot be effectively centralized and used as a pseudo management force where IT strategy (in general) and e-Government (specifically) can be normalized. In this alternative method, each ministry starts with its own IT department, leader, data model and technology strategy. The government creates a third party group, typically outside of any ministry, chartered to develop an IT strategy including an e-Government program. Ideally this strategy is created with major participation from the IT departments of each ministry. The third party group is given a large budget where five to twenty percent is an administration budget for the third party group and the remainder must be given to the other government departments.

In this model, the centralized budget becomes a proxy for centralized management where the third party group can essentially fund activities that it deems part of a central plan, and not provide funds to ministries that do not participate in central planning. It is far easier to sell a strategy where you can tell a group what needs to be done, and then actually pay for them to execute that strategy.

This model has been effectively deployed in Belgium where a third party group named Fedict was formed from resources within the various ministries along with additional personnel in 2001 ('Belgium: a pragmatic approach to eGovernment', 2012). This group worked with the ministry IT departments to construct an overall IT strategy and e-Government program. The group was given a budget of tens of millions of Euros of which more than 90% needed to be distributed to other ministries for the execution of the common strategy ('Moldova government workshop on cloud', 2012). Through this distribution mechanism, ministries were given a large incentive to participate in the common strategy, and starved of adequate budget if they were attempting to execute projects outside of the national strategy.

This method is expected to become more prevalent in the future as it recognizes the autonomous nature of government ministries while eliminating the inherent inefficiencies of decentralized management solutions.

## **5. Conclusion**

As governments embark on e-Government strategies whether to benefit their citizens, their businesses or to improve inter-ministry effectiveness, they are faced with the reality that most governments are decentralized in nature with many autonomous ministries working in very different technology directions. The problems of decentralization can be overcome using one of three management strategies:

- The government can create an enforced centralization of management and budget through a government CIO.
- The government can create a virtual centralized focus of control using one of the more powerful ministries to serve as a proxy for a national CIO or create a willing coalition of several ministries to act without 100% participation, bringing in less willing partners over time as the success of the coalition is realized.
- The government can create a third party strategy team and empower them to distribute budget monies to those ministries that follow a common IT strategy, effectively punishing those who work on projects outside of an agreed agenda.

A centralized model is the most efficient, but also the rarest given the intrinsic nature of government structures. While centralization can be faked through a powerful ministry or coalition of ministries, this process is much less efficient than a centralized approach. Countries like Belgium have begun using a centralized budget as an interesting mechanism to enforce centralized management without changing the internal structures of ministries. The latter is expected to be a rapidly growing method for e-Government deployments.

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# Exploring How the Appreciative Inquiry Model can Vitalize the Online Citizen Debate

Elena Sánchez-Nielsen and Carolina Martín-Vázquez

Dpto. E.I.O. y Computación, Universidad de La Laguna, Spain

[enielsen@ull.es](mailto:enielsen@ull.es)

[cmartinv@ull.es](mailto:cmartinv@ull.es)

**Abstract:** The success of e-participation depends on citizens' active involvement. However, citizens' active engagement is a complex issue affected by many different barriers such as individual, structural, cultural, and political constraints, and the perceived ease of using technology. The aim of this paper is to investigate how the Appreciative Inquiry (AI) model can be used in the context of e-participation to formulate appreciative inquiries, promote constructive dialogues, and vitalize the active engagement of citizens in online debates on policy-making processes in two local municipalities. This methodology has been applied in the European project "Puzzled by Policy: Helping you be part of EU", which provides a unique platform for users to learn and discuss policy at EU and national levels, while finding out what particular policies mean to them both nationally and locally, so that they can contribute to policy drafting. The qualitative findings suggest that the appreciative inquiry model has the potential to foster social participation and promote constructive narratives to encourage proposals on the policy-making process in local municipalities. In addition, the findings indicate that the online debates facilitated from an appreciative viewpoint by mediators are able to promote more interaction and participation compared with those not formulated from this viewpoint. As a result, appreciative questions elicit a more proactive and internalist type of discourse and, at the same time, one more focused on solutions.

**Keywords:** e-participation, online citizen debate, appreciative inquiry model, immigration

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## 1. Introduction

The aim of e-participation is to use ICT to enhance and deepen political participation among citizens (Macintosh 2006). A high level of interaction between citizens and decision makers can strengthen the policy-making process and allow new forms of collaboration and ways of working to create more informed and effective policies (Schlosber et al 2007). Online citizens' debates play an essential role in e-participation to disseminate and strengthen policy-making. One of the main benefits of online citizen debate is its *flexibility* in terms of time and location, as well as the choices made available to the participants (Price 2006). Although a growing body of literature has been devoted to the main benefits and opportunities that online citizen debate can offer, little is known about the driving forces that would foster citizens' active engagement. Specifically, different challenges need to be addressed in order to enhance and vitalize citizens' active participation in online debates through e-participation initiatives. These challenges refer to the perceived ease of using technology, individual and social constraints to online participation, apathy, structural constraints to online participation in terms of marginalizing minorities or alternative perspectives, and overcoming constraints to political participation.

The appreciative inquiry (AI) model is a relatively new, but increasingly popular, organizational development approach for creating positive organizational change. This model seeks to identify the best in individuals and organizations through a model of inquiry and discovery, creating motivation and engagement by participants to make change in organizations (Cooperrider 2005). This AI positive model has been successfully applied in offline contexts such as in organizational, community and educational situations.

The aim of this paper is to investigate how the Appreciative Inquiry (AI) model can be used in the context of e-participation to formulate appreciative inquiries through the *inquiry* concept, promote constructive dialogues, and vitalize the active engagement of citizens in online debates on decision-making processes in two local municipalities through the *discovery* concept.

The remainder of this paper is organized as follows. Section 2 presents the scenario that is used to apply the methodology. This scenario corresponds to the European project "Puzzled by Policy: Helping you be part of EU", in which the theoretical rationale, background and need for using the AI model as a methodology to foster social and constructive dialogue in the context of the Spanish pilot is described. Section 3 provides the quantitative and qualitative findings of the research using this AI methodology. Section 4 gives the concluding remarks.

## 2. The *Puzzled by Policy* e-Participation project

Puzzled by Policy (PbP) aims to reduce the complexity of decision making within the EU and reconnect citizens with decision makers and policy making, through the PbP online platform (<http://join.puzzledbypolicy.eu/>), to bring policy making closer to citizens on the hot topic of immigration (Lee 2011). PbP involves four pilots in four EU countries: Spain, Italy, Greece, and Hungary. In the case of Spain, the integration of immigrants and social cohesion is one of the most important challenges facing Spanish society related to immigration policy.

The PbP platform consists of three components (Lee 2012): (1) The *PbP Policy Profiler* is a Web based tool giving users the opportunity to find out about their preferences within the policy field of immigration; (2) The *PbP uDebate* is a multilingual, pan-European, deliberation forum, where users can view, discuss and share ideas on immigration policy; and 3) The *PbP Widget* enables the viral distribution of the platform throughout the Web.

In particular, the PbP udebate tool is focused on the use of a deliberation model. This model is implemented through deliberative discussion threads, where the posts of each thread are classified as an Issue, Alternative, Pro Argument, Con Argument or Comment. While all discussions are public, only registered PbP users may contribute to the discussion. This is to promote the accountability and transparency of posts. Every discussion is annotated as European or national, so that discussions can be browsed and merged accordingly.

In January 2012, Tenerife's public authorities, civil society leaders and community representatives launched an e-participation initiative with a view to fostering social cohesion and community bonds in two culturally diverse neighborhoods: (1) El Fraile in the Arona municipality in the South of the Island, and (2) Taco in the La Laguna municipality in the North of the Island. The idea arose from the cooperation between the European Puzzled by Policy project, and the Spanish regional project "Juntos En la misma dirección" (Together in the same direction) with the aim of encouraging urban dwellers to participate in shaping migration policies through the *PbP* platform. Both municipalities have a vibrant migration history and the need to re-consider their human and cultural diversity as a resource rather than equating it with problems and conflicts. This initiative quickly earned the interest of mayors, representatives of the different stakeholders, associations of neighbors, and immigrants from Senegal, Nigeria, Ghana, Uruguay and Colombia, as well as, public authorities, such as the Arona Municipal Council, La Laguna Municipal Council, the Department of External Affairs and the Immigration Observatory of Tenerife.

The policy framework proposed for this initiative was based on a process of consensus and participation of all the immigrants, non-immigrants, stakeholders and decision makers in order to identify the key aspects to be addressed, to provide best practices and build future plans for integration and policies in these local municipalities. To accomplish these aims, first, the Policy Profiler Web based tool was used to give people the opportunity to find out about their preferences within the policy field of immigration. Second, the uDebate tool was used as a deliberation forum, where users could view, discuss, and share ideas on European immigration policy, and more specifically on Spanish immigration policies. As a result, the goal was to work with citizens to opine, and then with policy makers to make them aware of the views of citizens with the purpose of taking these views into account when defining public policies in the areas of integration and social cohesion in these two local municipalities. It should be noted that this methodology could be applied to any other local municipality and policy to be debated.

Although online discussion tools can be designed and used in ways that significantly enhance the quality of discussion and decision-making, a great deal of effort is required to engage citizens in policy-making. The use of ICT for e-participation in PbP can be considered as a silver bullet; however, the experience gained from the PbP platform has shown that ICT alone cannot address the political, cultural and social barriers to participation. In this context, the AI model is a key factor that can help to vitalize participation in a realistic and achievable setting, through social constructive dialogue and progressive engagement.

In the following sections, firstly, the theoretical rationale for the use of the AI model is addressed. Secondly, the appreciative methodology is described.

## 2.1 Appreciative inquiry - theoretical rationale

Although the model of deficit and negative language prevails as the current and dominant narrative in western cultures, some authors have proposed a change (Gergen 2003). Positive language has been associated with an increase in the creative ability to solve problems, make decisions and judgments more effectively (Isen 2001), and with an improvement in the ability to learn and generate new ideas (Bower 1981). In contrast, negative language based on problems and criticism invites us to focus on the negative aspects of individuals or communities, triggering defensiveness and as a result, tends to discredit or belittle. The negative viewpoint rarely generates a new vision, limiting the proactivity among participants. Consequently, this type of narrative diminishes the potential that exists in humans to create and participate.

The AI approach is conceived to foster a collaborative construction of reality based on dialogue and a systematic search for what works best as a key way to achieve organizational or a positive community response. It is based on two basic concepts: (1) *the inquiry*, which is focused on asking questions, investigating, exploring, discovering and being open to new things, and (2) *the discovery*, which is focused on valuing and recognizing the strengths and successes to empower, rather than emphasizing the negative and falling into criticism. The appreciative attitude arouses the desire to create and discover new social possibilities through inspiring inquiries. This is accomplished through a story telling methodology, which includes a series of pre-meditated questions for facilitating discovery of strengths. The questions are based contextually on the past, the present and desired future experiences. A conceptual model includes the 4D cycle surrounding the “positive core” (Cooperrider 2008): (1) Discovery, appreciate what was and is, (2) Dream, what might be, (3) Design, what should be, and, (4) Decide, what will be. The practice of AI is based on eight principles (Whitney 2002). Table 1 summarizes these principles.

**Table 1:** Basic principles of the practice of the AI model

Principle	Definition
The Constructionist Principle	Words Create Worlds Reality is socially created through language and conversations.
The Simultaneity Principle	Inquiry Creates Change Inquiry is intervention. The moment we ask a question we begin to create a change.
The Poetic Principle	We Can Choose What We Study What we choose to study makes a difference. It describes, even creates, the world as we know it.
The Anticipatory Principle	Image Inspires Action Human systems move in the direction of their images of the future. The more positive and hopeful is the image of the future, the more positive the present day action.
The Positive Principle	Positive Questions Lead to Positive Change Momentum for change requires positive effect and social bonding. This momentum is best generated through positive questions that amplify the positive core.
The Wholeness Principle	Wholeness Brings Out the Best Wholeness brings out the best in people and organizations. Bringing all stakeholders together in large group forums stimulates creativity and builds collective capacity.
The Enactment Principle	Act “As If” Is Self-Fulfilling Positive change occurs when the process used to create the change is a living model of the ideal future.
The Free Choice Principle	Free Choice Liberates Power People perform better and are more committed when they have freedom to choose how and what to contribute. Free choice stimulates organizational excellence and positive change.

## 2.2 Methodology

The premise of the methodology developed is to apply the AI model focusing on the basic AI principles in order to promote a socially constructive dialogue, a positive and proactive attitude and to foster and vitalize the online citizen debate through the *PbP uDebate* tool. The methodology proposed has been built on how positive language is able to increase the creative ability to solve problems, leads to a more effective way of making decisions and judgments, greater optimism, and increased ability to learn and generate new ideas.

A commission comprised of experts in educational psychology, educational therapy, and appreciative inquiry was set up with three main goals: (1) formulating the set of appreciative inquiries using basic AI principles, (2) facilitating a constructive debate and vitalizing the active engagement of citizens using an AI-based moderation, and (3) defining the set of indicators for the assessment of the findings.

### *2.2.1 Building appreciative inquiries*

The appreciative inquiries for the uDebate tool were formulated by the commission of experts according to a set of projected qualities. Table 2 identifies these features and their description.

**Table 2:** Definitions of the design qualities for the appreciative inquiries formulation

Design qualities	Description
Open	The inquiries are designed to get spacious responses, targeted to meet general circumstances and opinions. These inquiries are used to initiate debates in order to find out what the expectations of the other parties are.
Hypothetical and reflexive	The inquiries seek to influence the parties indirectly, basing the inquiry on hypothetical situations, creating the space for the parties to see new possibilities and changes.
Enablers and generative	The inquiries are used to discover new possibilities and trigger change, so it is important how the words are chosen to ask it.
Language set	Language expression aims to facilitate the interpretation of the inquiry, based on simplicity and concreteness.
Positive dimensions	Inquiries are focused on those aspects that can facilitate change. Instead of focusing on lack and fall into negativity, they help to promote the widest set of alternatives and solutions.
Solutions	Criticism is left aside and questions focus exclusively on creative alternatives that can lead to a better future.
Successful experiences	It aims to find different examples of successful stories in the past and stories that can inspire people to repeat these achievements in the future.
Proactivity	Finding out leads to an attitude in which the person assumes full control of himself/herself to generate improvements.
Promoting changes and alternatives	The road to success starts with questions that help us build a better future. Questions stimulate our thinking and therefore our actions and results.

Two appreciative inquiry examples used in Spanish PbP uDebate, based on the features of Table 2, were the following:

- What does a person who comes to our country for training give us? What contributions do immigrants' countries make?
- What aspects do you think help promote coexistence and social cohesion in a multicultural country?

Both inquiries are open questions used to initiate debate focusing on positive dimensions and potential in order to promote the widest set of alternatives and solutions.

Two EU inquiry examples formulated without considering an appreciative approach were the following:

- Should EU member-states continue imposing conditions of income, housing and/or social security on the immigrants who want their families to join them from outside the EU? (Art. 7, Council Directive 2003/86/EC on the right to family reunification)
- Would you reduce the resources devoted to strengthening the processes of integration and social cohesion in times of economic crisis?

In these cases, both inquiries are closed questions characterized by technical language and focusing on problems instead of alternatives and solutions.

### *2.2.2 Facilitating appreciative debate by mediators*

Once appreciative inquiries have been formulated, the next step consists of encouraging and vitalizing citizens and stakeholders to participate in PbP uDebate, in which, facilitators play an essential role. According to AI fundamentals, four different phases have been identified in PbP uDebate to guide the deliberation and engagement after the appreciative questions have been uploaded to the debate: (1) search for resources, (2) construction of goals, (3) design of proposals, and (4) performance. The use of AI also provides a structure that allows facilitators to guide the debate through the abovementioned phases in order to discover strengths and useful resources to construct shared goals, design proposals to achieve them, and accompany these goals in

their development and performance. Some of the example scenarios of PbP uDebate involving moderated responses from facilitators for each AI phases and corresponding responses from participants are shown in Table 3:

**Table 3:** Example scenarios of AI based-debate in PbP uDebate on immigrant integration

Phase	Moderation based-example	Response from participants
Search for resources	Thank you! Do you know of any experiences that take advantage of these ways of seeing the world?	"The key point is that if they are qualified enough for the work they do and have enthusiasm and motivation to improve their work, it will result in overall efficiency for the economy of the company and in the country where the individual is working"
Construction of goals	Thank you! What if this happened? What would you notice?	"It would create a chain of functions that support local work to develop better the global one. With a good understanding and knowledge base, we would have concerned citizens with a common cause and with greater cultural richness in my region and country..."
Design of proposals	Thank you! How can we promote, among all the various aspects, getting more knowledge, experiences, views, and culture to improve the society in which we live?	"By studying and not limiting ourselves, making ourselves more competent, we will cease to fear that a skilled immigrant can get the most important positions in our country. Therefore I believe that diversity is a natural good that makes us grow as people and as a society"
Performance	Thank you! To date, how can we summarize the work carried out by all?	"Through the participatory work developed in Arona municipality, a driving group has been consolidated with a shared goal: Strengthen social cohesion and coexistence, by means of optimizing human and cultural diversity through citizens' participation. With this aim, the following lemma has been proposed: El Fraile for all! An action plan has also been developed, which is being carried out by diverse working committees related to different topics..."

### 3. Research design

In this section, the potential of using appreciative inquiries in the uDebate tool is tested in the Spanish pilot. Two indicators are defined to analyze the utility of the AI model: (1) the participation that questions are able to induce and, (2) the types of narratives generated by users.

#### 3.1 Data collection

A sample frame with 325 users who posted at least one comment over a five-month period (from March 2012 to July 2012) in the Spanish debate section at both an EU and national level was analyzed. The responses from the users to 18 questions were evaluated, nine of which corresponded to non-appreciative questions, and the rest were characterized by appreciative inquiries.

#### 3.2 Measures

##### 3.2.1 Independent variables

*Inquiry Type:* This independent variable corresponds to an appreciative or non-appreciative inquiry.

##### 3.2.2 Dependent variables

The dependent variables are: (1) number of responses, and (2) characteristics of the responses to the questions of the debate. Therefore, the following indicators were defined:

- *Indicators for quantifying responses:* the quantification of responses is measured by the active and passive participation. Active participation is assessed by the number of posts in the debate, while passive participation is evaluated by the number of views of visitors who consulted or read the discussions.
- *Indicators for qualitative assessment of responses:* this indicator is assessed according to three different dimensions. Each dimension has two associated categories.

- *Dimension 1: Tense.* The responses to questions in the debate can be classified as past or future tense. From the theoretical viewpoint of AI, the tense used to deliver a discourse is of great importance, since the collective creation of positive images of the future is believed to be the most important aspect of an intervention.
- *Dimension 2: Empowerment.* Empowerment is linked to the concept of locus of control of Rooter's framework (Rotter 1966). This concept refers to the ability of an individual or community to reflect on decisions by themselves beyond the social environment. The posture a person has in a dialogue moves within a continuum with two poles: the internalist and externalist pole. The internalist attitude is related to proactivity, a term which involves taking the initiative in developing creative actions to generate improvements. By contrast, an externalist attitude places the focus on the decisions and responsibilities outside of oneself or the group, assigning responsibility for change and decision-making on uncontrollable factors (luck, fate) or the power and decisions coming from others. The externalist attribution encourages passive and pessimistic language, since the person believes that they can do nothing to change a situation, thus building a dialogue focused on complaint or despair.
- *Dimension 3: Type of narrative.* The formulated question motivates the type of response. The responses are classified into two different categories: (1) criticism or problem and, (2) solutions or alternatives.

### 3.3 Findings on the qualitative impact of the inquiries on participation

To assess the quantitative participation through the uDebate tool, the number of views and posts were measured. Table 4 shows the frequency with the percentages resulting from the quantization of numbers of views and responses to the debate. This table shows a clear difference in participation between the questions formulated as appreciative compared with those not formulated from an appreciative viewpoint. Both the number of views and responses highlighted a difference in favor of appreciative questions. Specifically, related to the number of visits, the appreciative questions received 61.4% of the total visits, while related to the number of posts, the appreciative questions registered 69.9% of the total responses.

**Table 4:** FrequencyTable for formulated inquiries in uDebate tool

Inquiries	Number of views	Percentage	Number of posts	Percentage
Non- appreciative	4116	38.6%	98	30.1%
Appreciative	6535	61.4%	227	69.9%
Total	10651	100%	325	100%

### 3.4 Findings on the qualities of the inquiries

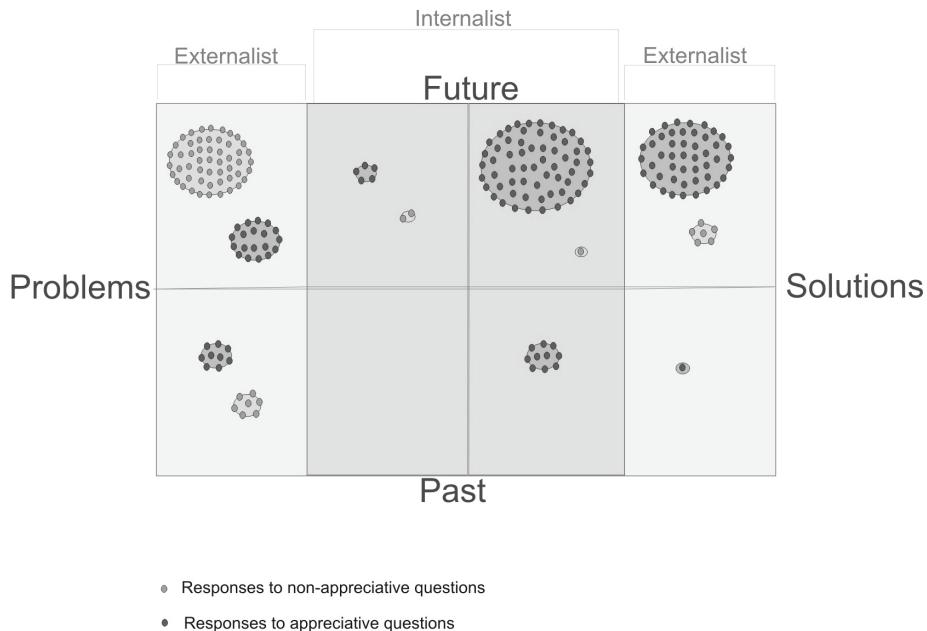
To evaluate the findings on the quality of the inquiries, the experts' commission in AI used the indicators described in Section 3.2.2. As a result, each comment posted was categorized into each of two categories associated with the three different dimensions (tense, empowerment, and type of narrative). Figure 1 shows the point cloud corresponding to the assignment process, in which, each point represents three answers posted to the debate. This figure illustrates how the answers to non-appreciative questions are focused on externalist and criticism-based discourses, while the answers to appreciative questions are predominately internalist and solution-based deliberations, and to a lesser extent give rise to externalist discourses and criticism-based discussions. Future-oriented responses are predominant in both types of questions.

In order to show the responses obtained from users to appreciative and non-appreciative questions, two examples are given below. In these examples, the assessment indicators are represented in parenthesis.

An example of a response from a user to an appreciative question is: "We present the proposals that are being developed by a panel that will be part (*focused on the future*) of the report (*focused on solutions*). This helps us (*internalize discourse*) to assess contributions and understand the place they occupy in the framework of a joint construction (*internalist discourse*) ..."

On the other hand, a response to a non-appreciative question is: "Noooooooooooo! The previous political party "Partido Popular" said (*focused on the past*) that immigrants are going to revive the country and make it richer. After two years, we see that this has not happened (*focused on the past*). No jobs for people born here (*focused on the problems*), they have brought drugs and crime (*externalist discourse and focused on problems*),

they have taken jobs with reduced salaries (*focused on the past*) and so, companies have reduced (*focused on the past*) recruitment of better qualified people..."



**Figure 1:** Point cloud results computed from the assignment of posts of uDebate according to the indicators for qualitative assessment of responses

A contingency analysis using the Person's chi-squared test was also carried out in order to assess the association between type of question and type of narrative. The indicators of tense, empowerment and, type of narrative, described in section 3.2.2, were used to perform this test. Table 5, 6 and 7 show the results of the Person's chi-squared test for type of question and tense, type of question and type of discourse, and type of question and empowerment, respectively.

The results of table 5 indicate that there is no significant relationship between type of question and the tense used by people to express their answers ( $\chi^2(231, 1) = 0.277, p > 0.05$ ). Both types of questions tend to lead to responses focused on the future. However, the results of table 6 show that there is a relationship between type of question and the type of discourse ( $\chi^2(231, 1) = 100.771, p \leq 0.01$ ), that is, the question design largely determines the attitude reflected by users when answering these questions. Finally, the results of table 7 illustrate that there is a significant relationship between the type of question and empowerment ( $\chi^2(231, 1) = 50.779, p \leq 0.01$ ). The question design determines the empowerment to answer questions.

**Table 5:** Person's chi-squared test for the type of questions and tense

	Value	GI	Asymptotic Sig. (2-sided)
Person's chi-squared	0.277	1	0.598
Correction for continuity	0.092	1	0.761

**Table 6:** Person's chi-squared test for the type of questions and type of speech

	Value	GI	Asymptotic Sig. (2-sided)
Person's chi-squared	100.771	1	0
Correction for continuity	97.881	1	0

**Table 7:** Person's chi-squared test for the type of questions and empowerment

	Value	GI	Asymptotic Sig. (2-sided)
Person's chi-squared	50.779	1	0
Correction for continuity	48.709	1	0

#### 4. Conclusions

In this paper, the use of the AI model is explored in the context of e-participation and applied in two local municipalities in order to foster and vitalize the active engagement of different actors involved in online

debates on the policy-making process on the topic of immigration. The questions designed for the online debate from an appreciative approach have been the most visited, and are those that promoted greater volume of comments. This demonstrates that the structure and narrative of appreciative questions have the capacity to promote the active participation of users. Firstly, it is noted that appreciative questions versus non-appreciative questions are related to different types of narrative used. Thus, responses to appreciative questions are perceived as a narrative focused on solutions, while responses to non-appreciative questions are seen as a narrative focused on complaints. Secondly, another characteristic of the type of response provoked by appreciative questions refers to the degree of empowerment, showing a tendency to elicit internalist responses, i.e. responses, in which, people take control and responsibility for change. As a result, appreciative questions elicit a more proactive and internalist type of discourse and, at the same time, one more focused on solutions.

We expected to find a measure of association between the type of question and the tense used that confirmed the principle of anticipation, but the results show no difference: the future tense is used to a greater extent, regardless of the question formulated. This makes us think that the anticipatory principle, which is projecting into the future, by itself, does not reflect specific aspects of the appreciative approach, since this projection can have positive or negative valences.

We also detected, during the process, the importance of the role and training of the facilitators. The questions they propose establish the action line that the responses can follow. Therefore, their role and training is vital to foster and vitalize constructive discourses.

To date, the main achievements from PbP uDebate using the AI model in the two local municipalities have been the definition of a set of goals to be performed. These goals include, for instance, improving the image of the neighborhood and contributing to its transformation into a leader in diversity management; strengthening partnerships between neighbors and social actors; encouraging the neighbors to participate in cleaning up the area; strengthening social bonds within the neighborhood; creating a friendly and participatory environment, and promoting accessibility by removing language barriers. Finally, one of the main advantages of the use of this AI model is that it can be used in any kind of online debate and topic.

## **Acknowledgements**

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# Measuring the Digital Divide in the Field of e-Government

Ninoslava Savić<sup>1</sup> and Zoran Radojičić<sup>2</sup>

<sup>1</sup> Higher School of Professional Business Studies, Novi Sad, Serbia

<sup>2</sup> Faculty of Organizational Sciences, Belgrade, Serbia

[ninas@uns.ac.rs](mailto:ninas@uns.ac.rs)

[zoran@fon.rs](mailto:zoran@fon.rs)

**Abstract:** This paper considers a topic of monitoring and evaluation of e-Government, focusing on a phenomenon known as digital divide that may exist in this field. Measuring a level of digital divide is especially important for decision makers, who are in a position to create or correct strategies for synchronized development and use of e-Government services, with respect to different entities like countries, populations, economies or companies. We investigate the size of digital divide in the context of applying different e-Government modules within monitored entities, divided into relevant groups. After defining one model for measuring different types of digital divide in e-Government usage, the model is applied on the case of Serbia, calculating sub-indices and the compound e-Government polarization index - EGPI. The model is a flexible and opened system that allows easy changes of its basic input parameters. This means that its semantic does not change when the set of sub-indices, the set of indicators for its quantitative expression and/or a division of objects into groups within a certain type of digital divide are changed. At the same time, all calculations are performed according to the same rules defined by the model. The paper contains both the theoretical part, and an empirical quantitative research. The results of this research elaborate on the actual level of polarization in acceptance of e-Government modules within enterprises in Serbia. Also, these results emphasize risk groups of enterprises that should receive special attention in the future, in order to minimize digital divide in usage of e-Government.

**Keywords:** information society, e-government, digital divide, measuring digital divide, e-government polarization index EGPI

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## 1. Introduction

Electronic government (e-Government) presents a new functional model of the public sector's internal and external relations, based on sophisticated ICT solutions, which ensure better government service provision, and increasing citizens' involvement. It consists of internal operational processes, external service provision and the supply of information by government institutions via Internet. The main benefits, expected from the implementation of e-Government, are:

- improving relations between citizens and the government,
- improving quality of government services,
- enabling integrated and individualized government services,
- reducing costs of service provision by improving the efficiency of government organizations,
- ensuring provision of government services and relevant information independent of time and place,
- improving government policies and decision-making processes,
- strengthening democratic institutions and democratic processes (Holland, Bongers, Vandeberg, Keller and Te Velde, 2002).

E-Government must be an innovative and continual process that includes the following phases:

- information provision (initiated by 'the government side'),
- interaction (e-communication between the government and the service consumers),
- transaction (interaction which involves a financial element),
- integration (cooperation between different government institutions),
- transformation (creation of new organizational forms).

Digital divide is phenomenon that comes together with growing ICTs and rising networked society. It implies different types of polarizations in relation to different possibilities to benefits from using ICTs, observed in national or international framework. Internationally, there could be an e-polarization between highly developed and less developed countries and regions. Nationally, there is an internal e-polarization within certain country,

on different social groups of population concerned as endangered like, for example: low against the high educated, older against younger, poor against rich parts of population. It is, also, possible to monitor digital polarization in economy, represented by enterprises, between small and big enterprises or between enterprises from less developed and more developed localities etc.

Studying and measuring of digital divide between countries and regions is significant for discovering the capacity of one nation to participate in the global information society. By measuring the gap between different socio-economic groups within one certain country, in the context of their potentials to participate in ICT application, it is possible to affect the design and the change of the current developing e-strategies.

It is possible to monitor and measure digital divide limited on the certain domain of information society like: e-Government, e-education, e-health or e-business. For example, it could be useful to connect measurement of e-Government and measurement of digital divide, creating a special model which could provide information about the existing digital polarizations in e-Government field.

This paper suggests one methodology, which quantitatively expressed a digital polarization in using e-Government services, that could be applied on different fields of measurement like population, economy, region, etc.

## **2. Classification of digital divide**

The expression "*Information society for all*" presents one of political priorities of the European Union (European Commission, 2000, 2002). European Union (EU) has attempted to establish a modern society in which everybody can enjoy all benefits of using ICTs by setting goal of minimizing all forms of "digital divide". The terms *participation* and *inclusion* are introduced when mentioning rightful society, with such socio-economic environment in which all citizens, or at least the majority, will be able to enjoy the advantages of information society (European Commission, 2001).

The term digital divide denotes the gap between individuals, households, enterprises or geographical regions that are on different levels of socio-economic development, which is monitored through their possibilities for the access to ICT, as well as their use of Internet in private, social and business activities (OECD, 2001).

Digital divide refers to differences in possibilities for ICT application and differences in the ways of its application. This phenomenon can be monitored as external or internal digital divide.

Internal digital divide refers to differences in ICT adoption that exists in one specific country. It can be monitored on population and on business entities (enterprises).

Internal digital divide of population is studied on different social groups that are classified according to the chosen criteria such as gender, education level, income level, age etc.

Internal digital divide of business entities is studied on different groups of enterprises, classified according to the appropriately chosen relevant criteria (the size of enterprise, field of work, realized profit etc.).

External digital divide can be noticed in relation to the environment of a certain country, when a specific country is compared to other countries, regions, communities of states or geographical units.

For all levels of digital divide mentioned above, there is a possibility to focus at certain aspect of information society, as a global phenomenon. So, we can study digital divide in different fields of information society, like:

- digital divide in the field of e-Government,
- digital divide in the field of e-business,
- digital divide in the field of e-health,
- digital divide in the field of e-learning etc.

This paper focuses on the digital divide in the domain of economy, represented by enterprises.

### **3. Measurement of e-Government**

One comprehensive measuring tool for monitoring of e-Government development should consist of the same elements as e-Government itself. In this way, it could reflect the e-Government main structure and its changes. This means that a successful measurement model of e-Government must have sensitivity to the developmental stages at which the activities and stakeholders of e-Government currently are (Holland et al., 2002).

Measurement and benchmarking of e-Government are important for policy makers as long as their results can provide basic information about public spending, significant for EU policy cycle. However, there is still a problem with the lack of data for measurement process that implies a need for capacity building at all levels. The EU benchmarking of e-Government services should be improved by:

- updating the list of basic services,
- focusing on services with the most potential to increase usage and
- measuring the provision of reusable and transparent public information and data (Undheim and Cognone, 2008).

For development of e-Government in certain entity (country, region, population, economy etc.) it is important to find and regularly apply a methodology for measuring and evaluating the development and penetration of ICT in the public sector in a given country. An appropriate tool for measuring e-Government status needs to be:

- flexible, which means that it allows an easy way of changing and/or adding new concepts, in accordance with the changes of technology and services,
- comparable, which means independent of the local administrative structure and procedures,
- internationally applicable, which means that the information provided by that tool could be used for international benchmarks (Holland et al., 2002).

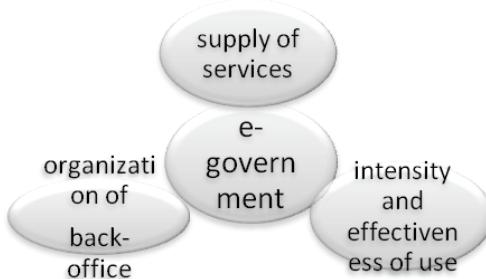
According to Heeks (2006), there are at least five potential levels of e-Government:

- local, state/provincial, regional, national and international.

The same levels can be viewed as a framework for measuring and benchmarking of e-Government.

One comprehensive measurement tool for monitoring and evaluation of e-Government is expected to include the appropriate measurement of three main parts of this process (Figure 1):

- the supply of services as the precondition of electronic government,
- the intensity of use and the effectiveness of electronic services and
- the organization of the back-office. (Holland et al., 2002).



**Figure 1:** Main aspects of e-Government measurement tool

European Commission gives the following recommendations for successful organization of monitoring e-Government development (eGovernment Economics Project [eGEP], 2006a):

- establishing a working group on e-Government measurement standards, in order to establish common lists of variables, their weights and data collection rules (including EU experts, representatives of institutions from Member States and statisticians from Eurostat and national statistics offices),

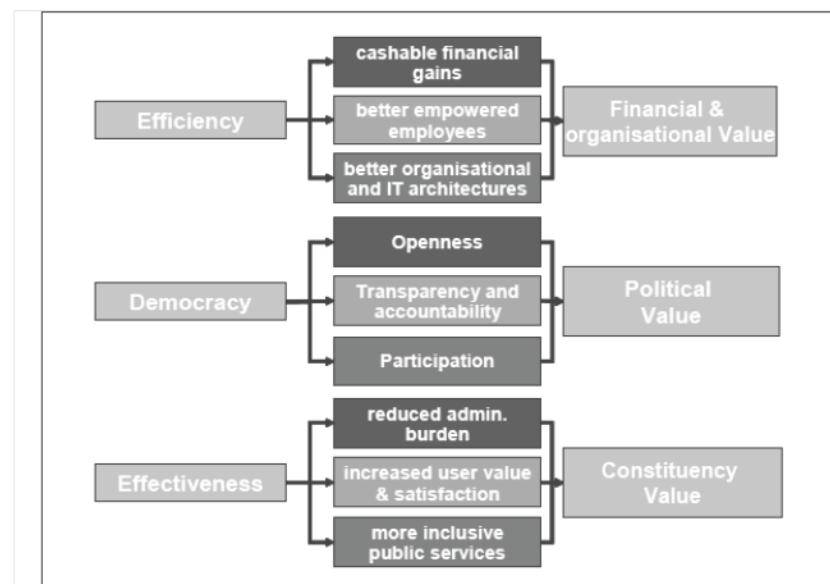
- definition of the organization in charge of data collection and analysis, which can ensure the homogenization of data, measures and weights for benchmarking,
- selection of e-Government services to be measured, according to strategic priorities of EU and agreed with country members.

eGEP( 2006a) has defined a conceptual framework for measurement of e-Government, expressed through an analytical model. The model identifies three value drivers (Figure 2):

- efficiency,
- democracy,
- effectiveness,

whose influence causes the creation of three different types of public value:

- financial and organizational value,
- political value,
- constituency value.



Source: eGEP (2006a)

**Figure 2:** eGEP measurement framework analytical model

If certain measuring tool includes composite indices, a good practice in creating and using them for benchmarks would include the following recommendations (eGEP, 2006b):

- developing a theoretical framework for the composite indices,
- identifying and developing relevant variables,
- standardizing variables to allow comparisons,
- weighting variables and their groups,
- conducting sensitivity tests on the robustness of aggregated variables.

There are many projects and studies on the international level covering the topic of defining the measuring methodology for expression the level of the digital divide in different fields (Barzilai-Nahon, 2006; Chin-Chang and Shu-Fen, 2006; Cuervo and Menendez, 2006; Selhofer and Hüsing, 2002; Stiakakis, Kariotellis and Vlachopoulou, 2009). However, there is no uniquely accepted methodology. All methodologies mainly create different social divide, according to different criteria chosen to be relevant for digital divide analysis (for example: according to gender, education level, income level etc.). A certain number of social groups are monitored in each divide. Finally, various transformations of chosen indicators formulate compound indices of digital divide.

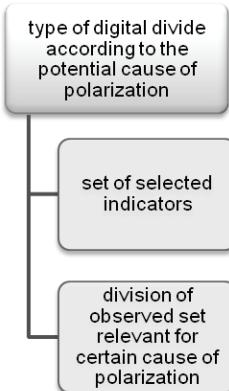
One of the published models for the calculation of digital divide index, developed in the scope of international project Empirica (Selhofer and Hüsing, 2002) starts from noticing groups within the population divided according to different criteria (for example women, older population, low educated population etc.). Taking into account the values of chosen indicators on these groups, their average value is calculated as final composite index of digital divide.

#### **4. The aim of research**

This paper studies internal digital divide in using e-Government services within the domain of enterprises. The aim of research is definition of the model for quantitative expression of total and individual digital divide level in usage of e-Government in economy. This model should enable monitoring the implementation of e-Government on enterprises, thru identification of possible polarizations caused by the different possibilities for using new technologies and services. At the end, the model will be verified on the case of Serbia, through the research conducted in the four-year period.

#### **5. Model for measuring digital divide in the field of e-Government**

The proposed model is based on the classification of total digital divide on the basis of assessed causes. First step in this model is a determination of possible causes of polarization in the set of observed entities (countries, enterprises, populations etc.). For each type of digital divide that is considered, the relevant set of benchmarking indicators must be chosen, and the appropriate division of observed set of objects into groups, relevant for certain type of digital divide, must be defined (Figure 3).



**Figure 3:** The key elements for describing certain type of digital divide

Suggested model defines the main rules for calculation of sub-indices and the total index of digital polarization in e-Government. The rules are based on the idea that measuring of digital polarization in the certain domain (represented by chosen set of objects) means introduction of the measure of polarization within the domain divided according to the chosen criterion into groups. In this case, as a measure for the degree of polarization we take the difference between maximum and minimum value of particular indicator in each defined group (Savić and Radojičić, 2011). In general, this difference varies between zero (when there is no polarization) and the maximum measured value of indicator (which means the maximal polarization). Dividing this difference with the maximum value of the appropriate indicator, we obtain the value in the range of [0, 1].

The final value of sub-index is computed as an arithmetic mean of the quotients calculated for all chosen indicators. In this calculation, all indicators have the same weight, due to simplicity. It is also possible to assign different weights to sub-indices, according to assessment of their significance for measuring total digital polarization. The total index of digital polarization is an arithmetic mean of all sub-indices, obtained in this way. If there are no differences in their significance, sub-indices have the same weight in computing the arithmetic mean.

The model for calculating of e-Government polarization index (EGPI) and the corresponding sub-indices present an opened system, flexible in changing its main components. Its main advantage is immutability of basic semantics when the set of sub-indices, the set of indicators for its quantitative expression and/or the set of defined risk groups within a specific digital divide are broadened or changed. It is possible to introduce new noticed type of digital divide, and to calculate new appropriate sub-indices for them. Measuring of digital polarization sub-indices can also be performed with an expanded list of chosen indicators. Finally, it is possible to

introduce a new way of division of the observed set of objects into risk groups of objects. At the same time, all calculations are performed according to the same rules defined in the model.

In general, when there are n types of digital divide, expressed by n appropriate sub-indices, if e-Government polarization index is labeled as EGPI, and sub-indices as EGPI<sub>i</sub>, i=1,n, the formula for EGPI calculation is as follows:

$$EGPI = \frac{\sum_{i=1}^n EGPI_i}{n}, \quad (1)$$

where the sub-indices EGPI<sub>i</sub> are calculated according to the formula

$$EGPI_i = \frac{\sum_{j=1}^{K_i} \frac{X_{jmax} - X_{jmin}}{X_{jmax}}}{K_i}, \quad i=1,n \quad (2)$$

where

K<sub>i</sub> – total number of chosen indicators for sub-index EGPI<sub>i</sub>,  
 X<sub>jmax</sub> – maximum measured value of indicator X<sub>j</sub>,  
 X<sub>jmin</sub> – minimum measured value of indicator X<sub>j</sub>.

## 6. Implementation of the model

The implementation of this general model is performed on the case of Serbia, with the aim of measuring the size and actual trends of digital divide in usage of e-Government services within enterprises.

The following types of digital divide were considered, in relation to assessed reasons for them:

- digital divide caused by differences in the size of enterprises and
- digital divide caused by differences in the economic level of the locality of enterprises.

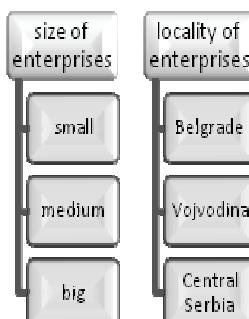
These two types of potential causes of digital divide were analyzed for the following groups of enterprises (Figure 4):

A. size of enterprises:

- small (10 to 49 employers),
- medium (50 to 249 employers),
- big (more than 250 employers),

B. locality of enterprises:

- Belgrade (the capital and the economy center of the country),
- Vojvodina (the north, more developed part of the country),
- Central Serbia (the south, less developed part of the country).

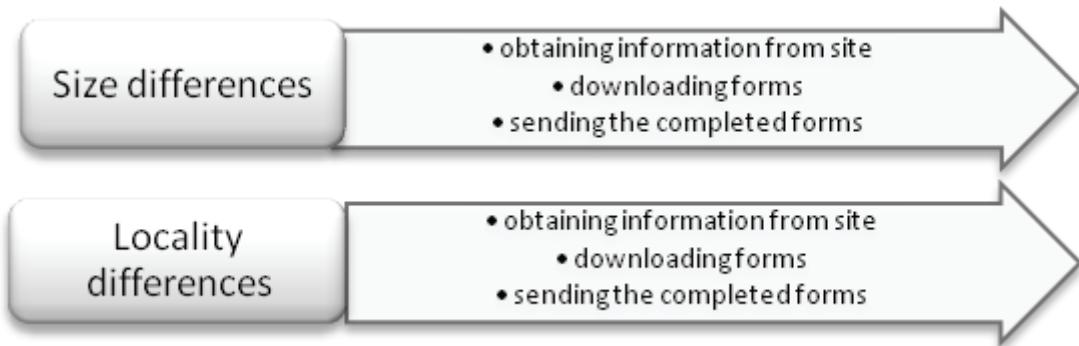


**Figure 4:** Groups of enterprises according to the potential causes of digital divide

For the measuring of digital divide in the e-Government field, the following indicators were chosen, taking into account their meaning and the actual data availability (Figure 5):

- enterprise use e-Government for obtaining information from site of public institution,
- enterprise use e-Government for downloading forms from the site of public institution,
- enterprise use e-Government for sending the completed forms to public institution.

The suggested model, implemented with this set of indicators, could be classified to the group of measurement tools which investigate *the intensity of use of e-Government services*. Different choice of benchmarking indicators could align it into different type of measurement tools.



**Figure 5:** Choice of indicators in sub-indices

In this particular case, there are two sub-indices in the model, one for each type of digital divide. Each of these two sub-indices is expressed through three selected indicators.

The formula for EGPI calculation is then as follows:

$$EGPI = \frac{\sum_{i=1}^2 EGPI_i}{2}, \quad (3)$$

where the sub-indices EGPI<sub>i</sub> are calculated according to the formula

$$EGPI_i = \frac{\sum_{j=1}^3 \frac{X_{jmax} - X_{jmin}}{X_{jmax}}}{3}, \quad i=1,2 \quad (4)$$

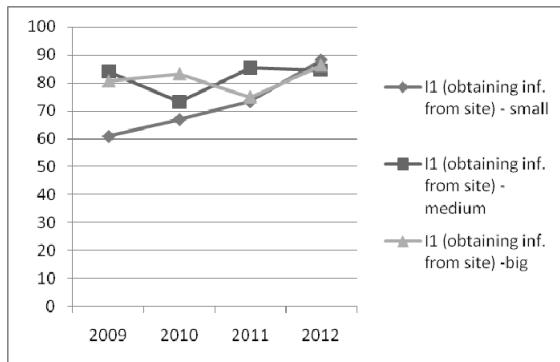
where

$X_{jmax}$  – maximum measured value of indicator X<sub>j</sub>  
 $X_{jmin}$  – minimum measured value of indicator X<sub>j</sub>.

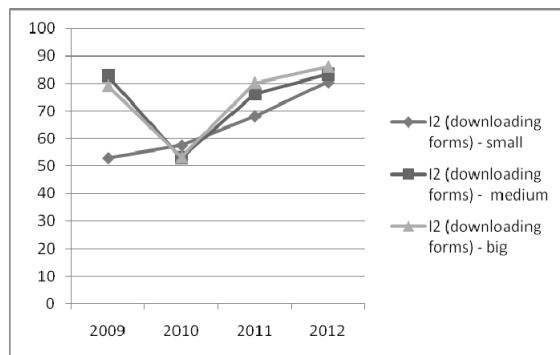
## 7. Research methodology and results

The raw data used as the basis for calculation of EGPI in the field of economy originate from the survey on the usage of ICT in Serbia, carried by the Statistical Office of the Republic of Serbia for years 2009 - 2012 (Vukmirović, Pavlović and Šutić, 2009, 2010, 2011, 2012). In this survey the methodology of Eurostat was applied on enterprises (Eurostat, 2007). It was carried out by phone, on the territory of the Republic of Serbia (without Kosovo and Metohia), on the stratified sample, allocated on the following regions: central Serbia (without Belgrade), Vojvodina and Belgrade. The reference period was within three months before telephone interviews. The scope of the representative sample was 1200 enterprises.

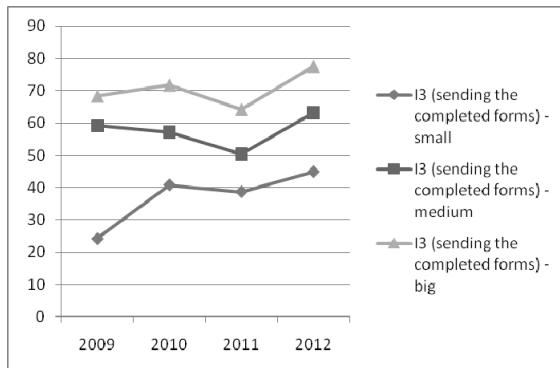
The input data for calculation of sub-indices and the total e-Government polarization index EGPI are expressed in percentages. The examples of input data are shown in Figures 6, 7, and 8. These are the values of indicators I<sub>1</sub>, I<sub>2</sub> and I<sub>3</sub> for years 2009 – 2012, used for calculation of EGPI<sub>1</sub> (e-Government polarization index caused by different size of enterprises).



**Figure 6:** Values of indicator I1 for years 2009 - 2012

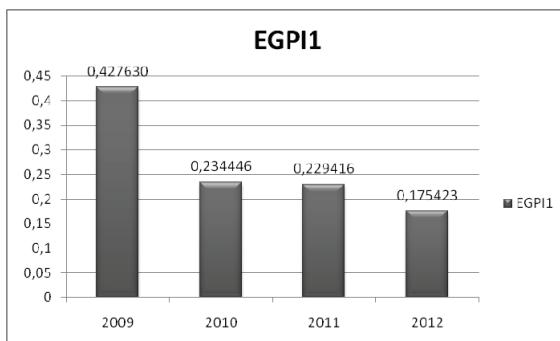


**Figure 7:** Values of indicator I2 for years 2009 - 2012



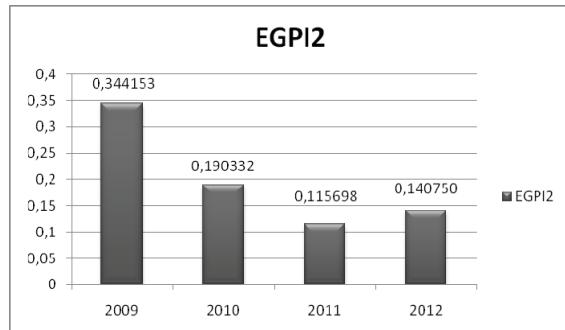
**Figure 8:** Values of indicator I3 for years 2009 - 2012

According to the chart shown in Figure 9, the greatest digital polarization caused by the differences in size of enterprises in Serbia in relation to e-Government usage refers to year 2009 ( $EGPI1 = 0,428$ ). Monitoring this phenomenon in the four years period, we find positive shift expressed by index decline ( $0,234$  in 2010,  $0,229$  in 2011 and  $0,175$  in 2012) which indicates the reduction of the gap between appropriate groups of enterprises. Most progress was achieved in 2010, while the reduction of the gap in the last two years is barely visible.



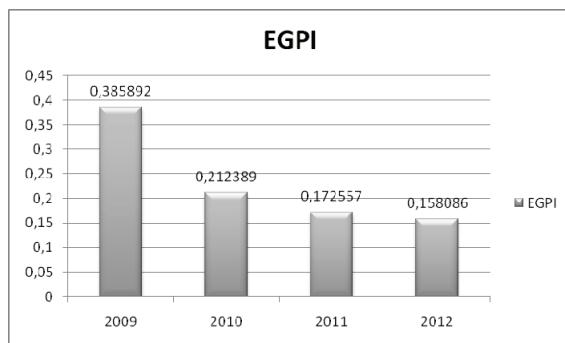
**Figure 9:** Values of sub-index EGPI1 for years 2009 – 2012

The second sub-index EGPI2, in comparison to values of sub-index EGPI1 shows lower values. That means that the gap in using of e-Government between enterprises located in the parts of the country with different level of development is smaller than the gap caused by different size of enterprises. However, it is alarming that this kind of digital divide, decreasing from value of 0,344 in year 2009, to 0,190 in year 2010 and 0,116 in 2011, at the end shows the increasing value of 0,141 in year 2012. That points to deepening of the gap in using of e-Government between the enterprises in different developed regions in Serbia (Figure 10).



**Figure 10:** Values of sub-index EGPI2 for years 2009 - 2012

As shown in Figure 11, the total electronic government polarization index EGPI for years 2009, 2010, 2011 and 2012 has the following values: 0,386, 0,212, 0,172, and 0,158. According to them we conclude about the falling trend of polarization among enterprises in Serbia in using e-Government services.



**Figure 11:** EGPI values for years 2009 - 2012

## 8. Conclusion

The proposed model quantitatively expresses the level of digital divide in the field of e-Government, by using the compound indices. It provides an opportunity for better monitoring the state of digital polarization in different groups of entities within country, and its trends. Although compound indices usually hide characteristics expressed by single indicators, analyzing only a list of single indicators could be too difficult for drawing conclusions about the complex phenomenon. From analytical data, which are often mutually correlated, without any transformation, is difficult to conclude about the level of internal digital divide. In this fact lie the power and the applicability of the proposed model. Digital Agenda for Europe (European Commission, 2010), and i2010 eGovernment Action Plan (2006) among other issues, propose e-inclusion as one of policy actions for minimizing all kinds of digital divide. This model is especially significant for the definition of development policy that could help improvement in critical groups of entities, which could lead to the achievement of an inclusive information society. The proposed model has been implemented thru the research conducted on Serbian enterprises, monitoring the usage of some e-Government services. The research has showed that there is a certain degree of digital divide in relation to acceptance of e-Government in economy of Serbia. We found the biggest polarization in year 2009, caused by different sizes of enterprises. After all, this gap shows the falling trend in the following years. For the second calculated sub-index, we found smaller values, so smaller gap among enterprises from different localities in Serbia. Nevertheless, alarming is that this kind of polarization in year 2012 increases. The total EGPI significant decreases in 2010, but shows almost stagnation in the following years. The scope of research was limited by the availability of the actual data for Serbia to only few aspects of the digital divide (only some proposed causes, and only some of 'e-Government' indicators that were available for the whole research period). Hence, its results are more an illustration of the implementation of suggested

model, then a comprehensive work directed on covering this complex issue. A lot of important aspects of digital divide in e-Government were not included in the model implementation. For this kind of research, more benchmarking indicators, which are not available at this moment in Serbia, are required. However, the model has the characteristic of flexibility for adding new measuring concepts with the same methodology, as it was explained. If the broader set of main concepts is implemented in the model, the more detailed and precise picture of the level and the causes of digital polarization at the observed entities is obtained. This process is always restricted by the availability of data needed for the research, i.e. by the real possibilities to reach the necessary data by carrying out an extensive measuring. Developing countries are, in that sense, in a more difficult position than developed countries, which regularly conduct different kind of statistical researches.

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# **Measuring the Public Value of e-Government: Trust in Measurement Processes or Processes of Building Trust?**

**Alberto Savoldelli<sup>1</sup>, Gianluca Misuraca<sup>2</sup> and Cristiano Codagnone<sup>3</sup>**

**<sup>1</sup>Independent Researcher, Milan, Italy**

**<sup>2</sup>European Commission, Joint Research Centre, Institute for Prospective Technological Studies, Seville, Spain**

**<sup>3</sup>Milan State University, Milan, Italy**

[savoldellia@gmail.com](mailto:savoldellia@gmail.com)

[gianluca.misuraca@ec.europa.eu](mailto:gianluca.misuraca@ec.europa.eu)

[cristiano.codagnone@unimi.it](mailto:cristiano.codagnone@unimi.it)

**Abstract:** In the recent past several authors have addressed the issue of the 'e-Government paradox' which is exemplified by the contrast between the level of investments made on deploying ICT-enabled services and the little impact produced and/or demonstrated so far. To this regard, in most maturing countries, main barriers hindering the adoption of e-Government services are those related to the lack of both a structured policy measurement process and an effective stakeholders' engagement. In particular, critical success factor for e-Government adoption seems to be a transparent and trustworthy policy decision-making process and its key prerequisite is the definition and implementation of a well organized and fully participatory measurement framework, enhancing stakeholder trust in policy decision. Starting from these findings, the paper explores the existing relationship between measurement and trust on e-Government decision-making processes, discussing which could be the possible trade-off between high quality measurement of public e-services and the high level of trust in policy decisions for their adoption and long term sustainability. The methodological approach underpinning the analysis is based upon a critical review of main e-Government measurement frameworks, selected according to their effective capability to support policy decision-making in implementing e-Government strategies as well as their expected value to reinforce 'trust' with citizens and stakeholders.. As a result of the analysis a new measurement model capable of measuring the public value of e-Government services is proposed. The model has been tested in a real context of usage for the measurement of the Telematics and Informatics Policies Implementation Plan (PiTER) of the Emilia-Romagna Region in Italy in the period 2011-2013. The paper therefore discusses the main findings emerged from the concrete application of the proposed model in light of the feedback received from the public administration and the stakeholders participating to the measurement process. It then outlines its conditions of applicability in other policy contexts as well as new possible research directions.

**Keywords:** e-government, evaluation, measurement, public value, trust, policy-making

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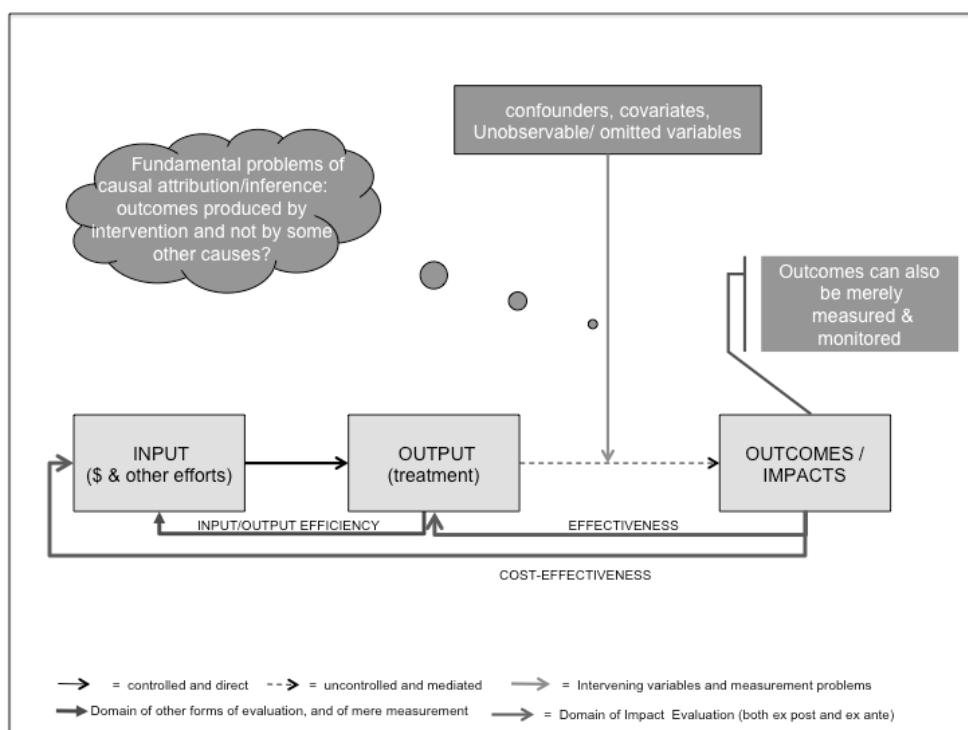
## **1. Introduction**

After more than two decades of policy efforts and investments into e-Government, not only we do not have conclusive evidence on its impact, but both the scientific and practitioners-generated literature is ridden with conceptual and terminological inconsistencies and ambiguities around concepts such as evaluation, assessment, measurement, etc. In this paper, after clearly delimiting and defining our domain of analysis, we propose a new framework to 'measure' the public value of e-Government that we call eGEP-2.0 as it represents the evolution and improvement of the eGEP<sup>1</sup> measurement framework that one of the author of this paper elaborated for the European Commission (Codagnone et al 2006). We argue and show that, with respect to other available methodologies and framework, the original eGEP framework represented the most comprehensive approach but suffered from the lack of the dynamic element needed to capture the processes that in each public agency move from initial planning, though implementation, up to monitoring and measuring results (Misuraca & Rossel, 2011). Before doing this, as anticipated, we need to clearly delimit the domain and the ambitions of our proposed framework as to clear the field from conceptual and terminological ambiguities that may ingenerates incorrect expectations as to what our proposal, as well as other frameworks, can produce. This requires making a clear distinction between evaluation and measurement. We do this with the support of figure 1 below. In much of the literature addressing e-Government the two terms 'evaluation' and 'measurement' are often used ambiguously an inconsistently, with the impression that the two may be synonyms. Both evaluation and measurement consider input, output, outcomes, and impacts, but only evaluation in strict scientific sense must also looks at covariates/confounders. Strictly defined impact evaluation, in fact, aims at demonstrating that the realisation of an outcome Y can be causally attributed to the

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<sup>1</sup> The eGEP acronym stands for eGovernment Economics Project.

combination of input/output X (the policy treatment) and not to any other cause. On the contrary, measurement is the process by which the attributes or dimensions of some phenomenon (in this case any variable among the blocks of inputs, outputs, outcomes, and impacts) are determined and counted, as amply documented in the OECD work on public sector measurement (OECD, 2006a, 2006b, 2009). The all body of work on "Performance Measurement" or "Impact Assessment", as well as many other types of labels, can be seen as belonging together with evaluation to the 'extended' family of what we can generically refer to as "assessment", but they are clearly different from evaluation *strictu sensu*. Hence, neither the original eGEP framework nor other similar exercises reviewed in next section can be and should be presented as evaluation frameworks for none of them can be used to demonstrate that the changes in a given variable of interest can be causally attributed to a given e-Government service, unless they also add an experimental or quasi-experimental component.. It is important to make this clear as to avoid making claims that are not supported scientifically and empirically. The eGEP-2.0 framework we propose is rigorously only an e-Government measurement framework that as such raises no claim as to demonstrating causally (evaluate) the effect that a given service or bundle of services (i.e. e-Government programme or policy) have for different constituency on a given sought outcome. This, however, does not necessarily mean that a measurement framework cannot be linked to, and support, a counterfactual impact evaluation. If the measurement is built on scientifically sound and empirically robust model of causal impact and if data are gathered on the objects of measurement steadily and reliably then eventually that can be used for a true impact evaluation. This is the object of another forthcoming paper (Codagnone, Misuraca, Savoldelli, 2014) and we will not enter into this subject here.



**Figure 1:** Stylised Logic chain for evaluation and for measurement (authors' elaboration<sup>2</sup>)

## 2. Brief state of the art

We have reviewed in depth the state of the art for what concerns e-Government assessment and the barriers deriving from its lack elsewhere (Codagnone & Undheim 2008; Misuraca et al., 2013; Savoldelli et al. 2012 and 2013). Below we extract a selective and compact summary strictly instrumental to our purpose in this paper. The first and most well-known exercises in our domain of interest have been and still are large survey based on scanning the websites of public agencies and scoring them in terms of either availability and sophistication of services provision or of level of participation embedded in them (Capgemini, 2004; 2010; UN-DESA, 2010). These approaches have been amply criticized and most of the e-Government measurement frameworks emerged in past decades, starting from the first version of eGEP, were launched to go beyond this supply-side focus, to look at more tangible outcomes and impacts, and to be more granular (Misuraca et al., 2013). Table 1

<sup>2</sup> Based on several sources: see among others (Algemene Rekenkamer, 2006; Boyne et al., 2003; Codagnone, 2009; Codagnone & Undheim, 2008; Hatry, 1999; Heeks, 2006; Heeks & Molla, 2009; Irani et al., 2005; OECD, 2006a, 2006b, 2009).

provides a synthetic overview of such frameworks, many of which include also user-centric measures to track take-up and satisfaction – two central parameters which allow governments to learn more about user needs and demands as well as providing a structured approach to assess policy impacts and to support the continuous improvement of eGovernment services. The frameworks or methodologies included in Table 1 have been selected using the criterion that they are some of the most cited in literature and used in practice (see Kunstelj & Vintar, 2004; Gil-Garcia & Pardo, 2005; Foley, 2006; Esteves & Rhoda, 2008)<sup>3</sup>.

**Table 1:** Comparison of selected e-Government measurement frameworks (Savoldelli, Codagnone and Misuraca, 2013)

Evaluation methodologies	Policy plan evaluation	Project and/or Services Evaluation and Benchmarking	exAnte Evaluation	exPost Evaluation	Business case template	Risk assessment methodology	Sustainability Assessment methodology	Public Value Evaluation Criteria								
								Effectiveness	Efficiency/Productivity	Organizational efficiency	User Centricity	PA services integration;	Strategic alignment	Privacy and security	Social Value;	Democracy,
eGovernment Signpost	X		X					X	X	X	X	X	X			
Mareva	X	X		X	X	X		X	X	X	X	X	X			
WeBe 4.0	X	X				X		X	X	X	X	X	X	X	X	
eGEP	X		X					X	X	X	X	X	X			X X
Metodología NOIE	X	X	X			X	X									X X
GOL Performance Measurement and Business Case Template	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X X
General Services Administration				X		X		X	X	X	X	X	X			X
VMM		X	X	X	X	X	X		X		X		X		X X	X X
DVAM	X		X			X	X				X		X			X X
Gateway Process	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Effectiveness      Efficiency/Productivity      Organizational efficiency      User Centricity  
PA services integration;      Strategic alignment      Privacy and security      Social Value;  
Democracy.

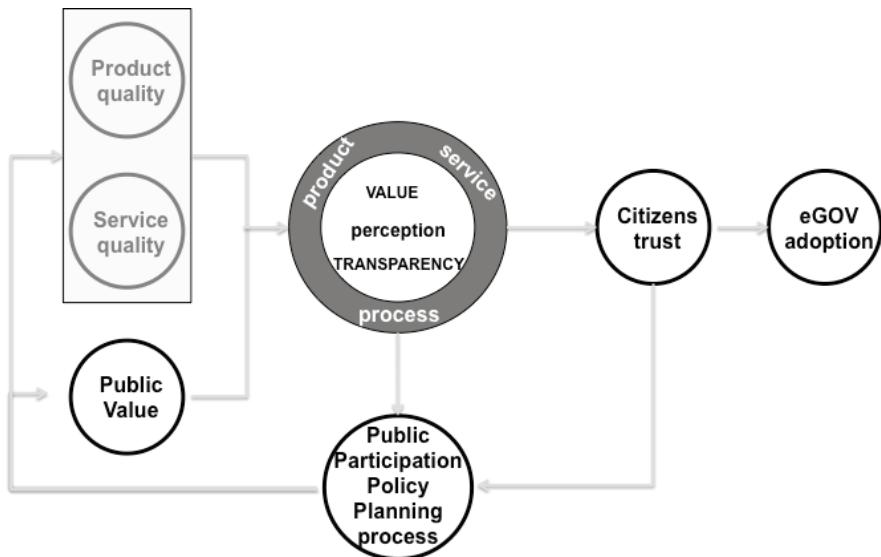
In Table 1 these methodologies are assessed against two criteria: a) the dimension of public value (Carbo & Williams, 2004; Johansen, 2004; Ebrahim & Irani, 2005; Codagnone & Undheim, 2008; Heeks & Molla, 2009; OECD, 2009; Stanimirovic & Vintar, 2012) covered by the areas of impacts and/or indicators proposed; and b) coverage of the various possible stages in the policy planning process. From this comparative analysis it emerges that current approaches are not exhaustive and comprehensive across these two criteria, which confirms the claim that the lack of a structured and comprehensive measurement and assessment framework, especially for local governance (see also Anttiroiko, 2008; Belanger & Carter, 2008; Stevens & Rhoda, 2008; Kolsaker & Lee-Kelley, 2008; Kunstelj & Vintar, 2009; Von Ryzin, 2009; UN-DESA, 2010; Stanimirovic & Vintar, 2012), is among one of the key barriers delaying full adoption of e-Government (Savoldelli, Codagnone & Misuraca, 2012). Furthermore, the majority of such frameworks are shaped by a technology-driven approach (Dawes, 2008), under-estimating the key importance of outcome oriented approaches strictly connecting e-Government with the policy making process (Titah & Barki, 2005; Perrin, 2006; Codagnone, & Undheim, 2008). This myopic behavior often brings eGovernment initiatives into a “lock-in/vendor-driven” situation with the consequence of risking to loose most of the expected benefits (Foley, 2006). Also important to stress the lack of covering all the relevant stages where a measurement and assessment framework would be needed, that is to say both *ex-ante*, *in-itinere*, and *ex-post*, and the need to define a well-structured *ex-ante* measurement (see also Gil-Garcia&Pardo, 2005; Foley, 2006; DEP, 2012).

While eGEP presents some of the limitations mentioned above, it has been largely recognized that it provides a more robust approach in assessing outcomes of e-Government initiatives (Misuraca and Rossel, 2011; Stanimirovic & Vintar, 2012). Therefore, our proposal for a new measurement framework has been built starting from the eGEP framework, which has been improved in various aspects, especially in the participation mechanisms for involving stakeholders and beneficiaries in the measurement process of e-Government services.

In this regards, as rendered in figure 2, the proposed measurement framework aims at overcoming the previous approaches, helping to establish a trust-based relationships among citizens, policy makers, civil servants and other stakeholders, so to balance the precision in the measurement of the impacts of e-

<sup>3</sup> They are: eGovernment Signpoint (Danish Digital Task Force, 2004); MAREVA (ADAE, 2007); WeBe 4.0 (Rothig, 2004; 2010); eGEP (Codagnone et al 2006); NOIE (Australian Government, 2005); GOL Performance Measurement (Treasury Board of Canada, 2004); eGovernment Satisfaction Index (Freed, 2009); VMM (Booz-Allen-Hamilton, 2004); DVAM (AGIMO, 2004); Gateway Process (DFP, 2012).

Government projects, with a more transparent and participatory assessment process since the early stage of the policy decisions (Savoldelli, Codagnone & Misuraca, 2013).



**Figure 2:** Key drivers of e-Government adoption (source: Savoldelli, Codagnone & Misuraca, 2013)

### 3. Key dimensions of eGEP-2.0 as an impact assessment model of policy decisions

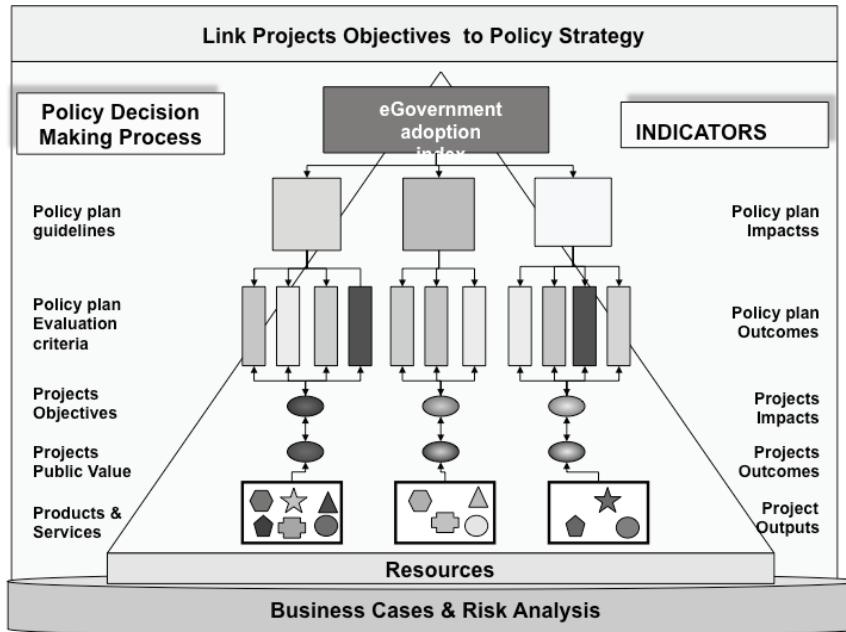
The simplest method to represent the consequential chain of events to be considered for an impact assessment is an Analytic Hierarchy Process (AHP) model (Saaty, 2008). From a policy-model perspective, an AHP starts from the ultimate policy goal and it is organised in several levels linked each other with mutually dependent relationships. In literature several examples of AHP applied to policy decision-making process exist (Mansar, 2006; Kahraman, Demirel, & Demirel, 2007; Parra-Lopez, Groot, Carmona-Torres & Rossing, 2009; Saaty, & Vargas, 2012), however most of them adopt AHP for modelling projects' selection and/or evaluation purposes, and few of them has been used for modelling policy-making decisions. Also eGEP (Codagnone et al., 2006), that is our starting point in the development of eGEP-2.0, does the same. eGEP is structured into three levels: overall goal (level 0); outcomes criteria (Level 1); impacts indicators (Level 2), and it has been applied for benchmarking the performances of e-Government web portals across administrations belonging to different EU Member States, therefore its nature mainly descriptive was successfully used in *ex-post* assessment of e-Government initiatives (Codagnone & Undehim, 2008). However eGEP as it was designed cannot be used to model a policy decision-making process as eGEP-2.0 aims to do, mainly because:

- it does not allow to represent the policy strategy formulation process, from the definition of the overall goals of a given policy planning cycle, to policy guidelines definition and approval (Savoldelli, Codagnone & Misuraca, 2013);
- it does not provide the necessary decisional links between the policy strategy dimension and the implementation projects dimension (Lundquist, 2006; Suggett, 2011);
- it does not have the ability to model the circular nature of the policy-making process (see figure 3 and also Heeks, 2006; Savoldelli, Codagnone & Misuraca, 2012).

In general terms, in fact, expected policy outcomes shape expected policy impacts (usually called *political guidelines*). For achieving these guidelines, public administrations implement projects which start their lifecycle as *project ideas*, by defining projects' expected outcomes, usually called *needs*. Upon these needs, an *ex-ante* estimation of the degree of achievement of quantifiable objectives is provided before deciding the *projects' portfolio* suitable for implementing a given *policy plan*. These objectives are usually called expected impacts and are used for justifying project expected outputs. *Vice versa* the degree of achievement of given projects' outputs, allows estimating projects' impacts and to determine to what extent projects have satisfied the need for which they have been implemented.

Of course this is a simplification of reality, where there are no deterministic cause-effect links amongst policy decisions–projects' outputs–projects/policy impacts. As anticipated, only a cause-effect analysis based upon a robust counterfactual approach can evaluate the probabilistic and stochastic relationships that more likely

represent complex realities where policy decisions should have to produce their effects (Svensson, & Pettersson-Libdom, 2008; Garbarino & Holland, 2009; Hargraves, 2010; Misuraca et al., 2013). However the above description of the logical links between policy decisions and implementation projects allow us to organize a policy-decision model easier to be adopted in a participative process aiming to achieve consensus among stakeholders. This is also the logic through which eGEP-2.0 was designed. The main differences between eGEP and eGEP-2.0 are described in table 2, by considering four comparison criteria which are further explained below.



**Figure 3:** eGEP-2.0 logic model that provides a link amongst projects objectives and policy strategy

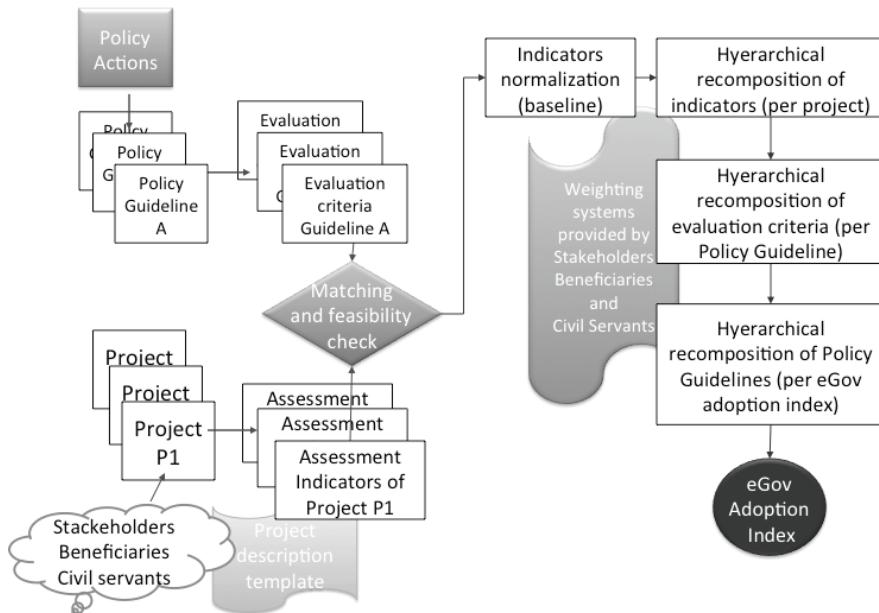
**Table 2:** Comparison eGEP-2.0 - eGEP in relation to their degree of applicability to an e-Government decision-making process

Comparison criteria	eGEP-2.0	eGEP
Degree of flexibility in policy planning process assessment	High	Low
Degree of flexibility in e-Government projects measurement	High	Medium
Degree of flexibility in participative measurement through stakeholders and citizens involvement	High	Low
Types of impact assessment stages supported	<i>ex-ante – on-going – ex-post</i>	mainly <i>ex-post</i>

**1) Degree of flexibility in policy planning assessment.** The majority of the assessment frameworks, including eGEP, are static by nature, based upon predefined criteria that are mainly related to projects that they are going to measure or compare, but rarely are designed to measure the link between policy objectives and e-Government projects (Savoldelli et al., 2013) as eGEP2.0 does;

**2) Degree of flexibility in e-Government project measurement.** The eGEP model, as other models analysed is based upon a static hierarchy constituted by a fixed number of measurement criteria and indicators that do not allow addressing all the characteristics of an e-Government policy plan and its related implementation projects. eGEP-2.0 model instead is structured with a dynamic hierarchy (Schmoldt et al., 2001), that can be easily adapted to any policy plan;

**3) Degree of flexibility in participative measurement through stakeholders and citizens involvement.** The eGEP model, as all others, does not allow an effective participation of stakeholders and beneficiaries in the policy planning process. eGEP-2.0 instead provides the necessary support to involve all relevant stakeholders since the beginning of the policy-making process. Their involvement is foreseen in three stages of the measurement process as described in figure 4:



**Figure 4:** eGEP-2.0 measurement models. Logic flow of measurement and their relationships with policy actors stages

- Defining e-Government projects to be evaluated/funded. In the figure this is represented by the steps placed in the lower-left side of the diagram. The involvement of stakeholders is foreseen through the fulfilment of a web-based project description template (Carbone, 2012), which allows to reach a consensus among policy actors on key dimensions constituting the project's characteristics;
- Choosing indicators suitable for measurement projects in coherence with the policy guidelines (left side of the flow-diagram). This is guided by a feasibility-check procedure that allows verifying the compliancy of project's objectives with policy guidelines;
- defining weighting system needed for hierarchical re-composition of the impact assessment model and the quantification of the e-Government adoption index. This is represented in the right side of the figure. In this case the key difference with eGEP re-composition approach consists in the adoption of weighting systems based upon stakeholders preferences and the usage of a negotiation process amongst policy actors based upon a sensitivity analysis of the weight assigned to the various levels of the hierarchical model (Munda, 2004; Gasparotos et al., 2008; Nordstrom et al., 2012).

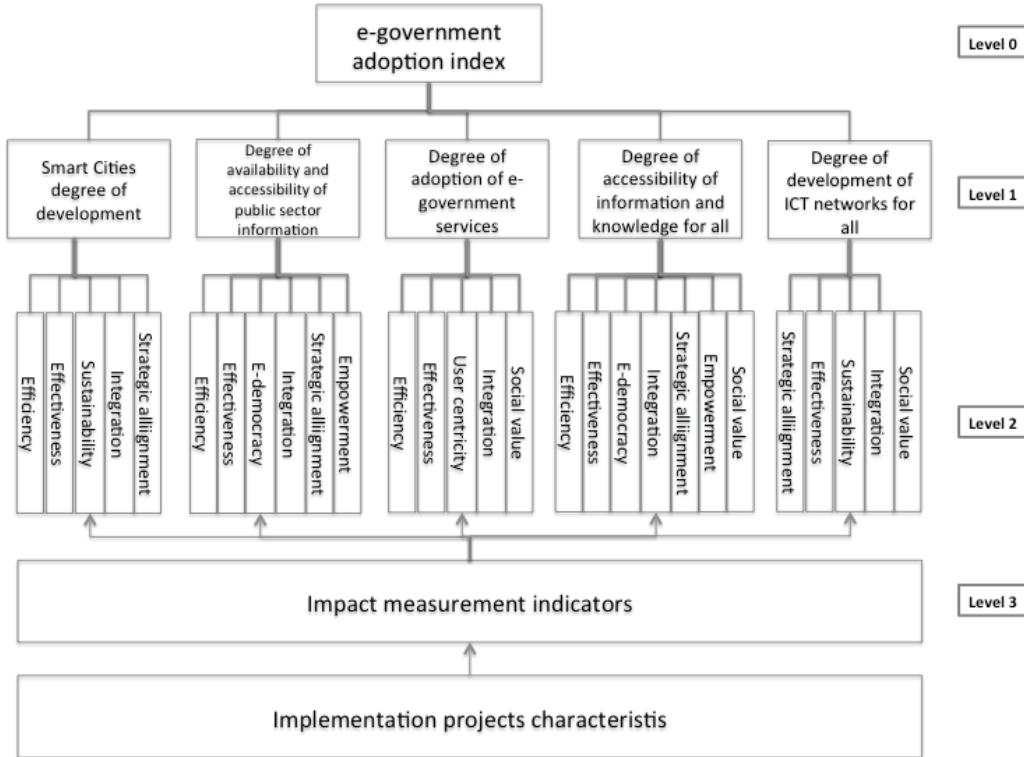
4) Types of impact assessment stages supported. As the majority of the impact assessment framework analysed, also eGEP has been designed to support mainly *ex-post* impact assessment. Its applicability to other assessment stages, even if it could be possible in theory, in practical terms it is difficult, especially for *ex-ante* expected impacts estimation, because it does not have enough flexibility neither in modelling the policy plan, nor in supporting participative measurement of the related implementation projects.

#### 4. eGEP-2.0 applied: the case of the Emilia-Romagna region

In this section we describe the experience conducted in the last three years (2011-2013) in the Emilia-Romagna Region in applying the eGEP-2.0 assessment framework to the Telematics Plan of the Region (namely “Piano Informatico e Telematico della Regione Emilia-Romagna – PiTER 2011-2013”). Figure 5 below presents the first three levels of the Assessment Model of PiTER, based upon the eGEP-2.0 model structure described in the upper-left side of figure 4. The first three levels of the model are constructed in coherence with the objectives of the political guidelines of PiTER and in agreement with the technical and political committees that constitute the governance structure of the ICT policy implementation in the Emilia-Romagna territory (Carbone, 2012; PiTER, 2012). In particular, level 1 of the eGEP-2.0 model applied to the Telematics an Informatics Plan of the Emilia-Romagna Region is based upon the key policy elements of the European Digital Agenda (European Council, 2010) declined on the specific needs of the Emilia-Romagna territory. The selected criteria of level 2 of the eGEP-2.0 applied to the Plan have been based upon a consultation process involving all key actors in the Region and it has given us the possibility to design the measurement model in a transparent and trustworthy way. Level 3 in the model is constituted by the impact measurement indicators dynamically

adapted to the characteristics of the projects that the policy plan intends to implement in achieving its objectives.

Figure 5 provides an example of the process for selecting impact measurement indicators in the case of policy guideline dealing with the development of ICT network for all in the regional territory. This guideline is mainly aimed at: “completing the broadband in the whole region” and “providing of equal condition of connectivity for all citizens2 (Carbone, 2012).

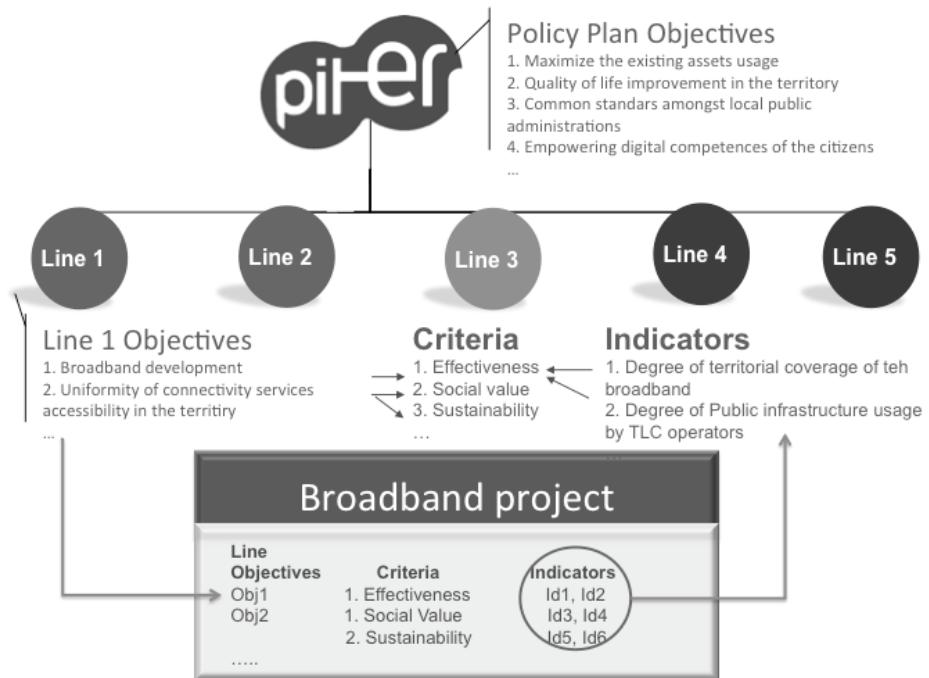


**Figure 5:** First three Levels of eGEP-2.0 – In the case of Telematics and Informatics Plan of Emilia-Romagna Region (PiTER)

During the PiTER modelling phase, per each objective of the plan, the governance structure of PiTER defined the set of measurement criteria to be used which have then been specified in the data gathering template to help stakeholders identifying which combination of policy guideline-line objectives-criteria better matches their project idea (see also figure 4, left side).

This matching process was based upon a series of interactions amongst the project proposers and the governance structure of PiTER, creating a participatory process for the construction of the implementation plan, during the duration of this consultation process (September – December 2011) exchanging and discussing on the basis of quantitative and qualitative data about the project.

Table 3 provides some evidences of such participation for the year 2012 when eGEP-2.0 has been applied for the first time to the whole decision-making process of PiTER (2011-2013). Its application not only has allowed to speed up the yearly *ex-ante* evaluation process of at least six months in comparison to previous adopted methodologies, but it has also allowed to assess 34 projects, with a degree of coverage of the policy plan objectives of PiTER close to 90%. Moreover the eGEP-2.0 model has also allowed achieving consensus among main e-Government actors of the Emilia-Romagna region upon about 100 assessment indicators, which in average terms means about 3 indicators for each policy implementation project or above 4 indicators for each policy objective.



**Figure 6**, Impact measurement indicators selection process in PiTER

**Table 3:** eGEP-2.0 application to the eGovernment Telematics and Informatics Plan of the Emilia-Romagna region in Italy

POLICY GUIDELINES	# of policy objectives addressed on total	# of eGovernment projects assessed and funded	# of assessment indicators selected	Average # of assessment indicators per project	Average # of project per policy objective	Average # of indicators per policy objective
ICT Networks for all	6 (86%)	4	12	3,0	0,7	2,0
Information and knowledge inclusion for all ages	6 (100%)	7	21	3,0	1,2	3,5
eGovernment services for citizens and companies	4 (100%)	11	37	3,4	2,8	9,3
Open data and open government	5 (80%)	4	12	3,0	0,8	2,4
Smart cities and smart territory	5 (71%)	8	26	3,3	1,6	5,2
<b>TOTAL</b>	<b>26 (87%)</b>	<b>34</b>	<b>108</b>	<b>3,2</b>	<b>1,3</b>	<b>4,2</b>

eGEP-2.0 was used in the year 2012 for a second measurement stage and for other 35 e-Government projects and for measuring the *in-itinere* impacts of the projects selected in the first application of eGEP-2.0 (year 2011). allowing us to The feedback from these two stages of application of eGEP-2.0 to the Telematics Plan of the Emilia-Romagna Region clearly shows considerable advantages for the policy planning process of e-Government in the territory, such as:

- a significant time reduction in implementing the planning process;
- an increase of transparency and traceability of information and data processed;
- an increase of participation of stakeholders in policy-making;
- a significant reduction of the risk of failure of individual projects;
- a better allocation of financial resource with greater “social-value for money” perspective;
- a better quality of data collection from three-stage measurement process which, in mid-term perspective would be beneficial for an evaluation of the impact of the plan through a counterfactual approach.

## 5. Conclusions and future work

In this paper we have discussed the issue of measuring e-Government and analysed some of the main frameworks of measurement used in practice and at policy level. In light of the comparative analysis of

selected measurement framework, we have discussed how in order to overcome the 'e-Government paradox', the measurement of e-Government should be participatory and address a public value perspective as eGEP-2.0 does. The real-life experimentation and application in the case of the Emilia Romagna Region demonstrates the validity of the model and its usefulness for assessing impacts of e-Government projects in each of the three stages of the policy measurement process (*ex-ante – in-itinere- ex-post*). The results from the application of the eGEP-2.0 shows that it presents significant improvement with respect to the approach underpinning the original eGEP methodology, as: 1) it is based on a process of consensus building that allows all actors involved in e-Government to be an active part in the decision process; 2) it provides a coherent solution establishing a match between political guidelines and implementation process easily traceable and documented, which guarantees a continuous and circular measurement process supporting *ex-ante-in-itinere-ex-post* measures; 3) it is faster and more effective than previous solutions.. At the same time further research is required to better understand the interrelations between the various dimensions of the eGEP2.0 model, as well as to test on a larger scale its validity and with a more depth. This would require for instance to set-up a social (e.g. quasi-natural) experiment to observe and monitor the changes that e-Government interventions are generating in different contexts, or comparing similar experiences in measuring the impact of e-Government. The findings from the 'validity test' suggest, in fact, that the framework is robust enough for being an initial starting point to guide the possible development of theoretical perspectives and practical applications required, on the one hand, to contribute developing a better theoretical understanding of the impacts of e-Government policy interventions; and on the other hand to implement a practical-oriented and participatory measurement instrument to assess e-Government policies and the consequences of different policy implementation options. The proposed methodology is also a clear enhancement in respect to the existing approaches proposed so far and it is easily replicable in different policy contexts. However it clearly shows further areas of improvement both from a research and practice perspective. This implies that further research should explore possible intersections of the proposed methodological approach and the one aimed at establishing *cause-effect* relationships between policy actions and social impacts, in order to better appreciate how their synergic use in different stages of the policy planning process could be considered. Moreover it should be investigated better how to improve the citizens participation mechanisms in the consensus building process underpinning formal policy-making procedures related to the various aspects of the proposed methodology. At present, in fact, the participation of citizens to the decision-making process is mediated by stakeholders and doesn't include any direct mechanism for achieving consensus around specific policy decisions..

**Disclaimer:** *The views expressed in this paper are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.*

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# The Adoption of Cloud Computing for e-Government Initiative in Regional Governments in Developing Countries

Shareef Shareef

Software Engineering Department, College of Engineering, Salahaddin University-Hawler-Iraq

[s.shareef@yahoo.com](mailto:s.shareef@yahoo.com)

**Abstract:** Electronic government initiatives continues in looking opportunities to identify the way they manage to provide services to citizen effectively and efficiently. E-Government require a developed Informations and Communication Technology (ICT) infrastructure in order to establish a coherent system. Most of the developing countries are facing various challenges due to the lack of ICT infrastructure. Cloud computing is an innovative and emerging technology to overcome these challenges. This technology relies mainly on the internet and other approaches such as; virtualisation, grid computing, web services and others. The provision of the services is an on-demand via the common medium of the internet gives this services a new uniqueness. This paper aims to highlight the opportunities to adopt cloud computing in e-Government initiatives in developing countries. Also sheds light on the challenges that might influence the adoption of cloud computing in the e-Government system.

**Keywords:** cloud computing, regional governments, sustainability, KRG, KRI

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## 1. Introduction

In the last decade, the internet and the World Wide Web changed our lives dramatically in terms of the way we work. Government authorities have been influenced by these changes in the way government function and service provision to the stakeholders. Also, the widespread use of technology access by stakeholders brings expectations and demands of government. Concurrently, governments are also proactive in this regard and are planning new ways of communication, interacting, and enhancing services. In addition, optimizing processes and reforming the service provision and more interactive services and businesses via e-Government to fulfil citizen's desires by spending more money on IT. The use of ICT is a significant approach to reduce the time required to process citizen's transactions, aspiring at enhancing the relationships with citizens by offering more seamless and efficient services (Layne and Lee, 2001). In this regards, about 77.4% of people looking for government information or services, first used online resources such as Google, Yahoo, or other search engines (Burroughs, 2009). Globally, the development of online web based applications has improved the facility to offer e-services for stakeholders in both public and e-business (Wojciech and Sergiusz, 2009).

Therefore, cloud computing can play a significant role as a tool to deliver infrastructure, software and services on demand through the internet by providing effective solutions to both public and private sectors. Cloud computing initiatives reduce costs and speed up cost reduction benefit, which offers new service consumption (Kshetri, 2010). This assists government authorities going green, reducing pollution and operative waste management.

However, developing states are steps behind in this competition by providing e-Government services to convince their citizens (Shareef and Arreymbi, 2012). The key challenges they face, are the lack of strategic plan, ICT infrastructure, resistance from government officials, and shortages of technical staff and lack of interactions between government departments (Sagheb-Tehrani, 2007). Implementing e-Government applications is not an easy task; it might be expensive and inefficient if done by local government departments only. Despite the fact that, some vital elements of e-Government solutions such as operations consistency and efficiency make adopting cloud services in the context of e-Government inevitable (Borko and Armando, 2010). Using cloud computing in the e-Government services offers several opportunities to improve effectiveness, and efficiency of both the public and private sectors. Thus, reduced delays in processes enhances citizen's satisfaction and ultimately facilitate the growth of the economy.

This paper therefore aims to find the opportunities of using cloud computing as a tool for e-Government implementation to provide services seamlessly and effectively. It also identifies the main issues that might affect the adoption of cloud computing in the e-Government system in developing countries. This paper is of interest due to the importance of such technology for the Kurdistan Region of Iraq (KRI) that suffers from the lack of ICT infrastructure. The other contribution of this paper, it might encourage government authorities to

learn lessons from such academic papers in which assist them to find solutions for shortages that they are suffering from.

This paper structured as follows: Section 2 provides an overview of cloud computing, which includes cloud computing architecture, a key advantages of cloud computing and its limitations. Section 3 presents a methodology for the accomplishment of this paper. Section 4 provides a discussion on the opportunities of adopting cloud computing in the e - government system, particularly in (KRI). Section 5 concludes the paper with the contributions of this study and proposes future work.

## **2. What is cloud computing?**

It is observed through survey and literature, there are various definitions of cloud computing around and some of them are illustrated in table 1. In reality, no such common standard definition of cloud computing is available in the literature (Voas & Zhang, 2009). However, a more commonly used definition has described it as clusters of distributed computers (largely huge data centers and servers) which provide on-demand resources and services over the Internet ( Sultan, 2010).

Mell and Grance (2011) defined cloud computing as a model for enabling anywhere, anytime, and on-demand services via access to the network to a shared huge of computing resources such as networks, storage, servers, applications, and services that can be swiftly offered with less management effort.

**Table 1:** Selected definitions of cloud computing, Stanoevska-Slabeva et. al. (2010: Table 4.1, p. 48)

Source	Definition
Gartner	"A style of computing in which massively scalable IT-related capabilities are provided "as a service" using Internet Technologies to multiple customers".
International Data Corporation (IDC)	"An emerging IT development, deployment and delivery model, enabling real-time delivery of products, services and solutions over the Internet (i.e. enabling cloud services)".
The 451 Group	"A service model that combines a general organizing principle for IT delivery, infrastructure components, an architectural approach and an economic model – basically, a confluence of grid computing, virtualization, utility computing, hosting and software as a service (SaaS)"
Merrill Lynch	"The idea of delivering personal (e.g. Email, word processing, presentations.) and business productivity applications (e.g. Sales force automation, customer service, accounting) from centralized servers".

Cloud computing is a growing technology and a lot of companies are changing their business models to a model which is based on cloud computing. This approach is cost effective of maintaining a dedicated server and thus cloud computing would be the on-demand resource solutions and the road which must be taken to ensure the efficiency of the services. Cloud computing technology, is a technology that advances the infrastructure of IT and scalable sophisticated applications which allow individuals around the globe to connect to data, information and computing resources anywhere and anytime (Fiji, 2011).

The development of cloud computing traced back to the early 1990s, and the idea of the cloud based on the existing technologies which are not new i.e. cluster computing, virtual computing, distributed, and utility computing, and software as a service (Borko & Armando, 2010). The cloud is innovative in the way it combines all of the above and transfers them from a localised processing unit to a web network (Weiss, 2007). However, the vision of such technology were not revolutionary, in other words cloud computing is not a new thing in terms of technology, it has been around ever since the development of the Internet. According to Dikaiakos et al. (2009), the vision of the twenty-first century is connected to data, and computing resources through small portable devices, as an alternative of accessing them via a usual desktop PC. Hence, cloud computing is a technology that assists organisations and companies to accommodate their services without relying on IT infrastructure, let alone invest in it and other supporting services.

Cloud computing is a general term that includes the entire services as shown in table 2. These services generally encompass three main classes: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). These services are accommodated into four deployment models which have been identified for cloud architecture solutions and are illustrated in table 3 (Mell & Grance, 2011; Wyld, 2010). Cloud is platform independent that means a cloud can be accessed from any device and platform as

long as it connected to the internet and the software that is used to serve the internet that meets the minimum requirements of Cloud. Today's internet browsers such as Firefox and Google Chrome are fully capable to meet the minimum requirements of any cloud server. Cloud Computing facilitates a new approach towards IT. It enables enhanced scalability and more efficient use of IT based on Virtualization of heterogeneous and spread IT resources (Stanoevska-Slabeva et. al. 2010).

**Table 2:** Categories of cloud computing services

Category	Description
Infrastructure as a Service (IaaS)	In this layer, products are provided through the internet such as hardware services, enabling customers to pay for usage of servers (e.g., virtual computers, virtual servers, storage devices, etc.).
Platform as a Service (PaaS)	Products provided through this layer which involves the ability to develop and host software remotely. For instance develop web solutions and place them on a web server running server operating systems (i.e. Windows Azure, which supports the delivery of highly scalable cloud-based applications).
Software as a Service (SaaS)	In this this layer, application softwares are provided via Internet as a service. In which the cloud provides a complete application functionality which ranges from productivity applications (i.e., office-type).

**Table 3:** Types of cloud computing

Category	Description
Private Cloud	The cloud infrastructure of this type is operated for a particular organisation comprising multiple consumer (i.e. business units). The system might be organized by its own organisation, a third party, or combination of them, and it may be exist on premise or off premise.
Community Cloud	The cloud infrastructure is used by a particular community of consumers from organisations that have shared concerns (i.e., mission, security requirements, policy, and compliance considerations). It might be owned, and operated by one or many organizations or a third party and may exist on premise or off premise.
Public Cloud	The cloud infrastructure is offered for general public use or a large industry group and is owned by an organization (i.e. business, academic, or government organization, or some combination of them) selling cloud services.
Hybrid Cloud	The cloud infrastructure is a combination of two or more cloud infrastructure (private, community, or public) that remain unique entities, but are bound together by standardized and proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

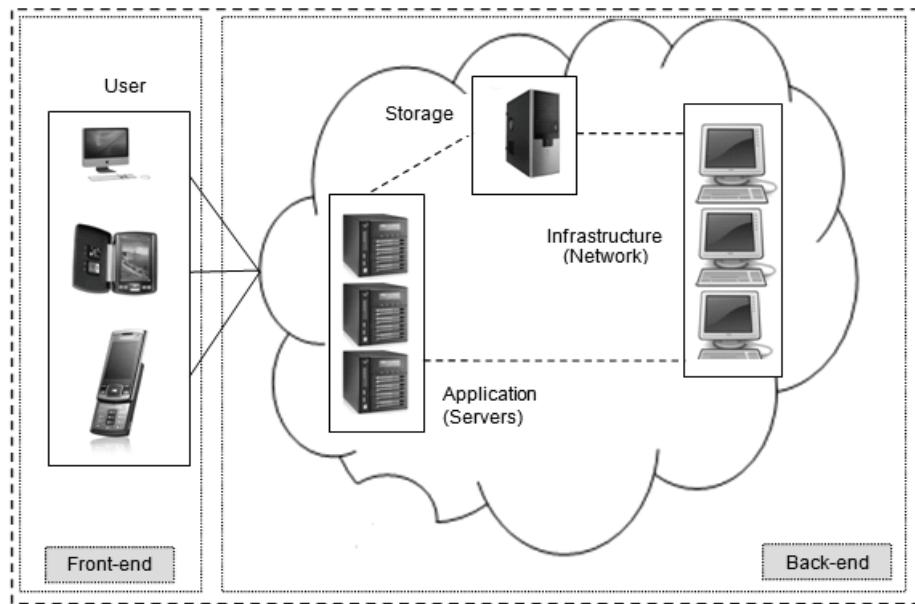
## 2.1 Cloud computing architecture

It is well known that cloud computing is computing over a cloud (Armbrust, et. al. 2009). The cloud architecture, the systems architecture of the software systems involved in the delivery of cloud computing includes hardware and software designed by cloud architect who typically works for a cloud integrator (Shivaji,et. al. 2010). Cloud computing can be divided into two components, the front-end or user end and back-end in which they are connected to each other via a network normally the internet. The front end is the computer user, or client. The back-end is the cloud part of the system as illustrated in figure 1.

The front end comprises the users' computer along with the application required to access the cloud computing system. When a user accesses its own email account from gmail for example, the user uses software running on the front-end of the cloud. The same is true when user accessing its own facebook account. The cloud computing system differs in relation to the user interface. For instance services like web-based email programs existing Web browsers like internet Explorer or Firefox. Other systems have unique applications which offer network access to users.

The back-end of the cloud system comprises hardware and software architecture that feed the interface in which the user it will see on the front-end. The back-end includes various computers, servers and data storage systems that create the cloud computing services. Theoretically, a cloud computing system can include practically any type of web application program from data processing to video images. Normally every application will have its own dedicated server. Because the computers are set up to work together, the applications can take advantage of all that computing power as if they were running on one particular machine. Cloud computing also allows for a lot of flexibility. Depending on the demand, user can increase how

much of the cloud resources required without the need for assigning specific hardware for the job, or just reduce the amount of resources assigned when they are not necessary.



**Figure 1:** Cloud computing architecture

The entire system would be administered by a central server, it is also used for monitoring user's requirement along with traffic to guarantee that everything of the system works without any problem. In addition, there are some rules known as protocols which used by the server and it uses a particular software known as middleware. This software used to allow computers to communicate with each other. Individual users connect to the cloud from its own computer or portable devices through the Internet. Then the cloud is observed as a single application, device, or document. The hardware in the cloud (and the operating system that manages the hardware connections) is invisible.

The main characteristic of cloud computing architecture is the ability to set up your own on-premise data storage. It also has the advantage of being able to custom build a system starting from the physical infrastructure, hardware and software through to the security system. In addition, it has the ability to manage it later when it's functioning. However, instead of building your own data storage, as an alternative you can rent computer storage from the cloud provider. The cloud computing has the potential of scalability when it is required and just pay when you use, such as pay-as-you-go. No specific commitment is required, start and finishing would be possible at any time. The only thing the user needs to do, is to run the cloud computing system's interface software, which would be simple as a Web browser, and the rest would be processed by the cloud's network.

## 2.2 The key advantages of cloud computing

Cloud computing can be seen as one of the most promising technology in computer science today, in which able to tackle a number of issues. This section identifies some key advantages of cloud computing (Zisis & Lekkas, 2011; Reese, 2009; Buyya, et. al. 2009):

- **Ease of Implementation:** The use of cloud technology does not require to purchase hardware, software licenses, or implementation services, an organization can set up a cloud computing rapidly.
- **Flexibility:** Users can quickly receive computing resources, as required, without human interaction. Capabilities can be quickly and elastically offered, in some cases automatically, to quickly scale out or up.
- **Scalability:** The cloud infrastructure is scalable, in other words, new hosts can be added as can physical servers, with limited modifications to infrastructure set up and software.
- **Accessibility:** The cloud can be accessed via various portable devices such as mobile phones, laptops, and PDAs, this is due to the capability of the cloud over the network.

- **Location independence:** The user usually has no knowledge or control over the exact location of the provided resources, this is due to the independence location of the provider.
- **Reliability:** This feature improves through the use of multiple redundant sites, which makes cloud computing suitable for business continuity and disaster recovery.
- **Cost effectiveness:** Cloud computing is a cost effective in which organisations can eliminate ICT capital expenditures and decrease ongoing operating expenditures by paying only for the services they use and, potentially, by reducing or redeploying their ICT staffs.
- **Sustainability:** Cloud service providers, by using economies of scale and their capacity to manage computing assets more efficiently, can consume far less energy and other resources than traditional data center operators. This is due to the efficient and carbon neutrality system.
- **Security:** Cloud computing implementations commonly deployed advanced security technologies, which are mostly available due to the centralisation of data and widespread architecture. The homogenous, and resource-pooled nature of the cloud, facilitates cloud providers to concentrate on securing the cloud construction.

### **2.3 The key challenges of cloud computing**

Cloud computing refers to the provision of computing resources over the internet. Instead of possession of data on your own hard drive or updating applications on demand. You use services over the internet, at different locations to store your information and use its applications. In other words, although you may find all you need with certain services. Achieving these will require consideration of various issues and challenges such as Security and Privacy, Connectivity, reliability, technology assumption and implementation.

#### **Security and Privacy:**

One of the major concerns of cloud computing is the security and privacy (Paquette, et. al., 2011). Users might not be convinced by handling their data to a third party. Particularly for those organisations that want to keep their important information on cloud services. In which most cloud service providers would guarantee that its servers are kept free from viral infection and malware. Most of the cloud types are shared services with other people and companies. Hence, people fear that anyone can access its information, especially if it's not a private cloud. It is also great concern for government authorities to keep citizen's information on cloud services. This is because citizen files are stored on the cloud, which means the information might be at unauthorised access risk (Borko & Armando, 2010) .

Privacy guarantees that a data is not accessed by unauthorised users is of paramount importance of any cloud computing services. It is not a barrier but should be taken into account. Privacy is another concern that the cloud computing technology is suffering from. Despite the cloud service providers (CSP) trying to secure the services by developing a password to protect account, security servers via which all data being transferred must satisfy proper data encryption techniques. However, still there is a great concern about security and privacy of the data and information stored in the cloud, even though there is a small possibility that hackers accessing the cloud services (Honan, 2012), but however the security and privacy should be taken into great consideration.

#### **Connectivity:**

Connectivity is another disadvantage that impact the implementation of cloud computing. The Internet is necessary for it to function and cannot be accessed without it. In some developing counties the quality of the internet is not as possible to implement cloud services (Shareef & Johnnes 2012). Not everyone has Internet access at their fingertips and WiFi isn't available everywhere so Internet access can become a big issue.

#### **Technology assumption and implementation:**

Organisations are seeking for direction in developing technology strategies. In order to identify which applications are suitable for moving to the cloud. For example, how applications are allocated between in-house and on the cloud? In addition, how the changes of technology can be implemented in the least

disruptive manner (Marston et. al. 2011). The conventional in-house design and evolution of IT will require an integrated cloud computing component as one of the important choices. The security checklist would cover all facets of security necessities such as; legal issue, policy issue, physical security, and technical issues (ENISA, 2009). The current literature (Huff & Munro, 2008) on technology adoption and particularly moving to grid computing (Lin & Lin, 2006), would offer a useful opportunity as a starting point. Government authority and researchers can take an empirical approach to investigate for a gradual adoption of cloud computing, and develop econometric models to recognise the strength of the relationship between relevant variables of interest. Organisations can also look for best practices for developing the cloud applications with their existing applications. For those applications that cannot be currently transferred to a cloud, organisations will still benefit from empirical research that overview the best solutions that can be set as a benchmark.

**Reliability:**

Cloud computing might not be suitable for all organisations. For instance, large companies might not be able to adopt cloud computing due to loss of services as a result of cloud glitches would be a significant threat. Especially if it affects their customers and hence considerable loss of sale opportunities and customer dissatisfaction. The issue of reliability in the context of cloud will continue to be a concern. Similar issues that occurred with the cloud services of Amazon and Google are possible to surface again as the number of cloud consumer and providers rise. The sudden unavailability of service outage, i.e. salesforce.com left consumers without services for six hours in February 2008. Amazon' simple storage service (S3) and Elastic compute cloud suffered a three hour outage in the same month a few days later and an eight hour outage in July of the same year by S3 (Leavitt, 2009). In addition, in the early 2009, Googles' Gmail went down for three hours, hence stopping its 113 million consumers from accessing their emails or the documents which they are stored online as Google Docs (Naughton, 2009). However, Amazon tried to address these issues, but still the adoption of cloud computing raises various challenges and need to be taken into consideration. Despite these challenges, recently large companies (such as Sanmina-SCI which has a revenue of 10.7 billion US dollars, which uses Googles Apps) were more interested than small companies in leveraging IaaS external cloud capability (Golden, 2009).

**3. Methodology**

To accomplish this study, the researcher conducted qualitative interviews with four highly position people in ministries of KRI, who were carefully selected, based on their respective experience and knowledge in their own area of expertise such as IT. The ministries were selected are; ministry of municipalities, ministry of transportation and communication, ministry of higher education and scientific research, and the IT department at the council of ministries. These interviews were conducted in order to identify and outline the current state of affairs of the region in terms of the technology used for service provision. Each participant based on his experience identified the current situation in the region in terms of ICT. They also had their own view of the possibility of the adoption of cloud computing in the e - government system.

**4. Cloud computing and e-Government**

Numerous countries across the world have tried to employ and implement e-Government solutions. Some of them have already implemented and obtained substantial benefits from it; others have just started or planned to employ it. However, most of the developing countries, are facing various challenges in implementing such solutions, for example, the high cost of ICT infrastructure and lack of professionals or trained staff to control and maintain the services offered. The researcher believes that cloud computing might play a vital role in providing solutions for today and in the future.

Two key aspects related to e-Government is currently perceived; continuous development of ICT infrastructure, and continuous rise of consumers' skills and knowledge of using computers and the internet (Cellary, and Strykowski, 2009). These two aspects provide opportunity to enhance the provision of e-services to the public and private sector. Government authorities should take it into consideration for the development and utilising e-Government solutions. To achieve this aim, the cloud computing should be applied in the public sector. Cloud computing allows to uniformly cover the entire area of e-Government services, independently of difference of local administrative bodies that may be worse or better organised to offer e-services. This is particularly the case in the countries where their ICT infrastructure is not developed as in developed countries such as the Kurdistan Region of Iraq (KRI). According to the director of the Erbil (capital of KRI) municipality

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there is no IT infrastructure in the department to accomplish and provide e-services to its citizens. There is now an emerging consensus that cloud will play a significant role in IT operations. This will substantially facilitate the provision of computing e-services and change the delivery model for services. A recent study carried out by international research firm Vanson Boume of IT and business decision makers revealed that 70% of participants think cloud computing will assist their business.

According to the interview carried out with the advisor at the IT department at the council of ministries most of the ministries in the region are connected together via fiber optic cables, and also there is a consideration of connecting to the FLAG network. However, he mentioned that until now the system is not available for government institutions. In addition, he stated that the current government system is facing several challenges that should be solved to prepare for e-Government initiative (Shareef et al., 2010). He specifically focused on the lack of interoperability and lack of inter-institutions coordination between ministries and government institutions. This might make an e-Government initiative difficult to implement, because every ministry is carrying out projects independently without referring to other agencies, or sharing the information with the other related ministries to uptake the project successfully. As a consequence, this will lead to assorted efforts from various government entities and thus will create a lack of interoperable systems.

The prospect of bringing cloud computing and e-Government together is challenging. It is vital to understand the different elements that are important to construct and maintain a cloud that achieves each government's objective. Governments in the Asia Pacific region assigned huge priority to server virtualization and network security (Chandrasekaran & Kapoor 2011). Server Virtualization will assist governments meet its merging objectives. In addition, security is a substantial facet to government adoption. The government adopts cloud computing merely if they are convinced that its data will remain secure and available. Therefore, the adoption of cloud computing in developing countries in general and in KRI in particular is vital to address the lack of IT infrastructure- server virtualization and security. Even in 2007 the KRI has managed to establish an access network; which is a network that connect most of the government departments together. However, according to the manager of the IT in the ministry of transportation and communication, since 2007 this project has not been used by government.

Most of the recent research is concentrated on cloud computing in the context of the internet and how it changes the computing solutions in developed countries (Fiji, 2011). Cloud computing will provide more significant opportunities for developing countries. Recent research highlights the use of mobile applications which enabled via cloud computing. In many developing countries, phones and internet connections have reached its citizen via wired infrastructure. Those countries such as KRI that are mountainous where many isolated villages are located, are virtually impossible to connect to the internet. Mobile technology infrastructure has become a viable savior for these physically and technologically isolated people. In this regard, according to the interview carried out with director of general of the ministry of transportation and communication mentioned to some of the main mobile companies in the region such as Asia cell, Korek Telecom, Sana Tel and Mobi Tel, etc. Which they are substantially contributing and hence facilitating the adoption of e-Government system.

However, the well-being level of mobile usage in the region combined with the lack of power and internet infrastructure, provides an exclusive opportunity that cloud computing can fill. The SaaS provides a free or low cost alternative to conventional desktop based productivity applications. They do not need to buy expensive offices with huge number of skilled staff or accounting software. These businesses have alternatives to employ customer relationship management (CRM) applications, which were very expensive in the conventional software world. By hosting their data on the clouds, these businesses are not held hostage to frequent power failures and broadband disruption. Their data will be available and accessible on their mobile. With the arrival of reasonably priced smart phones and mini laptops, with mobile data capabilities, they can have IT infrastructure which can parallel even those of developed countries (Harris & Nunn, 2012; Greengard, 2010).

It is obvious that most of the government departments have similar data processing needs, thus elements of the same type need similar software functionality to manage their operations. Hence, cloud computing can be measured as one of the key solution for such case via its ability to offer SaaS to serve the entire government departments employing similar application with little modification to meet each department needs. The modification in the cloud computing will affect the metadata only and not the application source code (Cellary & Strykowski, 2009).

Furthermore, Cloud software and hardware can be of benefit to educational establishments to continue to take advantage of new developments in IT technologies at affordable costs. This in turn assists governments pursuing environmentally friendly policies, decreasing pollution and effective waste management. The UK's National Computer Center (NCC) estimates that small to medium enterprises and educational establishments can decrease the total cost of ownership of technology using hosted solution. This result was obtained by the cloud vendor "Gooroo" in a survey which deduced that UK SMEs will adopt cloud computing in an effort to decrease the costs during the economic recession. The majority of respondents (65%) said that a reduction in overall IT costs was the key driving force behind their embracing of cloud computing. However, in regards to the KRI situation, the interview carried out with the manager of the ICT Centre at the ministry of Higher Education and Scientific Research (MOHE) mentioned that the entire universities in the region are not connected to each other and have the lack of ICT infrastructure. On the other hand, there are numerous educational establishments that are adopting cloud computing to facilitate the learning process and, hence influence economic growth. Therefore, the government authorities in the region can learn lessons from implemented projects of cloud computing such as the University of Westminster in the UK, and the Washington State University's School of Electrical Engineering and Computer Science (Sultan, 2010). Lastly, three out of four participants in the interview stated that the adoption of cloud computing in e-Government would be a significant benefit of government in facilitating the provision of services to citizen effectively and efficiently.

## **5. Conclusion**

Many countries across the globe have tried to adopt technology as a solution to provide services to its citizen effectively and efficiently. However, some of them have already started and obtained a substantial benefit from it. However, others are still struggling with adopting technology properly such as KRI, this is due to the lack of strategic plan, ICT infrastructure, legal framework, IT skills and others. In this paper, the researcher believes that the cloud computing can play a significant role in the way of supporting service provision to the citizen. This paper also shaded light on the possibility of adopting cloud computing in e-Government.

The research findings also revealed that cloud computing can help to implement e-Government systems effectively and would facilitate in the service provision. Particularly essential as the KRI lacks a proper ICT infrastructure. Furthermore, this paper also assists policy makers in government to offer a clear vision for cloud computing in e-Government. Further research is required for the cloud computing framework of implementation, which should be the subject of future research. Ultimately, any conclusions could be useful to other researchers in the developing world who are seeking to explore the potential of similar initiatives.

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# Challenges to e-Government Applications: A Delphi Study

Shawren Singh

University of South Africa, Florida, South Africa

[singhs@unisa.ac.za](mailto:singhs@unisa.ac.za)

**Abstract:** A three-round electronic Delphi survey addressing 20 issues, completed by 41 e-Government panel members was conducted to establish the relative importance of issues or factors affecting the use of this technology. The outcome measures were the relative importance and the level of agreement of the panel members on the e-Government enablers (presented as statements) to the success of e-Government applications. All the issues presented in this study were regarded as being relatively important by the participants. In addition open-ended comments were collected from the participants. Having establishing importance, the issues were thematically classified. The classification in order of rank importance is: system obstacles to success; relationships between key actors; drivers for change; gaps in understanding; and managing stakeholders. The high level of agreement among the expert panel members indicates particular themes and priorities that need to be addressed in understanding the challenges faced in the implementation of e-Government applications.

**Keywords:** e-Government, Delphi survey, consensus

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## 1. Introduction

This research paper reports on a project, the objective of which was to establish the importance of the challenges that affect e-Government applications. This is important because there appears to be a relatively low rate of successful use of computer applications in the support of government services to the public. The objective of e-Government is to improve service delivery to the citizen and in so doing improve the efficiency of the government's activities concerned. The application of Information and Communications Technology (ICT) facilitated by the Internet and web technology is the primary tool to enable the objectives of e-Government. Attention has been given to e-Government since the 1990s when it was realised that the Internet and web technology was being used to transform business processes and practices.

ICT has become essential, not only to how business and government are conducted but also to how life is led in the developed and to some extent in the developing world. The worldwide ICT investment is estimated at \$3.8 trillion for 2013 (Rivera & Goasduff, 2013), with e-Government being one of the rapidly growing sectors of ICT. Yet there is a high incidence of ICT implementation not resulting in success with some sources claiming that more than 70% of ICT systems do not deliver within the timeframe required or within the budgetary constraints (Al-Ahmad *et al.*, 2009; Robertson, 2008). There is also the problem that some ICT investments do not lead to the functionality and thus improvement of processes which was sought by the sponsor. Some ICT applications lead to serendipitous results but in general there is far more wastage of resources in projects than unexpected benefits.

## 2. Contextual background

Through the ubiquitous use of ICT it appears that the appropriate application of e-Government technologies have become a key component to the realisation of government objectives (Ramon, 2012). It has also been recognised that e-Government applications can play a role not only in waste reduction but also in improving the interface between citizens and making the task of citizens contact with government less daunting. Through another lens e-Government applications can be seen as a mechanism to reduce the inevitable waste resulting from the traditional silos mindset common in government (De Brí & Bannister, 2010; Uusikylä, 2013). Some researchers argue that this technology may even forge processes of governing that is to a greater extent actively democratic. In this section we discuss some challenges to e-Government applications.

### 2.1 System obstacles to success

There have been several successful e-Government initiatives. For example, the Republic of Korea, the Netherlands and the United Kingdom and Northern Ireland have been ranked as the top three countries in the United Nations e-Government development index (United Nations, 2012). Sarantis, Askounis, and Smithson (2009) argue that some of the project management approaches that are proposed for e-Government project implementation are more suited to the management of the overall development of information systems, rather than being directly targeted to a specific e-Government need. The resulting effect of this is a poor

understanding of the key issues required to make e-Government a success and it also detracts from the ability to be able to conceptualise what the benefits may be. These inappropriate project management approaches may under prepare the stakeholders to receive the benefits of the new system. Inappropriate project management approaches further complicates an already complex ICT project. As stakeholders are both internal and external to the project, it becomes a difficult task to ensure that the project satisfies the various needs of the community of stakeholders (Juciute, 2007; Kamal, Weerakkody, & Irani, 2011).

## **2.2 Relationships between key actors**

In the context of government departments, civil servants influenced by their ministers may attempt to be agents of technology change. It has been known that ministers issue directives to their departments to implement particular systems within a pre-defined time period often attached to their term of office (Mooij, 2007; Sudan, 2002). The ICT personnel, who do not wish to disappoint the minister, hastily try to develop solutions and in their endeavours may comprise the development process.

One objective of e-Government is to deliver citizen-centred services. To achieve e-Government success requires active partnerships between government, citizens and the private sector (Farelo & Morris, 2006). It is demanding to succeed with e-Government as there exists a complex set of dynamics with citizens and how they use government services. Heeks (2006) reports that the total number of citizens that are actively using e-Government applications is relatively small. Millard (2006) found in Europe that e-Government users use government services on an average of 3.1 times a year compared with non-e-Government users, who only tend to use government services 1.5 times a year. In Africa there appears to be no reliable statistics on how frequently e-Government applications are used by citizens.

Complexity in e-Government applications pose a particular challenge (Purao & Desouza, 2011) to designers and developers of e-Government applications. For example, Lips (2008) reports on the Kafkabrigade project in the Netherlands. This projects attempts to tackle, what she refers to as, the '*wicked*' problems or excessive administrative burdens from a citizen-centric point of view. The Netherlands national government has launched a website ([www.kafkabrigade.nl](http://www.kafkabrigade.nl)) where Dutch citizens can post their problems concerning disjointed government departments. Relationships within e-Government structures are complex, for example government-to-citizen, citizen-to-government, government-to-government, government-to-business, business-to-government, government-to-employee, and employee-to-government (Anntiroiko, 2008). Governments adopting other countries e-Government systems pose a problem in implementation. Heeks (2003) points out that e-Government systems should be country specific and not an off-the-shelf system from another country.

## **2.3 Drivers for change**

Managing the development of an e-Government application is challenging, thus Agarwal (2007) points out that a top-down approach has been followed by several e-Government projects which has often not worked and the resultant system has not been able to fulfil the needs of the citizens despite the cost of these projects. Using the top-down approach the managers have an understanding of the goals of the systems and the users may have a different understanding of the goals of the system. This introduces an understanding gap. Throughout the world there has been a considerable level of e-Government activity and different countries have applied these technologies in different ways to achieve their objectives (United Nations, 2012). Despite various claims of success there is a lack of sharing of information on successes and failures of these e-Government applications (Agarwal, 2007).

The task of implementing successful e-Government applications has been further complicated by the budgetary constraints which are being imposed by governments and e-Government projects are being subjected to a higher degree of scrutiny to evaluate whether they are delivering the benefits which they have promised (Gupta, Bhattacharya, & Agarwal, 2007).

## **2.4 Gaps in understanding**

A gap in understanding may be defined as a difference between senior management's understanding and or potential citizens' understanding and the way in which these understandings are received and acted upon by ICT professionals. The problem of understanding gaps in the perceptions related to investment in ICT systems

between stakeholders is a feature of both the private and public sector. It is well established that in ICT development problems often stem from the original challenge or opportunity not being adequately defined (Murer, Bonati, & Furrer, 2011; Pressman, 2009). This in turn may be seen as a result of inadequate corporate communication as to what is required. It has been suggested that one way of improving this situation is to employ an IS/IT benefits realization process (Lin, Pervan, & McDermaid, 2007).

## **2.5 Managing stakeholders**

Citizen-orientation which in some instances is still being referred to as customer-orientation has been proposed as a way in which governments have attempted to improve the quality of services offered to business and citizens (Bannister, 2000; Helbig, Gil-García, & Ferro, 2009). There is a debate in the literature as to which is the most appropriate term to use in describing the individuals who obtain the direct benefits from ICT systems in the e-Government environment and the terms customer or citizen are used (Brewer, 2007; Mintzberg, 1996). The term customer suggests a number of issues, one of which has to do with the organisation satisfying a particular need and service. The term customer also suggests the possibility of the person receiving the service has some degree of freedom to choose the service provider. In the majority of e-Government systems the person who utilises the service does not have any choice. We argue that the term customer is inappropriate and the term citizen serves to better describe the relationship between the provider and the user of the service.

In government departments there appears to be internal inefficiencies in terms of ICT and human resources (Farelo & Morris, 2006). According to Abrahams (2009) e-Government applications face challenges because of the fragmented nature of government administration and its communications processes. The use of silo structures can optimize the efficiency of individual parts of government but it does so at the expense of understanding organisation as a whole and seeing how it can relate to the environment in a more effective and holistic manner. It is proposed that a holistic approach be adopted were public service agencies work across portfolio boundaries to achieve a shared goal and an integrated government response to particular issues. These approaches can be formal and informal. They can focus on policy development, program management and service delivery simultaneously (Australian Public Service, 2004).<sup>1</sup>

## **3. Setting up the Delphi Study**

The Delphi method has been used in Information Systems research since the 1980's (Päivärinta, Pekkola, & Moe, 2011). There are various approaches to conducting a Delphi study. Some researchers would commence by distributing an open-ended questionnaire to a group of experts (Remenyi & Sutherland, 1993). However, in this study, the open-ended questionnaire was not considered to be necessary since we conducted a literature review (Hsu & Sandford, 2007; Watson, 2008) and a brainstorming (Geist, 2010) session with four e-Government experts. The brainstorming session consisted of three Skype conference calls, several one-on-one Skype calls and e-mails. **Error! Reference source not found.**<sup>1</sup> outlines the approach that was used for the Delphi study.

After conducting the literature review and brain storming session, we identified 20 statements. The statements were pre-tested at the University of South Africa with six academics and with three practitioners. This led to the refinement of the statements. The final list of twenty statements that was send to the expert panel were:

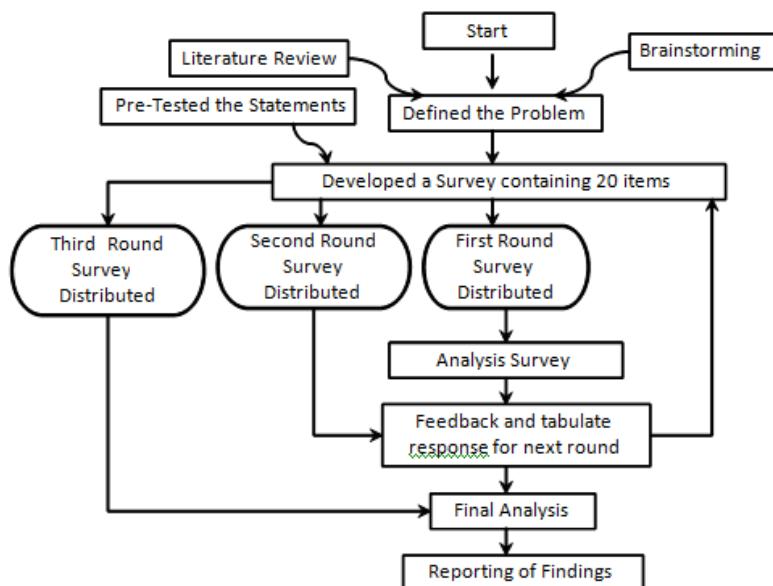
The success of e-Government systems is affected by:-

1. The pressure to modernise government.
2. The need to contain government expenses and thus keep tax from increasing.
3. The short time horizon of a government i.e. 5 years.
4. Lack of knowledge within government departments as to how to justify governments investment.
5. Complicated internal bureaucratic policy requirements by government departments.
6. Attitude of outsourcers to government contracts.
7. Civil servants struggle to manage outsourced contracts.
8. Governments' outsourcing processes are complicated.

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<sup>1</sup> The language used in this sector moves rapidly, various terms "one-stop government," "joined-up government" and "whole-of-government," have been used with the latest term now being t-Government meaning transformed government. Of course ICT is the main tool used to facilitate the transformation.

9. Civil servants lack of understanding of outsourcings.
10. Integrating civil servants and outsourced team members is difficult.
11. The influence of politicians.
12. Interference by government Ministers.
13. Influence of policy shifting in government.
14. Civil servants are generally not sufficiently technologically savvy to understand the consequences of their decisions regarding the project.
15. Civil servants decision making processes are complex and bureaucratic.
16. The scarcity of in-house ICT expertise and resources.
17. The tendency towards 'turf wars' within government departments.
18. Civil servants inability to understand the point of view of the citizen.
19. Challenges of competition from other government departments.
20. Civil servants often do not know what is actually required from the system/project.



**Figure 1:** Flow Diagram Showing 3 Round Delphi Process

The final round of the Delphi study had an open ended question requesting respondents to list up to 5 major obstacles that they were aware of which causes problems in the deployment of e-Government applications. In accordance with the ethics protocols governing this research, respondents were sent a letter of consent and a research participants' information document. This Delphi study was conducted in the spirit of an e-Delphi study (Avery *et al.*, 2005; Espinosa & Caro, 2011; Gordon & Pease, 2006). We accepted informed consent to this Delphi study when respondents accepted the terms and conditions on the survey website.

#### 4. Expert Sample

An expert sampling technique was used, with this technique the respondents are chosen in a non-random manner based on their expertise of the issues being studied (Bhattacherjee, 2012). The final sample consisted of 41 respondents, all with experience in e-Government, see Table 1.

Respondents	
Academic	19
Academic with e-Government experience	7
Practitioner	4
Consultant	2
Researcher	8
Other: (Government statistics and data systems )	1
Total	41

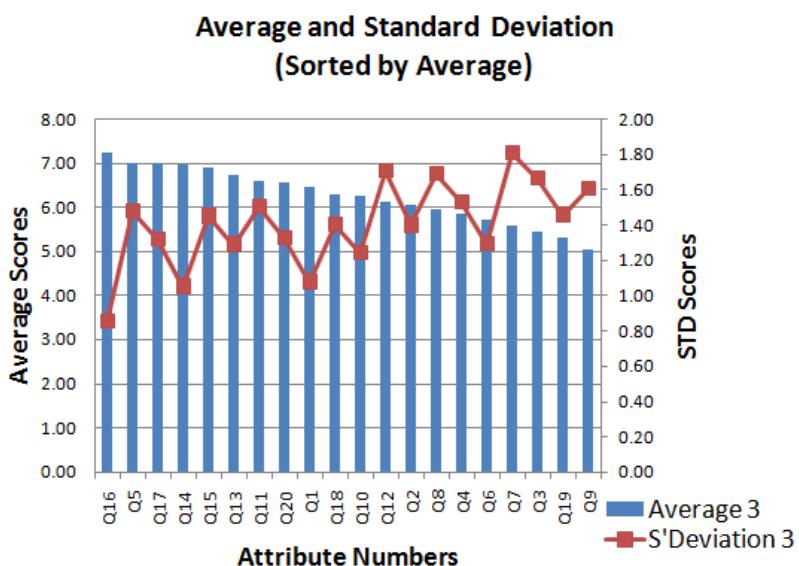
**Table 1:** Respondents to Delphi Study

## 5. Three Round Delphi Study

The statements presenting the 20 selected e-Government challenges were distributed to the participants using LimeSurvey, an open source survey application. We planned, created, designed and pre-tested the electronic version of the Delphi survey. For the first round, respondents would only proceed to the survey if they had read and accepted the informed consent statement. On completion, the electronic survey was submitted and we immediately received and automatic e-mail from LimeSurvey stating that there was a new response added to the database. After the due date of each round, the data was exported from the LimeSurvey database to a spreadsheet which had been specifically designed to calculate the average response from the group for each issue and reprinted the statements showing each individual's actual response and the average score for each issue. The research participants were then asked to re-evaluate their response on the basis of their own score for the previous round and the average score of all the participants for the previous round for that issue. The whole exercise was then repeated a third time in order to give the respondents an opportunity to consider their responses three times.

## 6. Results of the Delphi Study

In Figure 2 a bar chart shows the average third round scores for the whole population of this study, together with a line graph showing the standard deviation of each issue. The supporting number for this graph may be seen in Table 2.



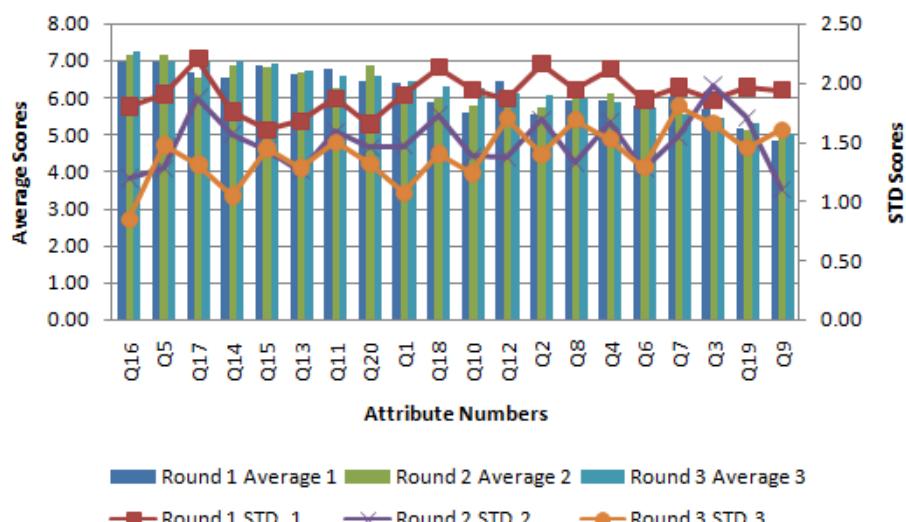
Q15	Civil servants decision making processes are complex and bureaucratic.	6.90	1.45
Q13	Is influenced by policy shift within government.	6.73	1.28
Q11	The influence of politicians.	6.59	1.50
Q20	Civil servants often do not know what is actually required from the system/project.	6.56	1.32
Q1	The pressure to modernise government.	6.44	1.07
Q18	Civil servants inability to understand the point of view of the citizen.	6.29	1.40
Q10	Integrating civil servants and outsourced team members is difficult.	6.24	1.24
Q12	Interference by government Ministers.	6.12	1.71
Issue No.	Statement	Average Score	Std Dev.
Q2	The need to contain government expenses and thus keep tax from increasing.	6.05	1.40
Q8	Governments' outsourcing processes are complicated.	5.95	1.69
Q4	Lack of knowledge within government departments as to how to justify governments' investment.	5.85	1.53
Q6	Attitude of outsourcers to government contracts.	5.71	1.29
Q7	Civil servants struggle to manage outsourced contract	5.56	1.80
Q3	The short time horizon of a government i.e. 5 year	5.44	1.66
Q19	Challengers of competition from other governmental departments.	5.29	1.45
Q9	Civil servants do not understand the need for outsourcing.	5.02	1.60

**Table 2:** Average Third Round Scores and Standard Deviations for the Group

All statements scored five or more with standard deviations of less than 1.80. This suggests that not only are the statements considered of relative importance by the population, but also that there is a relatively high consensus of this view.

Figure shows the 20 statements, sorted by the third round average score, but with their average score per round and their standard deviation per round plotted on the same diagram. It is important to note that the standard deviation in all but five cases declined each round. We do not consider this a setback, because in round one there were fifty four respondents. In round two there were thirty nine respondents. Round two lost fifteen respondents. Using active encouragement techniques for round three, there were forty one respondents, which affected the final scores. Overall, this indicates that a degree of consensus was established.

### **Average and Standard Deviation**



**Figure 3:** Average and Standard Deviation Scores for Each Round

## 7. General discussion

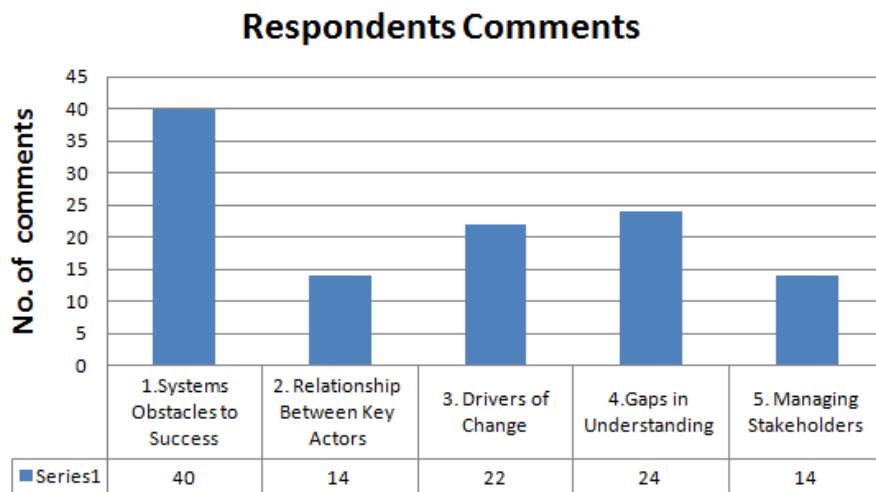
Having established that all the statements were considered as important to the respondents, we then thematically categorised the statements. Table 3 is the newly categorised attributes. We calculated the group average and group standard deviation for the new categories. We then ranked the new categories based on the group average. The new categories in rank order are:

1. System obstacles to success
2. Relationships between key actors
3. Drivers for change
4. Gaps in understanding
5. Managing stakeholders

No.	Statement	Average Score	Category	Rank	Group Average	Group STD
16	The scarcity of in-house ICT expertise and resources.	7.22	System obstacles to success	1	6.44	1.56
5	Complicated internal bureaucratic policy requirements by governmental departments.	6.98				
15	Civil servants decision making processes are complex and bureaucratic.	6.90				
13	Is influenced by policy shift within government.	6.73				
8	Governments' outsourcing processes are complicated.	5.95				
4	Lack of knowledge within government departments as to how to justify governments' investment.	5.85				
3	The short time horizon of a government i.e. 5 year	5.44	Relationships between key actors	2	6.25	1.57
17	The tendency towards 'turf wars' within government departments.	6.98				
11	The influence of politicians.	6.59				
18	Civil servants inability to understand the point of view of the citizen.	6.29				
12	Interference by government Ministers.	6.12				
19	Challenges of competition from other governmental departments.	5.29				
1	The pressure to modernise government.	6.44	Drivers for change	3	6.24	1.25
2	The need to contain government expenses and thus keep tax from increasing.	6.05				
14	Civil servants are generally not sufficiently technologically savvy to understand the consequences of their decisions on the project.	6.95				
20	Civil servants often do not know what is actually required from the system/project.	6.56	Gaps in understanding	4	6.18	1.57
9	Civil servants do not understand the need for outsourcing.	5.02				
6	Attitude of outsourcers to government contracts.	5.71				
7	Civil servants struggle to manage outsourced contract.	5.56	Managing stakeholders	5	6.18	1.57
10	Integrating civil servants and outsourced team members is difficult.	6.24				

**Table 3:** Newly Categories Attributes

Using the newly formed categories, we then further categorised all the comments to the open ended question. We opted to use the traditional paper based version. Using this approach, it gave us the opportunity to stand over the comments and shuffle them around. There were a total of one hundred and fourteen comments. **Error! Reference source not found.** is a graphical representation of the classified comments.



**Figure 4:** Classification of Comments

## 8. Implications for e-Government Applications

From the results of the Delphi study it appears reasonable to assume that

1. system obstacles to success,
2. relationships between key actors,
3. drivers for change,
4. gaps in understanding and
5. managing stakeholders

influence the success of e-Government applications, as illustrated in **Error! Reference source not found.**. The degree to which these factors affect the success of e-Government applications requires further investigation. The open comments from respondents for each classified factor lends insight to some of the challenges facing e-Government application

### 1. System obstacles to success

The various needs of the community of stakeholders are not adequately understood as demonstrated by the following comments:

- "e-gov (e-Government) applications are developed and deployed in individual depts (departments) while citizens' needs cross departments"
- "Institutional logic of bureaucrats is to implement policies, not to serve citizens"

### 2. Relationships between key actors

The complex nature of disjointed government relationships and its effect on government is articulated in these comments:

- "Lack of inter-departmental infrastructure leading to silo-based systems"
- "ICT related projects are perceived as solely the jurisdiction of the IT department"

### 3. Drivers for change

The comments below highlight the complex nature of change in government:

- "Timeline is too long which changes the goal posts each time the technology changes."
- "Too short a term of office for decision makers/strategists/implementers to see strategy through to the end."

### 4. Gaps in understanding

Senior management's understanding of the e-Government applications are expressed in these comments:

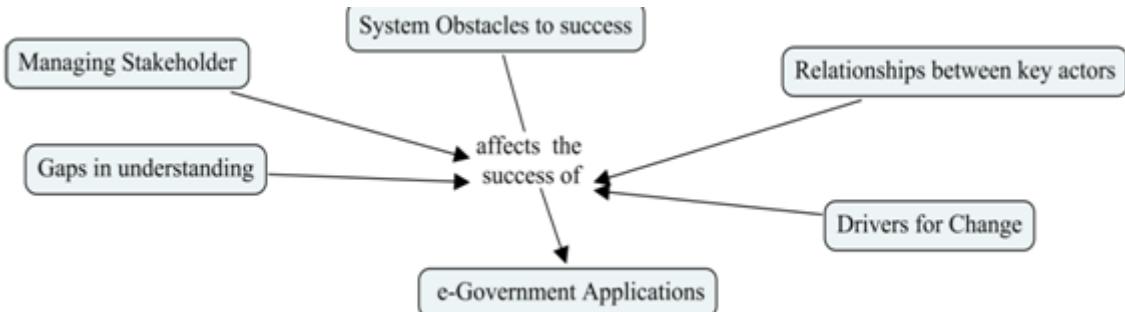
- "Many of the decision makers are not computer literate or knowledgeable enough to understand the technologies and capabilities in the market."
- "Poor IT skills base among civil servants who are supposed to manage e-Government services."

### 5. Managing stakeholders

The lack of citizen-orientation and internal inefficiencies are conveyed in these statements:

- "E-gov (e-Government) applications being built to suit the needs of govt (government) rather than citizens (i.e. not citizen-centric)"
- "Laziness"

It appears that senior managers need to evaluate how the development process of e-Government applications can be improved to deliver required measurable benefits.



**Figure 5:** Factors Affecting e-Government Applications

## 9. Conclusion

The purpose of this study was to identify some challenges that are faced by e-Government applications. This Delphi study has produced satisfactory results both in terms of the high scores obtained by the statements, indicating that they were important to the respondents, and the overall lowering of the standard deviations which showed a level of consensus of views.

When e-Government systems appear to fail, it results in the loss of large amounts of money and considerable organisational trauma. The organisational trauma caused by the malfunctioning e-Government systems can result in frustrated citizens, high turnover in staff and sometimes even disruptions to the country's economy.

Why such failures occur in the 21st century with more than 50 years' experience behind the information systems community is difficult to understand. Research has not adequately delivered with regards to being able to identify e-Government applications which have high risks of failure, nor has research provided insights as to how to manage such applications when they start to go wrong. This study has several implications for the field of e-Government application development. Firstly, the findings can benefit the e-Government research fraternity by providing some insight into the factors that affect the success of e-Government applications. Secondly, the findings offer researchers a guide to structure future research projects around identified factors that affect e-Government applications. Thirdly, the list of statements identified from the literature review and brainstorming session can be used by e-Government project stakeholders to develop checklists for their e-Government project. Finally the comments from the open-ended-question provide some insight into the mindset of the domain experts. The author is in the process of further investigating the identified factors that affect e-Government applications.

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# Towards e-Government: Evaluation of Innovative Activities in Public Administration Organizations in Lithuania

Aelita Skaržauskienė, Steponas Jonušauskas and Monika Skaržauskaitė

Mykolas Romeris University, Vilnius, Lithuania

[aelita@mruni.eu](mailto:aelita@mruni.eu)

[steponas@ecdl.lt](mailto:steponas@ecdl.lt)

[skarzauskaitė@mruni.eu](mailto:skarzauskaitė@mruni.eu)

**Abstract:** The paper presents innovative management practices for addressing complexity, uncertainty and changes. The subject of the research paper is to evaluate the innovative activities in public administration organisations implementing e-Government in Lithuania. The authors wanted to explore the way managers in public administration organisations perceive innovation and how they report on hinders or facilitators of their innovative activities. Data were collected through an e-questionnaire survey. Drawing on quantitative evidence the paper is seeking to improve the understanding of the role of innovation and to give guidance on how to handle the relationship between technologies and innovative management practices in public administration organizations.

**Keywords:** e-government, innovation, public administration

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## 1. Introduction

Demographic, economic, and technological shifts are creating an innovation imperative for government. In both the developed and developing world, many governments face a number of urgent challenges—one of which is that the rising demand for innovative services is running headlong into the reality of limited resources. At the same time public budgets are shrinking and citizens, now accustomed to new technologies and constant connectivity, have higher expectations as to the speed and quality of public services (McKinsey Center for Government, 2012). The emerging answer—from various places across the globe—is bold, rapid management innovation. Public-sector innovation can reduce costs, raise productivity, and improve the public's opinion of government. "E-Government refers to government's use of information technology to exchange information and services with citizens, businesses, other arms of government and may be applied by the legislature, judiciary or administration, in order to improve internal efficiency, the delivery of public services or processes of democratic governance" (Limba, 2011). Nowadays, e-Government has reached its critical point, because it seems insufficient to move public services into electronical environment only. "Further development of e-Government requires innovations that increase the efficiency and security of electronic public services. Therefore, one of the most important aspects related to e-Government is ensuring a better service receiver's satisfaction with electronic services, paying full attention to such electronic public services that could be provided at international level" (Jastiuginas et al, 2012). Significant progress in e-Government field requires innovative, effective and safe management practices. "It's really clear that innovative technologies should change the relationship citizens have with their government because of the ability to have a constant dialogue. Businesses are doing that today very, very successfully. They're acquiring data and using it to see patterns that tell them how they might serve their customers differently. Government should be doing the same thing" (Brown, 2012). The use of ICT creates basis for E-Government and impacts sustainable development in public sector. There is the need for the redefinition and rethinking of e-Government development in order to understand how the opportunities offered by new technologies promote new level of e-Government and to assess how and to what extent public administration organisations understand the role of innovation, to explore why and how innovation is transforming the way government interacts with citizens, civil society, and the private sector. The authors of this research paper wanted to explore the way managers in Lihuanian public administration organisations perceive innovation and how they report on hinders or facilitators of their innovative activities.

## 2. Technological and nontechnological innovations

„Various definitions have been developed to explain innovation, and as a result the term has gained greater ambiguity“ (McFadzean et al, 2005). Examination of the innovation literature confirms that there is enormous diversity in views and approaches to what actually constitutes innovative activity. Innovation has been recognized to have a central role in organisation development. However, the majority of empirical evidence concerning the relationship between innovations and organisation performance has focused on technology

development. Although the concept of innovation is usually linked to the scientific and technological dimensions, there is a large consensus that innovation is a complex process that cannot be reduced to the technological side (Romero, 2010). New ideas have proposed new ways to interpret this process. One of them suggests that the innovation paradigm is changing from the closed innovation model to an open innovation model (Chesbrough, 2003). Pursuing this tendency, the Organization for Economic Co-operation and Development, OECD (<http://www.oecd.org/about/>) has broadened the innovation concept to cover also non-technological innovation (OECD, 2005). Organizational innovation involves a customary dimension specific to the institution, implying change in the organization, and it is more related to structure, practices, arrangements, organizational beliefs, rules and norms, than to its technical aspects (Pettigrew and Fenton, 2000; Edquist et al., 2001, Romero, 2012). A revision of the innovation dimensions, both for technological and nontechnological, was proposed by Hollanders and Cruyse (2008). According to the author's suggestion, five innovation dimensions could be defined, "two of which reflect innovation outputs (applications and intellectual property) and three of which reflect innovation inputs (innovation drivers, knowledge creation and innovation and entrepreneurship)". Hollanders and Cruyse (2008) also have introduced a new category defined as throughput indicators. These indicators measure knowledge diffusion, including collaboration between organisations and other several actors, also new organizational arrangements. Archibugi, Denni, Filippetti (2009) argue that it is quite relevant to take into consideration where does innovation takes place, including the the specific sectoral structure and the socio-economic environment where it occurs. However, "these dimensions do not cover appropriately non-technological or non-R&D innovation, such as organizational and marketing innovation, so called innovative management practices or innovative activities" (Romero, 2010). Analysis of "the determinants of non-technological innovation and comparisons with those of technological innovation", have been performed by Schmidt and Rammer (2006). The research concludes that the determinants of technological and non-technological innovation are quite similar. Actually, organisations have a propensity to innovate in every form if their tangible and intangible assets (e.g., human capital and financial resources) are high. Common aspects between the factors of technological and non-technological innovation are connected also with the share of highly qualified labour and the size of the company. In this research paper the authors focus on nontechnological innovations in public administration and define them as innovative activities. Consequently, „innovation can be defined as a process that provides added value and a degree of novelty to the organisation and its suppliers and customers through the development of new procedures, solutions, products and services" (McFadzean et al, 2005).

### **3. Innovative activities in public administration**

Innovative activities in e-Government field are essentially important for the modernization of public administration, by raising the quality of electronic public services and user satisfaction. "Traditionally e-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends" (Petrauskas, Augsutinaitis, 2011, Civilka, 2012). But it seems insufficient to move public services into electronic environment only, the development of e-Government requires innovations that increase the efficiency and user satisfaction of electronic public services, paying special attention to services delivered across borders. Innovative governments are moving away from specialized agencies and discrete services toward more streamlined, citizen-centric processes that focus on optimizing the user experience (McKinsey Center for Government, 2012). Examples include facilities that cater to a wide range of citizen's needs by housing the customer-service divisions of multiple agencies, e-Government portals that allow citizens to access data and services online instead of at a physical location, and mobile applications. Innovative governments are encouraging citizens to help shape ideas and priorities for public services. Some agencies are crowd-sourcing the development of new ideas, while others are gathering user feedback in the early stages of policy development. Citizens, private companies, and civil society are playing an increasingly important role in executing public policies and services, becoming "delivery partners" to the government (for example, via open data portals that enable citizens to monitor government performance and develop new applications for public use). Based on insights from ongoing research on e-Government on a number of trends in innovative activities could be identified (Capgemini, 2007, Noble, Lehmann, 2000, McKinsey Center for Government, 2012):

- better delivery of government services to citizens, providing simpler processes and greater convenience;
- improved interactions with business and industry;
- citizen empowerment through access to information;

- efficient government management;
- less corruption, increased transparency;
- revenue growth, and/or cost reductions;
- new sources of information when shaping policies and services;
- efficient sharing responsibility in delivery.

Electronic government is being implemented worldwide and in all levels of governance. "Local authorities play a particularly important role, since they can identify the changing customers' needs best of all" (Ancarini, 2005). Although the governance functions of those institutions in different countries slightly differ, their common goal remains the same, that is not only to make the governance itself more efficient, but also to make it more accessible for the public (Gronlund, 2002; Gugliota, Cabral, 2005). McKinsey research shows that "some of the most cutting-edge innovations have come from the developing world: governments that believe they have no choice but to take bold risks. Others have come from developed nations, which feel more pressure than ever to do more and better with less". The next chapter is exploring the peculiarities of e-Government development in Lithuania.

#### **4. E-Government expansion in Lithuania**

Idea of the Electronic government creating can be considered as an integral part of efforts taken in most countries in order to modernize their public sector. "Various indicatives are being implemented in Lithuania for purpose of improvement of public sector based on possibilities provided by the Internet. The public administration sector has been the target of much criticism all over the world. The reason is the same everywhere – taxpayers want to see the efficiently functioning and cheaper executive power" (Augustinaitis, Petrauskas, 2002). This will of Lithuanian citizens is pronounced more clearly as the bureaucracy and work style inherited from the Soviet times are still deeply rooted in the society. One of the most important tasks for e-Government in Lithuania is to create an innovative better operating and less costing public administration system the activity of which would be targeted at residents of the country, their needs and welfare. More and more e-Government projects are being implemented and developed in Lithuania, people use electronic public services and acknowledge their value, number of computer and Internet users is growing rapidly in recent years (Data provided by the Department of Statistics under the Government of the Republic of Lithuania, 2012). As mentioned in the previous chapter, information and communication technologies support effective and sustainable development. The Lithuanian strategy on the public administering emphasizes extensive amplitude of electronic services a wider use of them, but not a simple their transference into electronic environment. Rural Internet Access Points (RIAPs) are one of the most important sources of access to the global information society in Lithuania. Owing to RAIN I and RAIN II projects carried out by absorbing EU structural support funds, the fast and high-quality internet became accessible not only in cities but also to rural areas public sector, business organizations and residents. It is planned that by the end of 2013 broadband internet will reach 98.7 percent of rural areas. There is no doubt that the widespread and availability of the internet in Lithuania is one of the prerequisites and conditions for the e-Government. Also, the number of e-social projects, funded by public organizations or private persons, is constantly growing in Lithuania. Among them are such projects as manobalsas.lt (My Voice LT) (<http://www.manobalsas.lt/index/index.php>), Transparency international administered project Mano Seimas (My Parliament) (<http://manoseimas.lt/>), or eVoting testing system <http://www.ivote.lt/>. According to the project developers - My Voice LT - manobalsas.lt- is a rational voting system on the internet. On this webpage, people are invited to make a short test to find out which politicians and political parties are closest to their political views. In questionnaire is given questions based on public interest issues from a variety of areas - education, health, economy, foreign policy and culture. It is believed that people, knowing politicians position toward issues that concern them, can make a rational decision what politician will represent their interests the best. At the same time the project contributes to the strengthening of democracy in the country, civil society development, populism reduction, encourages people to vote responsibly and activates interest in politicians' attitudes and political parties programs.

Surveys being carried out in Lithuania in the field of needs for public services and their supervising have proved that provision of public services upon information and communications technologies means is beneficial for these governmental authorities. "While precipitating the process of e-Government the modernization and innovations shall become of prime importance, because citizens require governmental authorities to provide

better e-public services which have to be more protected and democratic and business representatives require less bureaucracy and more efficiency" (Strategy on the public administering development up to 2010, 2004). "Benefits are related to improvement in the area of the public service provision operational efficiency, increase in citizen's loyalty and decrease in functions of the state institutions' personnel and public services provided can be described as high-quality, quickly-used and publicly accessible" (Jastiuginas et al, 2012).

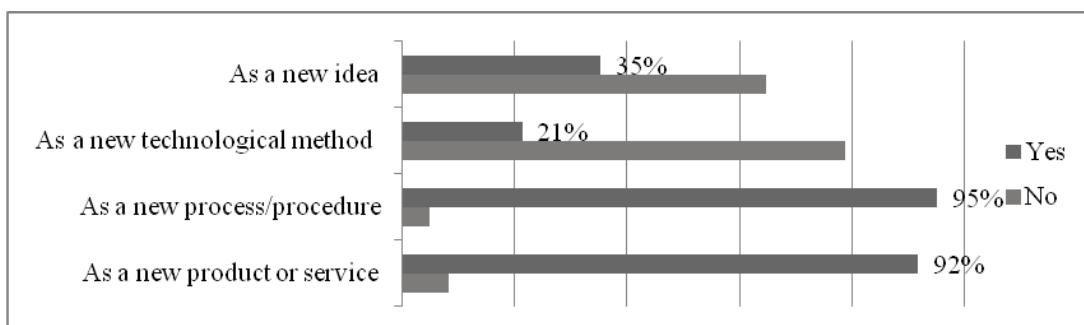
However, when implementing e-Government, it shall be extremely important to honour various innovative methods and solutions, avoiding obstacles for innovative activities. The next chapter is exploring the way managers in Lithuanian public administration organisations perceive innovation and how they report on hinders or facilitators of their innovative activities.

## 5. Research process/ methodology

The paper follows a quantitative research approach. The total sample consists of 155 respondents. The sample was at random selected in Lithuanian Public sector organizations such as Ministries and Departments. Firstly, sample size of 100 was determined using sample size table and having in mind that the population size is over 10000 and data is continuous. Secondly, having collected 100 responses, the worst variances were identified in every subsample. Finally, the size of every subsample was calculated using formula recommended by Bartlett, Kotrlik and Higgins (2001). In this survey mainly public heads of departments and managers were surveyed using web-based questionnaire, developed by Fafaliou (2012) for the research project "Relationship between small and medium sized enterprises and innovation activities". The limitation of this research paper is that only national results were presented, the cross cultural results will be analyzed and described in future research papers. Data was analyzed using statistical software package SPSS. The questionnaire ends with demographic questions. The return rate of this survey was 55% and can be treated as a good one.

It's interesting to note that 95% of participants perceived *innovation as a new process/ procedure*, 92% as a *new product or service*, and only 21% of respondents understand *innovation as a new technological method* or as a *new idea* (35%).

**Table 1:** The perception of *innovation* meaning

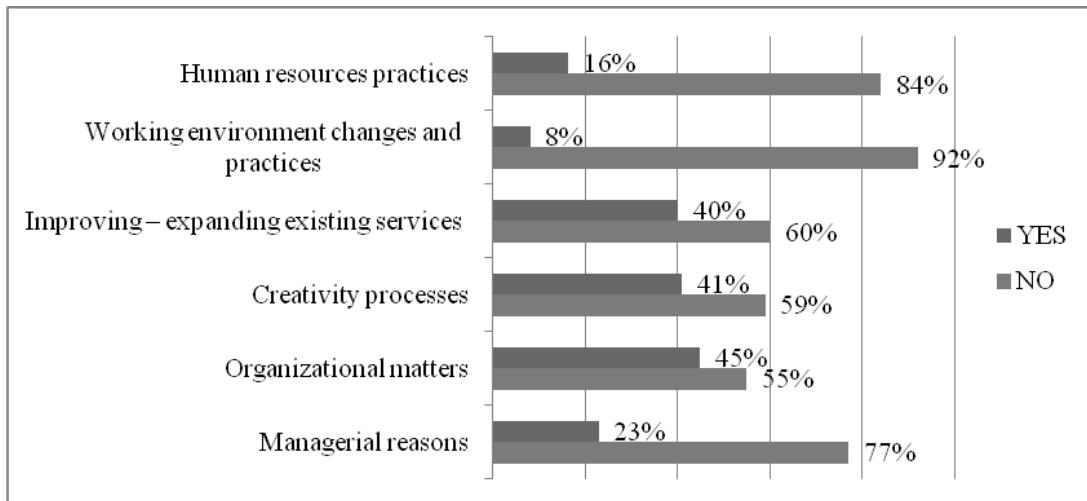


77% of respondents believe their organisation is innovative, 23% answered this question negative. The reasons for being innovative are *improving/expanding services, organisational matters and creativity processes*, which were described as the *new techniques in solving problems, production of new ideas, brainstorming etc.* Only 23% of respondents mentioned *managerial reasons* and *human resource practices* (16%) as influencing innovativeness of the organization. Surprisingly, working *environment changes and practices* were identified only from 8% respondents as determinants for innovative organization (see Table 2).

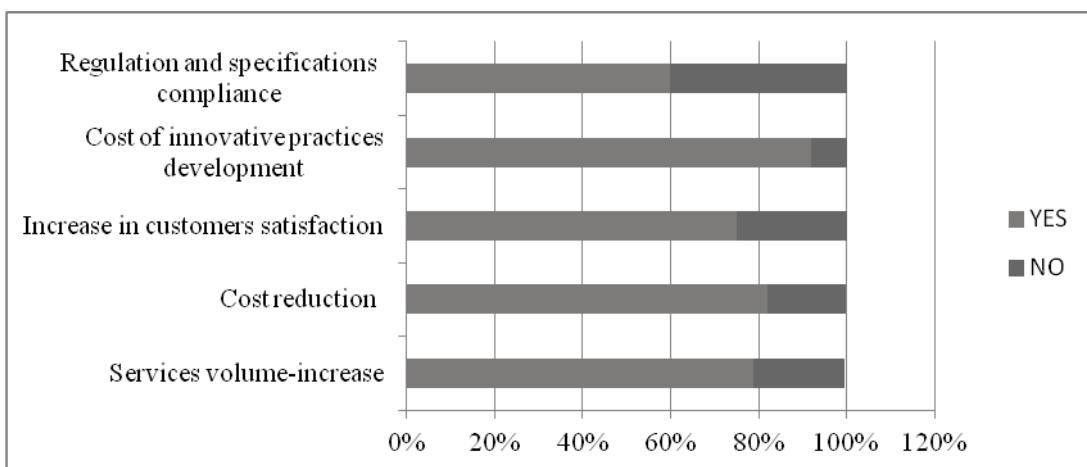
Important to note that all the participants answered positively (yes or no option) the question "*Do you believe that innovations are important to all types of organizations, regardless of the field they operate?*" It could be concluded that respondents deeply understand the value of innovation for every organization.

More than half respondents (66%) believe that innovation could be measured. The measurement of innovation in public administration organisations differs from the measurement in business organisation, because the innovation in public administration couldn't be measured in market share increase, profitability or production increase. However, the innovation in public administration could be measured in increase in *customer satisfaction* and *service –volume and cost reduction* according the answers of this survey respondents.

**Table 2:** The reasons for being an innovative organisation



**Table 3:** In what way the innovation could be measured in public administration?



75% of respondents answered the question "*How did you cope with technology and innovation in the company until today?*" with the answer "*We did not cope*". 90% of organisations try to cope with technologies and innovation through research organisations (e.g. Universities, Technological – Educational Institutes) and innovation relay centers (80%). Only 42% organisations receive support from *in house R&D department*. Consulting companies help 74% of organisations to cope with innovations, business companies are good example coping with innovation for 75% of respondents.

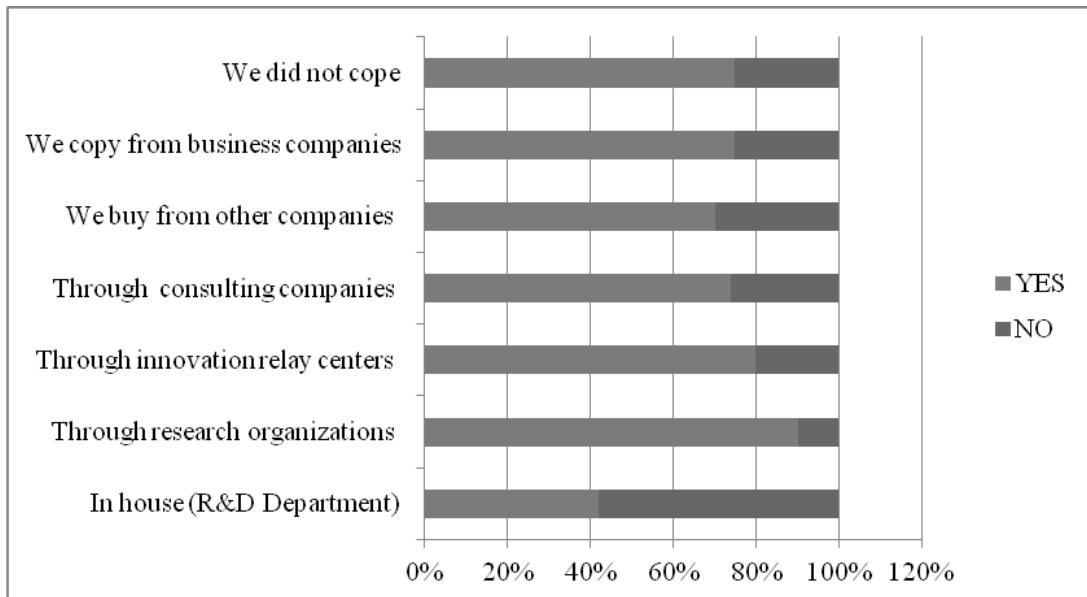
Market research and marketing activities, as well as environment, are sources for developing innovation. 68% of respondents identified customers as a source for innovation and similar percentage- technology evolutions.

26% of respondents claim there is *no award system* associated with the innovative ideas or proposals in their organization, 33% of organization don't have *financial rewards* for innovative activities, on the other hand 41% of respondents inform about *salary raises, benefits, allowances and other financial rewards* in their organisations related to innovative activities.

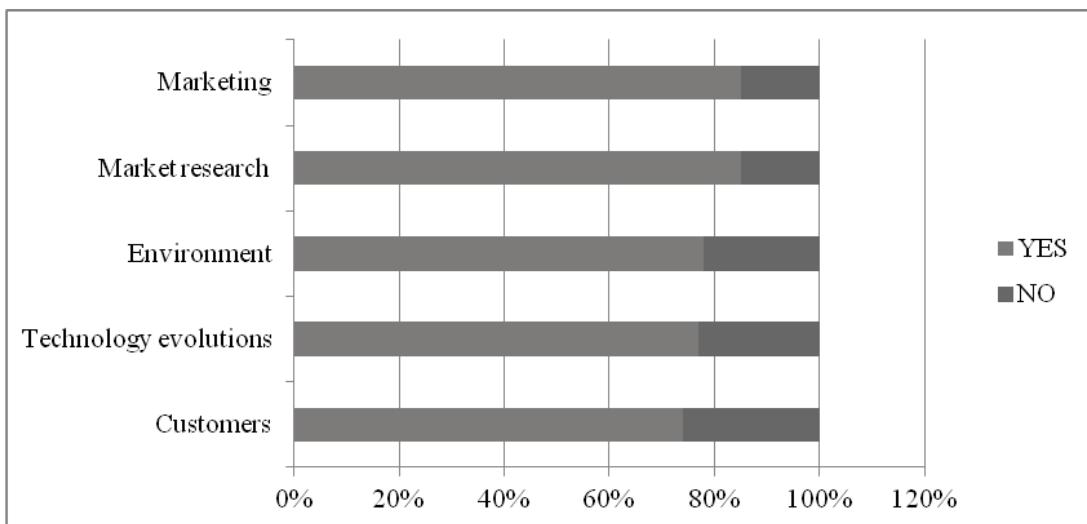
The analysis of the most important obstacles to organizations in order to develop innovations shows that the most commonly mentioned factors are *bureaucracy* (90%), *investment deficit* (80%), *infrastructure shortage* (85%) etc.

**Limitations:** The references used for this survey are not an exhaustive list within the topic area. Relevant sources of information may also exist in other domains of scientific inquiry. Because of the chosen research approach, the research results may lack generalizability. The research was launched as a national survey; therefore there is no possibility to compare results across different countries.

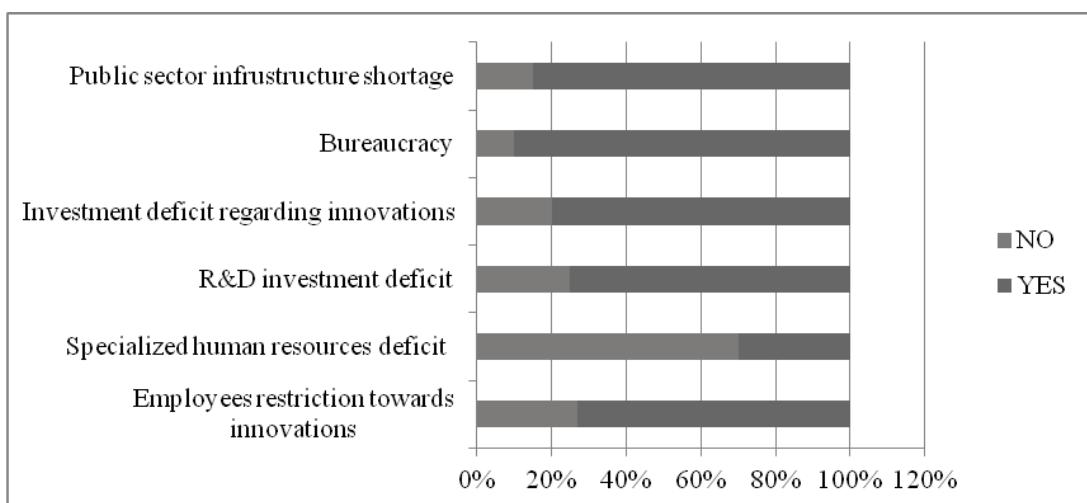
**Table 4:** How did you cope with technology and innovation in the company until today?



**Table 5:** The sources used as ideas generators when developing innovation



**Table 6:** The most important obstacles in order to develop innovation



## **6. Conclusions**

Public budgets are shrinking, but citizens, now accustomed to new technologies and constant connectivity, have higher expectations as to the speed and quality of public services. E-Government has reached its critical point, because it seems insufficient to move public services into electronical environment only. Further development of e-Government requires innovations that increase the efficiency of electronic public services. Innovative activities in public administration could reduce costs, raise productivity, and improve the public's opinion of government.

Through our research and experience, we have identified the ingredients necessary to fostering innovation, regardless of the organizational model. It could be concluded employes in public administration deeply understand the value of innovation for every organization and perceive innovation as *a new process/procedure or service*. The reasons for being innovative are *improving/expanding services, organisational matters and creativity processes*, which were described as the *new techniques in solving problems, production of new ideas, brainstorming etc.*

Government leaders can either create a dedicated space for innovation or enable innovation across their entire administration or agency. The research results informs us about the tension between information technology and public organisations. This tension is emerging because the gulf between expectations from new technologies and the reality of operations.

The survey results show organisations have difficulties to cope with technologies and innovations, and support from research organisations is valueable and important for development of innovative activities. Market research as well as changes in environment, are sources for developing innovation. 68% of respondents identified customers as a source for innovation and similar percentage- technology evolutions.

Organisations could foster innovations by creating financial rewards and motivation system, more than half of respondents claim their organisation still lack financial rewards for innovation.

The innovation in public administration could be measured in increase in *customer satisfaction* as well as *service –volume* and *cost reduction* according the answers of this survey respondents. Innovation performance could be measured using innovation scoreboards which provide good overview of trends in innovation over a period of time. They also highlight individual countries' strengths and weaknesses.

To achieve a wider development of innovative activities, the e-Government priorities shall be defined and deeper analysis of existing situation related to the main public services provided upon information technologies fullfiled. It's clear that the successful introduction of new technologies in e-Government would depend on many factors, including social and attitudinal factors. The insights designed in this research could be used with further studies to examine e-Government adoption in other countries to sustain the required generalizability of findings.

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# Interoperability and Standardization of e-Government Ubiquitous Systems in the EU Member States

Anna Soltysik-Piorunkiewicz and Janina Banasikowska

University of Economics in Katowice, Faculty of Informatics and Communication,

Department of Informatics, Katowice, Poland

[anna.soltysik-piorunkiewicz@ue.katowice.pl](mailto:anna.soltysik-piorunkiewicz@ue.katowice.pl)

[janina.banasikowska@ue.katowice.pl](mailto:janina.banasikowska@ue.katowice.pl)

**Abstract:** The ability of public administration to perform public tasks by electronic means is an important factor in the assessment of the quality of its operation and a condition of achieving progress in building the information society. This can be achieved only by a close collaboration between information systems of public administration bodies in mutual relations and in relations with natural persons and businesses. The prerequisite is achieving the interoperability between the systems. Interoperable, basic infrastructural services (secure communication between administration bodies, cross-border access to files), common specifications, guidelines for interoperability and reusable software are the basic factors in an effective electronic administration. Works are underway to adopt an updated version of European interoperability framework, support and popularize interoperable services of electronic administration, based on standards, open specifications and interfaces. The paper presents the conception of interoperability and standardization of ubiquitous systems e-Government in the European Union member states. It defines the term "interoperability". It discusses three levels of assessing interoperability: technology, systems and tasks. The interoperability standards are considered in three aspects: technical, organizational and semantic. Examples of the European Union countries with the most developed interoperability frameworks are provided. There is an overview of e-services in e-Government ubiquitous systems in Poland as well as examples of using interoperability to deliver e-services online. In order to examine the functionality of e-Government ubiquitous information systems, we reviewed the systems offered by the public administration sector in Poland for delivering e-services in e-Administration. The examination covered: ePUAP as a selected example of a ubiquitous system in public administration in Poland, OST 112 - emergency call system, SI PR - integration of services for assistance delivery, Prezydencja - Polish Presidency information system, SIS and VIS - Schengen information and visa system, ePosterunek - Police management system.

**Keywords:** interoperability, standardization, e-Government ubiquitous systems, e-services

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## 1. Introduction

The vision of computerization of the environment of a human being is constantly changing due to a variety of available information and communication technologies. The capability of computer devices to store, process and make data available is developing and increasing. The conception of ubiquitous systems, originated by Mark Weiser, assumes that computer devices will be present in every area of human life so as to operate in the so called background, i.e. in the environment of a human being, and aid him/her. The first time that Mark Weiser proposed his conception „ubiquitous computing” was in 1988 (Ubiquitous Computing, [online]), and in the years 1991-1993 he published the assumptions of this conception (Weiser 1991; Weiser 1993; Weiser Oct. 1993).

Characterizing his conception, M. Weiser presented a few principles of building a ubiquitous system. First of all, such a computer system should be used to solve problems of a human being, and more specifically allow them to do things that otherwise they could not have done. Moreover, a ubiquitous system for a man is one that works alongside them, not causing additional disruptions, as a quiet or invisible worker isn't. The use of human intuition by a computer system allows the possibilities of human activity to be increased. Technology should help a human being to easily achieve this, working in a way that is invisible to them (Weiser 1991).

This conception is evolving and now we are also talking about ubiquitous systems in terms of „ubiquitous communication” and „intelligent user interface”. These technologies underlie the research on „ambient intelligence”. In 1999, ISTAG (the European Community's Information Society Technology), i.e. an advisory group for Information Society Technology, in a document concerning lines of research proposed the term „ambient intelligence” as a vision of computerization of the human being's environment, according to which *the human being will be surrounded by computationally and networkingly advanced technology that is aware of their presence, personality and needs, and capable of intelligently responding to indications of desires expressed by gesture or speech, and even of engaging in an intelligent dialog.* (Weyrich 1999) Currently we can name a lot of areas where the conception „ambient intelligence” could find practical application, i.e. medicine,

the automotive industry, manufacturing, processing of orders, mainly thanks to the development of Internet technologies, mobile devices for supporting communication services using mobile applications and wireless network-based technologies, as well as agent technologies and in-built systems.

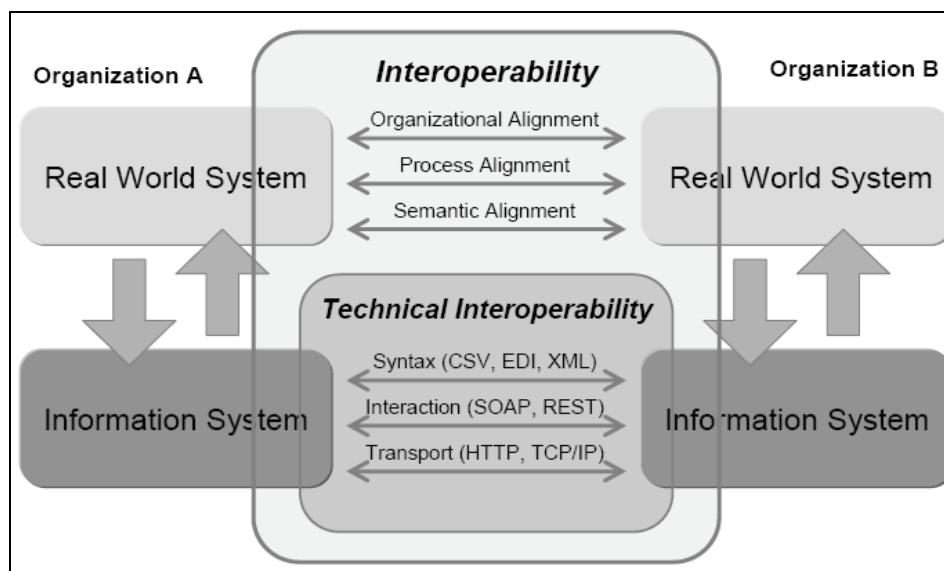
One of the areas where the conception of ubiquitous systems can be used is e-Administration and provision of e-services as part of an intelligent ubiquitous system for supporting e-services. However, the prerequisite for building such a system and using ubiquitous systems in the area of e-Administration is the introduction of system interoperability standards.

## 2. Interoperability of ubiquitous systems in e-administration

According to the European Interoperability Framework for electronic administration services, interoperability means „the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge” (Weiser 1993a). This shows that it is important to ensure interoperability at the level of a particular state and in a broader context.

Ensuring interoperability as defined above is an important problem in ensuring the development of electronic administration. An important role is played by the issues of managing business processes and an important stage of the process of implementation of public e-services is reorganization of administrative processes.

The document of paramount importance for interoperability in the European Union is *European Interoperability Framework EIF*. In June 2002, during the Seville summit, the representatives of the EU member-state governments adopted the document „*eEurope Action Plan 2005*” which obliged the member states to prepare interoperability framework to deliver pan-European e-Government services to citizens and businesses. European Interoperability Framework is addressed to the persons in charge of the e-Government projects in the Member states and institutions of the European Union. During the conference on e-Government in Como in July 2003, the assumptions of the European Interoperability Framework were recognized as the key element of the development of e-Administration services in Europe. In 2004, the European Commission published the first version of the European Interoperability Framework which recommended that EU states’ governments create National Interoperability Framework in line with EIF so as to enable interoperability at the community level. The conception of implementing such an interoperability is presented in Figure 1.



Source: own work based on (Olszak and Bielewicz 2007)

**Figure 1:** European structure of interoperability for pan-European e-Government services

Interoperability is assessed at three levels:

- Technological level, which comprises elements of a communication and information infrastructure, such as communication links, computer platforms along with operating systems, standard software and tools in the form of database management systems, software for application development, etc. From the

perspective of interoperability, of fundamental importance are communication standards at the level of bit transmission in LANs and WANs or message transmission between software components,

- System level comprises data remembered in any databases, application software, data presentation software and objects. At this level, attention is paid to the issues of syntactic compatibility and message cooperation,
- Task (business) level comprises objects and procedures that are directly connected with real tasks performed by the entities concerned. These are mainly the processes of task performance, information used in these processes, organisational and legal conditions.

The most important recommendations of EIF include the following:

- Availability – understood as ensuring a multichannel access to contents in a form that can be understood by users,
- Multilingualism – making the contents available not only in national languages,
- Security – compliance with the pan-European level,
- Privacy – protection of personal data,
- Subsidiarity – EIF operates on an auxiliary basis and doesn't interfere in internal national actions
- Use of open standards,
- Preferring open source software,
- Creation of multilateral solutions – originating from various sources and from various providers (Malotaux, van der Harst, Achtsivassilis and Hahndiek 2007; Banasikowska 2011).

The European Interoperability Framework places a particular emphasis on implementing its assumptions through choosing open standards and free open source software in e-Government projects.

According to the European Interoperability Framework, open standards should have the following features:

- The standard was adopted by a non-for-profit organisation and the development of the standard will be based on an open decision-making procedure available to every party concerned,
- The standard was published, and charges for using the standard are low and do not constitute a barrier to the access to the standard,
- The copyright to the standard or its part is available without charging any additional fees, and the way of making it available cannot be changed,
- There are no restrictions to reusing the standard.

The interoperability standards are generally considered in three aspects: technical, organisational and semantic. The technical standards of interoperability are responsible for data presentation, collection, exchange, processing and transportation. The organizational standards of interoperability are designed to provide organisations with processes and internal organizational structures for optimal information exchange.

The definition of a free and open software comprises four points given the numbers from zero to three. It describes a free and open software by the following freedoms granted to the recipients:

- Freedom to launch the programme for any purpose (freedom 0)
- Freedom to analyse how the programme works and to adapt it to one's own needs (freedom 1).
- Freedom to disseminate copies (freedom 2).
- Freedom to enhance the programme and disseminate own copies to the public so that the whole community can use them (freedom 3).

However, the prerequisite for freedoms 1 and 3 is the access to the source code. The assumptions of interoperability, and of open standards in particular, are best met by a free and open software.

The following countries in the European Union have the most developed national interoperability frameworks:

- Great Britain – e-Government Interoperability Framework (e-GIF),
- Germany - Standards und Architekturen für E-Government-Anwendungen (SAGA),
- Denmark – OIO Kataloget,
- France - Le cadre commun d'interoperabilite des systemes d'information publics (CCI),
- The Netherland - Catalogus voor de Nederlandse overheid van Open Standaarden (CANOS).

### **3. Genesis of building ubiquitous systems for e-Government**

The aim of ubiquitous information systems and communication systems is to ensure reliable computer solutions and communication services at any time and in any place. This means that there is a need for an interdisciplinary field of scientific research and development which combines signal processing by means of hardware and software information technologies, and uses and combines ubiquitous, wireless, embedded, portable and/or mobile systems. The applications of the above mentioned systems include from environment monitoring to ubiquitous multimedia, multidimensional signal processing, sensors, robotics, integrated communication systems and nanotechnologies.

The importance of ubiquitous systems can be shown, among other things, by the fact that on 24-26 February, 2012 the second international conference took place in Rome on ubiquitous and embedded information systems and communication systems. The conference gathered a lot of scientists, engineers and practitioners interested in the theory and applications in the fields related to ubiquitous and embedded information systems. The topics of the discussions included mobile and ubiquitous information systems, digital signal processing and designing of embedded systems.

Another scientific event connected with the subject of ubiquitous systems were the second workshops on Comprehensibility and control in ubiquitous computer systems that were held on 18 June 2012 in Newcastle, Great Britain. Due to a proactive and complex behaviour of ubiquitous information environments, it is important for these systems to be comprehensible (or able to be comprehended) so that also the users could understand „what the system knows, how it learned it and what it is doing”. Ubiquitous systems should give end users a full control through ensuring them a better coordination, control and individualisation of application. Comprehensibility and control are of key importance in improving the usability of these new and possibly unintuitive systems and helping users to understand, appreciate, trust and finally accept and use them.

### **4. Implementation of e-services in e-Government ubiquitous systems in Poland**

The fast technological development and widespread computerization affect all the areas of human life, state administration and business. Especially important are ubiquitous systems in public administration in delivering online administration services in the relations: Government – to – Government (G2G) – public institutions to other public institutions; Government – to – Citizen (G2C) – public institutions to citizens, society and consumers; Citizen – to – Government (C2G) – citizens and consumers to public institutions; Government – to – Business (G2B) – public institutions to private enterprises; Business – to – Government (B2G) – private enterprises to public institutions.

Among the services delivered online by public administration we can distinguish 20 basic services that are recommended by the European Union and taken into account in the assessment of the level of development of electronic administration and local services delivered by local authorities. The basic services are divided into 12 services for natural persons and 8 services for legal persons.

An average stage of the development of services for natural persons in Poland is presented in table 1.

Only one service is 100% delivered online. In the case of 5 services, you can download from the website of the relevant office an application to be filled in and usually, due to statutory requirements, submitted in person in the relevant office. In the case of the other 6 services, at the website of the relevant office you can read information about the way a given service can be received. Natural persons show little interest in attending to matters online, because most services require an electronic signature, and in consequence the stage of the development of these services remains at a low level.

**Table 1:** Stage of development of services for natural persons

Administrative services for natural persons	Level of the development of services in %
Healthcare	50
Social benefits	46
Planning permission	51
Police – handling of notifications	25
Registration of cars	49
Identity documents	50
Job placement	47
Information about change of address	47
Public libraries	58
Vital records	47
Personal income tax	100
Enrolment at higher education institutions	59
Average stage of the development of the services in %	52,4

**Table 2:** Stage of the development of services for legal persons

Administrative services for companies	Level of the development of e-service in %
Obligatory social insurance	100
Company tax	100
Value Added Tax	100
Company registration	100
Submitting data to the Central Statistical Office	100
Customs declaration	100
Environmental protection permission	43
Public procurement	50
Average stage of the development of the services in %	76,75

Most of the administrative services for companies are 100% delivered online (Table 2). In the case of one service (Public procurement), you can download from the website of the relevant office an application to be filled in and submitted in person along with the required documentation in the relevant office. In the case of one service (Environmental protection permission), at the website of the relevant office you can read information about the way a given service can be received. Legal persons show big interest in attending to matters online and most of these persons have the required electronic signature.

## **5. The research: Analyses of examples of ubiquitous systems in e-Government in Poland**

The research concerned mainly on task level of interoperability describing the processes of task directly connected with real tasks performed by the entities concerned.

The analyses of functionality of e-Government ubiquitous information systems, offered by the public administration sector in Poland for delivering e-services covered:

- ePUAP as a selected example of a ubiquitous system in public administration in Poland,
- OST 112 - emergency call system,
- SI PR - integration of services for assistance delivery,
- Prezydencja - Polish Presidency information system,
- SIS and VIS - Schengen information and visa system,

- ePosterunek - Police management system.

### **5.1 ePUAP as a selected example of a ubiquitous system in public administration in Poland**

Elektroniczna Platforma Usług Administracji Publicznej (Electronic Platform of Public Administration Services) (eUslugi, [online]; ePUAP, [online]) is a system where public institutions offer its services based on electronic communication channels through a single access point in the Internet. The development of the system is divided into stages due to the EU funds. ePUAP provides free tools designed for the work of public administration offices.

Elektroniczna Platforma Usług Administracji Publicznej (ePUAP) is an information system that allows citizens to attend to official business via the Internet, and the representatives of public players – to offer their services free of charge in the electronic form. The idea behind the development of ePUAP was to create a single, easily accessible and secure electronic channel for providing public services. Based on this idea, the portal [www.epuap.gov.pl](http://www.epuap.gov.pl) was created. The portal ensures efficient communication between:

- Citizens and administration,
- Entrepreneurs and administration,
- Public administration institutions,

The platform ensures access to electronic administrative services to both the citizens and public players. As far as the applications designed for citizens are concerned, ePUAP includes Catalogue of Services. This is a tool for standardizing the way of presenting and describing public administration services. Its aim is to maintain a coherent list of public services delivered by electronic means and allow them to be effectively searched, navigated, browsed and filtered. As far as the applications designed for public players are concerned, the advantage of using the portal [www.epuap.gov.pl](http://www.epuap.gov.pl) is the possibility of offering public services via the Internet free of charge. Public players which use the platform do not have to build their own systems to enable citizens to contact the institution and attend to an official business. They base their activity on the use of appropriate system tools such as:

- Elektroniczna Skrzynka Podawcza (ESP), allowing public institutions to fulfil the obligation, arising from the law on the computerization of the activity of the entities performing public tasks, to accept documents in the electronic form (submitting applications and requests as well as performing other actions in the electronic form)
- Central Repository of Electronic Document Models, i.e. a database constituting a single place of storage of models and forms used in administration, created to organize models and forms of electronic documents.

The project “Building the Electronic Platform of Public Administration Services” was implemented as part of the Sectoral Operational Programme – Increase in Enterprises’ Competitiveness, for the years 2004-2006, under the priority 1: Business development and increase in innovativeness through strengthening the institutions of business environment, action 1.5: Development of the system enabling entrepreneurs access to online information and public services. The project was implemented from January 2006 to October 2008.

Currently the Ministry of Internal Affairs Centre for Information Projects is implementing the ePUAP2 project to extend the functionality of the ePUAP platform and increase the number of services delivered online. The project is partially financed from the European Fund for Regional Development funds as part of the Operational Programme Innovative Economy for the years 2007-2013, priority 7 – information society – building of electronic administration. The project is predicted to be implemented in the years 2009-2013 (ePUAP2, [online]).

### **5.2 OST 112 - emergency call system**

National ICT Network for the needs of operating the 112 emergency number (OST 112) is a project that constitutes an element of comprehensive activities conducted by Ministry of Internal Affairs Centre for Information Projects to increase the security of citizens through building an integrated Emergency Call Centre (Centrum Projektów Informatycznych, [online]). The OST 112 project involves the launching of a communication platform for handling calls on the 112 emergency number and other emergency numbers as well as communication between the services responsible for rescue and public security. OST 112 will constitute the basis in the form of the information and communication infrastructure for, among other things, the

Emergency Call Information System (SI PR) for receiving and handling emergency calls, the system of radio communication built by the Ministry of Internal Affairs Centre for Information Projects and for the functioning of rescue services and public order.

### **5.3 SI PR - integration of services for assistance delivery**

For the handling of the calls on 112 to be fast and comprehensive, it is necessary to create a unified ICT system (called Emergency Call Information System SI PR) that will enable the integration of the services set up to deliver assistance. This task was given to the Ministry of Internal Affairs Centre for Information Projects. The use of modern ICT solutions will have a direct influence on the increase in the effectiveness and efficiency of the emergency number, which will lead to the improvement of citizens' security.

As part of the SI PR project, a national platform is being built designed for handling emergency calls for the needs of the functioning of Emergency Call Centres (CPR) and Province Emergency Call Centres (WCPR). When implemented, the solutions will standardize the process of reporting an incident using number 112. The information about the threat will be directly received by a CPR/WCPR operator, the operator will be able to immediately enter the call into the system (as part of the common, dedicated OST 112 subnetwork) and notify the relevant services about the incident.

### **5.4 Polish Presidency information system**

In 2011, Poland held the Presidency of the Council of the European Union for the first time. The period of the Polish Presidency started on July 1, 2011 and lasted for half a year.

One of the key elements supporting the process of preparation and then holding of the Presidency was launching an interdepartmental project: "Ensuring the information and ICT infrastructure for the preparation and supporting of the Polish Presidency of the Council of the European Union in the second half of 2011" (Prezydencja, [online]). The implementation of the project was possible thanks to the cooperation between the Ministry of Internal Affairs and Administration Centre for Information Projects, Ministry for Foreign Affairs Department for coordination of the Polish Presidency, Government Protection Bureau and Internal Security Agency. The Ministry of Internal Affairs and Administration Centre for Information Projects was the coordinating body, responsible for ensuring the complex ICT infrastructure for the whole project.

During the Polish Presidency of Council of the European Union, a range of meetings were to be organized in Poland (e.g. informal European Councils, other high level meetings, expert meetings, accompanying events). It was also possible that Poland would host part of EU summits with third countries that were planned to take place during the Polish Presidency. The experience of other countries shows that the organizers must also be prepared for holding additional, unplanned meetings, including high level meetings. This means the necessity to ensure appropriate technical and logistic infrastructure.

The ICT system of the Polish Presidency was a multifunctional tool, used by a significant number of people who in various ways were involved in the Polish Presidency. They include, first and foremost, the invited members of the delegation, EU citizens, journalists, information agencies, organizers, maintenance personnel, etc.

### **5.5 Schengen information and visa system**

The Ministry of Internal Affairs Centre for Information Projects, and particularly the Department for European Projects, performs tasks that have a specific character in the context of the other projects implemented by the entity. It is responsible for carrying out content-related, organizational, legal, technical, and office tasks for the Government's Plenipotentiary for Preparing the State Administration Bodies for Cooperation with the Schengen Information System (SIS) and Visa Information System (VIS) (SIS i VIS, [online]). Thus, it coordinates all the activities of the national institutions (about 40 entities) authorised to cooperate with SIS and VIS.

The specificity of the projects mainly consisted in the fact that they are:

- implemented in two dimensions – European and national;
- the fulfilment of Poland's international obligations arising from the EU membership;

- financed from the EU budget funds (European level), national budget, European funds as part of EU financial instruments;
- implemented based on dedicated schedules of the national SIS and VIS projects approved at the level of the Council of Ministers – Programmes for adjusting State Administration Bodies - MasterPlan.

SIS and VIS are two international projects implemented simultaneously as part of building the European Area of Justice, Security and Freedom. Engaged in the SIS and VIS related activities are all the European Union member states and Norway, Switzerland and Island (although they do not belong to the EU, they are active participants of the Schengen cooperation). The inhabitants of the Schengen area can move freely, take jobs and live in any EU country (there are some restrictions in case of the Great Britain, Ireland, Bulgaria, Cyprus and Romania).

## **5.6 ePosterunek - Police management system**

The aim of the ePosterunek application (ePosterunek, [online]) is to facilitate the work of the Police organizational units, in particular the investigation services conducting preliminary proceedings. The aim of the system is to support the handling of proceeding related forms using the mechanisms for gathering particular data in a way that eliminates the need for entering it many times, mainly as part of conducted proceedings relating to crimes. The basic objectives of the application include:

- support of the handling of matters and incidents, in particular creation, management and maintaining of case files;
- facilitating the handling of matters and optimization of the speed of generating proceeding-related forms.

It should be stressed that the terminology in the ePosterunek application is the same as the terms used in the National Information System of the Police (KSIP) thanks to the implementation of the dictionaries of KSIP and TEMIDA, which will make the use of the application easier.

Thanks to the integration of the ePosterunek application with the electronic Platform of Public Administration Services (ePUAP), a citizen, through [www.epuap.gov.pl](http://www.epuap.gov.pl), can report an incident that does not require an immediate intervention, e.g. report loss of a person.

The integrated, multi-service Police communication platform with the function of e-Service for citizens and entrepreneurs will offer six services for citizens delivered online. These are:

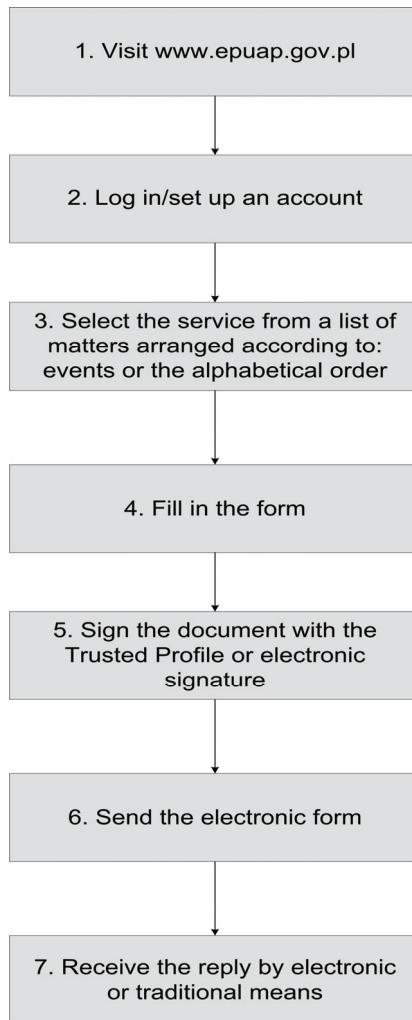
- e-licence (licence of a detective, physical protection and technical security);
- e-complaint;
- e-grievance;
- e-auction (sale of property)
- e-procurements;
- e-gun-permission;

An easy access to these eServices will be ensured by the so called „electronic kiosks” which will be installed in places generally available to citizens – in Province Police Headquarters, Metropolitan Headquarters and the National Police Headquarters. eServices will be combined in the central communication platform, fully archived and centrally managed.

These solutions will make the conducting of business activity easier, by, among other things, eliminating the barriers at the business - administration interface, and increasing the possibilities of the use of public information by entrepreneurs thanks to the introduction of the central register of needs for the delivery of services and supplies to the Police. They will also make it easier for citizens to make a contact and attend to matters in government administration. Moreover, the implementation of the project products will lead to the popularization of modern standards for electronic communication within the Police and in the relation Police – business, Police – citizen.

Additionally, thanks to the implementation of a multi-functional equipment along with the system for electronic transmission of documents, the communication among the employees of Police organizational units

will improve. Thanks to the project, administration eServices will be made available to wide range of recipients – citizens and entrepreneurs. The project product will be a platform useful in the communication between the Police officers and employees. To attend to a selected matter, you must follow the 7-step method (Figure 2).



Source: (ePosterunek, [online]).

**Figure 2:** Execution of e-service in the ePosterunek system

## 6. Conclusions

The analysed applications need some development of data bases system due to interoperability standard. The most important part of growth of Polish e-Administration system is to prepare an e-id for management of information in all of mentioned part of e-Government system. To receive the service, the application should have an enter based on e-id for all citizens.

The use of open standards recommended in EIF, also through free and open software, offers those ordering given software a complete independence from the supplier. At any time, they can decide to change the supplier without fear for losing access to their own data because every new supplier will be able to ensure such an access. What is important, having an ordered technology built based on open standards, and above all free and open software, opens the market for a number of suppliers that compete for the customer with quality and price of the product, which leads to the demonopolization and development of local IT markets. Such competition often results in free software licences. Communication with citizens based on open standards and free and open software guarantees everybody the possibility of choosing the software. Thanks to the use of such standards it is possible to implement the conception of ubiquitous systems for Smart City or Smarter Planet in e-Administration and build an intelligent ubiquitous system for supporting e-services.

The implementation of the conception of interoperability as defined by EIF in all the member states of the EU will allow electronic services to be delivered at the highest transactional level within these states to natural persons and companies as well as delivery of mutual services among the states in the form of panEuropean services.

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# Evaluating the Development of e-Health Project: The Case of Slovenia

Dalibor Stanimirovic and Mirko Vintar

University of Ljubljana, Faculty of Administration, Ljubljana, Slovenia

[dalibor.stanimirovic@fu.uni-lj.si](mailto:dalibor.stanimirovic@fu.uni-lj.si)

[mirko.vintar@fu.uni-lj.si](mailto:mirko.vintar@fu.uni-lj.si)

**Abstract:** National project for Informatization of the health care system in Slovenia, known as e-health, was initiated in 2005. e-health entails the inclusion of stakeholders into the functional network, reconstruction of the health care system business model as well as integration of many information systems (IS) at different levels. Undertaking this extremely difficult task, while taking into account a complex and multidimensional structure of the health care system, e-health should provide opportunities for high quality and professional work with patients, long-term development and facilitate access to relevant economic, administrative and medical data, required for effective management of the individual health care organizations and health care system in general. The main objectives of the paper comprise the identification and analysis of the key e-health components and success factors, evaluation of the e-health development and production of applicable guidelines for further development and implementation of e-health in Slovenia. Research is based on the extensive document analysis and information retrieval through in-depth investigation of primary and secondary resources and other forms containing e-health related contents, while the evaluation framework was established on the basis of the most important components of e-health, defined during the analysis of existing research in the field. Paper reveals various deficiencies which have in our opinion substantially affected the development of e-health and undermined stakeholders' engagement in the project, which could significantly jeopardize the deadlines set and increase implementation costs.

**Keywords:** e-health, analysis, infrastructure components, evaluation, development guidelines.

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## 1. Introduction

Informatization is one of the fundamental structural reforms that would allow for successful and effective tackling of challenges facing the Slovenian health care system (Marušič et al. 2004, Ministry of Health 2005 and 2008). Experience of the most developed countries shows that successful implementation of informatization projects is of immense strategic importance for further development of the health care system (European Commission 2008 and 2011, Chaudry et al. 2006), but also displays important implications for the increase in social welfare (Jakubowski and Busse 1998, Godlee et al. 2004, WHO 2009), economic development (Berg 2001, Ammenwerth et al. 2003, Goldzweig et al. 2009) and evolution of information society (Grimson 2001, Sandford et al. 1992). Although the basic informatization of the health care system was established relatively early, Slovenia still does not have an interoperable and comprehensive health information system (HIS). Majority of existing IS have been developed within individual health care organizations and are designed specifically to meet their own needs (Marušič et al. 2004, Ministry of Health 2008) while they are not adequately interoperable and do not provide complete, relevant and timely information (Marušič et al. 2004, Ministry of Health 2005 and 2008). The already initiated national project of health care system informatization from 2005, known as e-health (Ministry of Health 2005) should be able to integrate all fragmented IS and offer a complete solution benefitting all interested parties. e-health should provide opportunities for high quality and professional work with patients and long-term development, whereas relevant and reliable economic, administrative and medical data provided by e-health should facilitate better quality planning (Islam 2007), control and management of individual health care organizations and health care system in general (Ministry of Health 2005 and 2008). The main objectives of the paper comprise the assessment of the e-health progress, identification and analysis of the key e-health components and success factors, and production of applicable guidelines for further development and implementation of e-health in Slovenia. In achieving the aforementioned objectives we have been focusing primarily on the following interrelated research questions:

- Review of the e-health strategies, policy papers and related documents.
- Evaluation of the recent e-health developments in Slovenia.
- Identification of the main deficiencies in the current setting of e-health and provision of guidelines for development and implementation.

Methodologically speaking, the paper represents an in-depth analysis of the e-health development in Slovenia. The evaluation framework was established on the basis of the most important infrastructure components of e-health, which were defined during the investigation of existing research in the field, as well as

recommendations and guidelines from the European Commission (European Commission 2008, 2009 and 2011), representing one of the highest authorities in the field of e-health evaluation and benchmarking. Selection of the research methods was adapted to the research field (Yin 2003, Patton 1990), given the complexity and scope of e-health initiatives. Following the introduction, the second section of the paper presents the state of the art in the field and conceptual implications of e-health. The third section outlines the e-health project, provides an evaluation and eventually identifies the main deficiencies related to e-health development in Slovenia. Lessons learned and guidelines for more effective development and implementation of e-health projects are presented in the fourth section. The last section contains the review of the overall evaluation, discussion on its practical applicability, limitations and future work, and subsequently submits the final arguments regarding the research results and future development of e-health in Slovenia.

## **2. State of the art**

Eysenbach (2001) is referring to the term of e-health as a general "buzzword", which is used to characterize virtually everything related to computers and medicine, and interprets e-health as an emerging field in the intersection of medical informatics, public health and business, denoting health services and information delivered or enhanced through the internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology (ICT). Marconi (2002) defines e-health as the application of internet and other related technologies in the healthcare industry to improve the access, efficiency, effectiveness, and quality of clinical and business processes utilized by health care organizations, practitioners, patients, and consumers in an effort to improve the health status of patients. According to Healthcare Information and Management Systems Society (HIMSS 2003), e-health represents a patient-focused framework including various dimensions such as: delivery of key information to healthcare partners, provision of health information delivery services, facilitation of interaction between providers and patients, acceleration of the integration of healthcare industry-related business processes, both local and remote access to healthcare information, support for employers and employees, payers and providers. And conversely, there are a number of definitions which are more narrowly targeted and focused on individual aspects of the e-health research. They are outlining the concept of e-health as the process of providing health care via electronic means, in particular over the internet. It can include teaching, monitoring (e.g. physiologic data), and interaction with health care providers, as well as interaction with other patients afflicted with the same conditions (Pretlow 2000), internet technologies applied to health care industry (Wysocki 2004), all that's digital or electronic in the health care industry (Strategic Health Innovations 2005), internet related health care activities (Joint Healthcare Information Alliance 2004). As noticed by several authors (Della Mea 2001, Oh et al. 2005, Ahern et al. 2006) the term e-health has a highly variable and interchangeable usage, which significantly complicates the establishment of the development framework of e-health, identification of its implications, as well as its substantive characterization and distinction from other related concepts.

Regardless of their definition and research perspective, virtually all authors emphasize that the main goal of e-health should be the contribution to a high-quality, efficient patient care and effective performance of the health care system (Berg 2001, Oh et al. 2005, Winter et al. 2007, Haux 2006, Lippeveld and Sapirie 2000, etc.). e-health could empower patients and help in exceeding information asymmetry between main stakeholders while ensuring that reliable and timely health care information is available for operational and strategic decision making providing better health care services and enhancing public health (Wilson 2000, Lippeveld and Sapirie 2000). e-health systems and services combined with organizational changes, process reengineering and development of new skills can act as key enabling tools facilitating considerable enhancements in access to care, quality of care, as well as efficiency and productivity (Danzon and Furukawa 2001) of the health care system. Implementation of e-health is expected to reduce costs and improve productivity in areas such as 1) billing and record-keeping, 2) reduction in medical error, 3) alleviation of unnecessary care, and 4) savings achieved by business-to-business e-commerce (Danzon and Furukawa 2001, European Commission 2007 and 2009).

## **3. E-health in Slovenia**

Ministry of Health has been dealing with the informatization of Slovenian health care system for almost two decades. e-health project from 2005 in its latest form consists of 17 sub-projects aiming at extensive renewal and integration of IS in health care domain. Strategic objectives within the e-health strategy should be

implemented by the year 2023 facilitating fully integrated national IS enabling monitoring of the on-going treatments and related costs, faster access to medical data, medical services as well as cost evaluation, online ordering and coordination of waiting lists, increase of efficiency and transparency of the health care system and optimization of the business processes (Ministry of Health 2005 and 2008). Based on the Strategy for informatization of the Slovenian health care system 2005-2010 and Resolution on the National Health Care Plan for the period 2008-2013 (Ministry of Health 2005 and 2008), all development activities are focused on:

1. The establishment of basic ICT infrastructure including: network used for communication and data exchange, Diagnosis Related Groups (DRG) and standardized definitions of health and social data required for development and management of Electronic Health Records (EHR) and e-prescription as well as improvement of the health care Smart card functionalities. Existing diagnosis as well as medical procedures are standardized and structured according to ICD 10 AM<sup>1</sup> classification, whereas EDIFACT<sup>2</sup>, HL7<sup>3</sup> and XML<sup>4</sup> are current data standards for transfer of messages.
2. Integration and merging health and social IS into a national HIS and establishing a central, unified health information portal that will allow all stakeholders within the health care system secure and reliable exchange of data, execution of electronic services as well as standardized and transparent information and interoperability with similar systems in the European Union (EU).
3. Introduction of e-business as standard way of conducting operations and processes in the Slovenian health care system and promoting and encouraging the use of e-health applications by all health care system stakeholders.

The e-health project is thus divided into three substantially separate, yet related areas. The first area is the establishment of a national HIS, comprised of Health Network (hNET), a health portal (hAOP) and EHR. The second area represents the establishment and operation of Centre for Health Care Informatics, undertaking the central role in governing of IS. This area also includes upgrading and maintenance activities of the entire project after its completion. The third area will enable the improvement of health care processes, access to health care services as well as education and training of target groups. Although e-health project is still deep in the implementation phase, Figure 1 presents the projected infrastructure of e-health, which should become fully operational sometime after 2020 (Ministry of Health 2005). Implementation of e-health will presumably initiate twofold changes. First, significant changes can be expected in the field of informing, empowerment and inclusion of patients in the health care process, and second, well-designed e-health should facilitate timely access to relevant data and information and consequently initiate better supported decision-making at all health care, administrative and management levels. According to the project objectives, the fully functional version of e-health should provide standardized bi-directional connections between the designated entities of the health care system, network synergies and substantial improvements in information and resource flows. More specifically, this means that e-health should allow monitoring of the patient throughout the medical process, recording of all the activities associated with the patient, as well as control over the costs incurred in the various stages of treatment. Moreover, large deficits in the Slovenian health care in recent years, on the one hand, and long patient waiting times on the other, require more rigorous monitoring of the health care professionals' workload and related output, labour and material costs, as well as control over the utilization of health care resources and facilities such as operating rooms, expensive diagnostic devices and laboratory equipment.

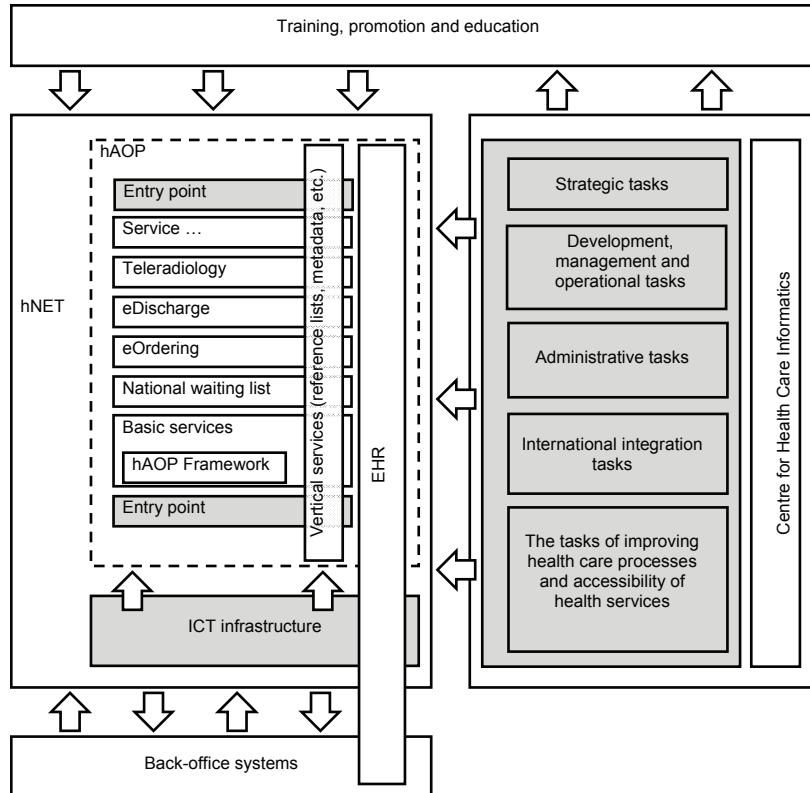
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<sup>1</sup> International Statistical Classification of Diseases and Related Health Problems (ICD) is a medical classification list developed by the WHO. It codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases (WHO 2012).

<sup>2</sup> Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) is the international standard developed under the United Nations. It comprises a set of internationally agreed standards, directories, and guidelines for the electronic interchange of structured data between independent computerized information systems (UN 2012).

<sup>3</sup> Health Level Seven (HL7) is a set of international healthcare informatics interoperability standards developed by the Health Level Seven International. HL7 network provides a framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information (HL7 2012).

<sup>4</sup> Extensible Markup Language (XML) is a markup language that defines a set of rules and standards for encoding documents in a format that is both human-readable and machine-readable. It is developed by the World Wide Web Consortium (W3C) (WRC 2012).



**Figure 1:** Planned infrastructure of e-health in Slovenia

Nevertheless, despite ambitious e-health strategy and objectives, most of the project goals have remained unfulfilled. Namely, the current infrastructure of e-health includes components facilitating only a few peripheral functionalities (Smart card, Professional card), which do not yield tangible benefits neither for patients nor for health workers and health system managers. Due to leadership issues and lack of coordination, as well as inadequate budgeting and technical problems, the e-health development has stagnated in the recent period on almost all key areas. Consequently, the current infrastructure of Slovenian e-health is non-functional and causes time and resource losses.

### 3.1 Evaluation of the e-health development in Slovenia

The evaluation of the e-health development in Slovenia was conducted in the second half of 2012. During that time we carried out extensive document analysis and information retrieval through in-depth investigation of primary and secondary online resources, interviews, policy papers, strategies, project reports and records, action plans and other forms containing e-health related contents. Reflecting the substantial scope, complexity and various settings, as well as the asymmetrical development of the individual thematic and organizational areas within, evaluating the development of the entire e-health projects was unfeasible. Therefore we had to apply the structural decomposition, through which we identified and extracted 12 relatively autonomous infrastructure components within e-health projects. Subsequently, by evaluating the development level of selected components, we transformed these components into 12 equally weighted indicators (see Figure 2), which in sum reflect the actual development level of overall e-health project. Development level of the individual components, and ultimately the overall development of e-health, was evaluated applying the following grades (see their explanations in parentheses):

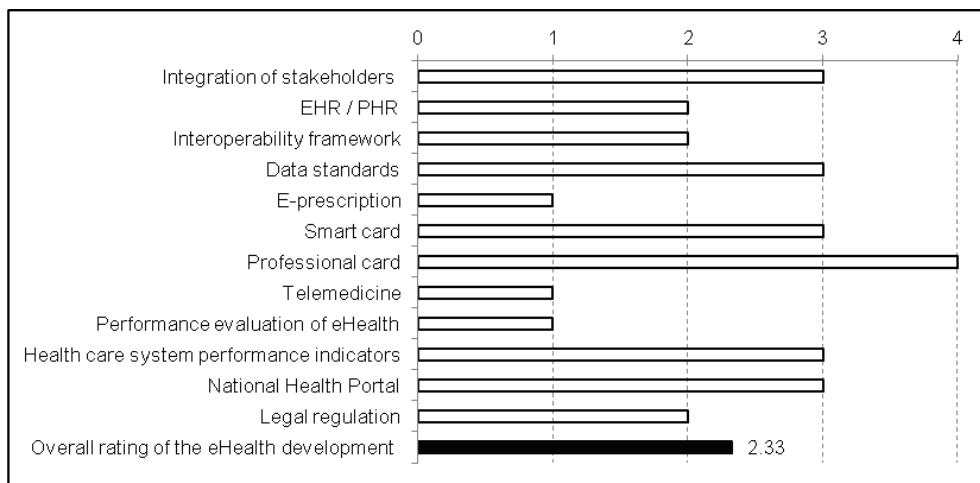
1 – Conceptual phase (component and its operations are based only on the conceptual design; its development, sourcing and implementation procedures have not yet been defined or started).

2 – Development phase (there is a concrete blueprint for the construction of the component encompassing all planned operations. Development, sourcing and implementation procedures have been defined, initiated and monitored).

3 – Partly functional (some of the planned component operations are implemented, functional and applied in practice within the health care environment).

4 – Functional (all of the planned component operations are implemented, functional and applied in practice within the health care environment).

Finally, based on the assigned grades, the calculation of the average score of the components' development level was carried out, facilitating the determination of overall development level of the e-health project (Figure 2). The nominated components within e-health project were defined and selected partly on the basis of EU research and guidelines (European Commission 2008, 2009 and 2011) striving to identify the most important factors for development of e-health projects.



**Figure 2:** Development of the e-health components in Slovenia

Components determining the overall development of e-health in Slovenia achieved the average score of 2.33 (std. dev. 0.98) on the scale from 1 to 4 (1 – Conceptual phase, 2 – Development phase, 3 – Partly functional, 4 – Functional). Initial analysis and later evaluation revealed significant deficiencies in the overall up-to-date development of e-health, mostly regarding the development of individual components of e-health (Figure 2). Especially concerning is the fact that according to some estimates, e-health development in Slovenia considerably lags behind the EU27 average, as well (European Commission 2008 and 2011, Ministry of Health 2011). Explicit deficiencies related to underdeveloped e-health components (listed components were graded with scores less than 3 - Partly functional) are summarized and defined below:

- EHR / PHR – Two of the most important components of e-health are in the development phase and currently do not provide required functionality enabling database connectivity for patients migrating from primary to secondary and tertiary health care level.
- Interoperability framework – Component is in the development phase and currently does not facilitate operationalization of adopted standards and integration of existing IS within health care, laboratory and radiology departments (lab results, Picture Archiving and Communication System – PACS, etc.).
- E-prescription – Component is in the conceptual phase and the time frame for its construction and subsequent inclusion in the e-health infrastructure is still indeterminate.
- Telemedicine – Component is in the conceptual phase and although contained in the Slovenian e-health strategy from 2005, development activities in the telemedicine field have not been specified, let alone launched.
- Performance evaluation of e-health – Component is in the conceptual phase, since health policy in Slovenia has not established a methodology including appropriate indicators for evaluating the performance of already implemented operational components of e-health and monitoring of the components in the development process.
- Legal regulation – Component is in the development phase lacking several important regulations for the e-health application, especially regarding the transfer of medical data, personal data protection, privacy, interoperability standards, liability and risk issues. Given the existing political debate focused

predominantly on economic issues and stringent austerity measures, lack of support and incentives for legislative amendment in the field is likely to remain unchanged for some time.

The observed deficiencies within the development of e-health in Slovenia, which obviously extend to several areas (policy-regulatory, financial, institutional and technological area) have significant impact on overall performance of e-health, and consequently do not allow its effective utilization for improvement of health care services and evidence-based management of the health care system. The most significant deficiencies revealed by our research are summarized below:

- Absence of top-down support for implementation of e-health;
- Poorly defined health care policies and e-health project objectives;
- Unadjusted and hyper-regulated normative framework;
- Insufficient funding, lack of management skills and human resources;
- Fragmentation and large number of diverse legacy IS on all three levels of health care system;
- Partially defined communication network standards and data exchange standards;
- Lack of standardized definitions of health and social data required for development and management of EHR, PHR and DRG;
- Disregarding interoperability perspective while procuring an increasing number of narrowly specialized IS;
- Inadequate and vague evaluation practice in the field of major ICT projects;
- Lack of experience in the execution of complex and long-term national (ICT) projects;
- Unawareness of the potential benefits of e-health and lack of skills within the scope of ICT by the health care professionals;
- Lack of consensus on development priorities as well as cooperation and coordination between key stakeholders.

#### **4. Lessons learned and guidelines**

Evaluating the development of e-health has proven to be a very difficult task, given the complexity of the e-health project itself, lack of appropriate evaluation metrics, and loosely defined project objectives. Notwithstanding the rather chaotic state of affairs in the research field, certain preliminary conclusions can be drawn. It is evident that problems in the development of Slovenian e-health extend to various areas, reflecting in the unsatisfactory development level of individual infrastructure components and overall e-health project, whereas on-going financial and economic crisis just revealed the magnitude of pertaining problems, additionally undermining public trust and stakeholders' engagement. Health care systems which strive for the successful development and implementation of e-health projects have to generally overcome difficulties with the political, legal/regulatory and technical constraints, provide appropriate funding for material and immaterial resources, and precisely specify the course and objectives of the e-health projects. Analysing current situation in the field of e-health in Slovenia, we identified various deficiencies which have in our opinion substantially affected the development of e-health. Synthesis of the research results and derived deductions are presented in the form of guidelines:

- Acquire political support, bring together stakeholders from the public sector, not-for-profit organizations and the private sector, and prepare viable strategy documents and action plans (assess the current ICT infrastructure, departmental IS, legacy IS, interoperability issues, specify the health information standards, education and training of the medical staff, analyse different informational needs of primary, secondary and tertiary health care level, check the financial construction and financial projections related to the budget of e-health in the medium and long-term, examine the potential obstacles to e-health realization and conduct a sensitivity analysis, etc.);
- Examine current and projected health care issues, incorporate country specificities, determine national health care priorities, and provide an action plan clearly specifying how e-health will contribute to the solution of national health care priorities, as well as enable desired reorganization and restructuration of the health care system itself;
- Select a top manager and a quality project team with experience in large ICT projects, clearly structure the project plan, project phases and deliverables for each phase, determine the timeline of the project by

reaching mutual consensus with all stakeholders, distribute the assignments and strictly monitor and inspect the work on the project;

- Ensure adequate resources before the start of each phase of the project and make realistic plans within both temporal as well as financial terms;
- Mobilize all stakeholders to ensure commitment, material and moral support, encourage their participation and constructive criticism, provide an inclusive plan for permanent education of the stakeholders and communication between the project team;
- Enhance the preparation and implementation of public tenders (materially and procedurally) related to procurement of ICT equipment and realization of smaller individual ICT projects within the overall e-health project;
- Perform a constant supervision and strict control of the already executed project tasks with respect to the substantive and temporal objectives, and ensure close monitoring of the tasks which are in the execution phase;
- Inform and sensitize the public, promote project achievements so far, organize marketing campaign to popularize the e-health project and increase user acceptance of e-health services, gain support from the media, experts and citizens; e-health is a socio-technical project.

Delays in e-health development require a detailed analysis of the current situation, accommodation of new resources and well-coordinated implementation of operational tasks, which will gradually bring the development of e-health to its final phase. These measures usually necessitate a radical change in the project management and government financial stimulus. Determination to resolve the problems with e-health development and implementation, and eventually provide medical and economic benefits, will therefore require the mobilization of all stakeholders and experts in the field, definition of clear and measurable objectives and a consensus about the necessary public expenditures. Related

## **5. Conclusions**

Although reasonably susceptible to subjectivity and arbitrary interpretations, evaluation in hand provides a valuable insight into the development problems of e-health in Slovenia. Main limitations of the study probably concern the adequacy of performed weighting process and the fact that development level of individual e-health component was actually defined on the basis of primary and secondary sources investigation without empirical testing and practical validation of each component in health care environment. Accordingly, the issues of equal weights assigned to designated indicators and objective definition of development level raise some important questions of principle, while the results of the evaluation may therefore be arguable and misleading. These issues should be properly resolved in further research and succeeding experiments trying to establish a theory-based and balanced framework for evaluation of e-health development. Despite certain methodological dilemmas and limited resources, conducted evaluation reveals the dynamics of e-health development and related deficiencies and barriers. In addition, by applying presented guidelines, it may eventually provide the groundwork for further development and implementation of the intractable and costly e-health projects, and useful assistance for enhanced allocation of project management resources.

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# An Assessment of Rural e-Government in Romania

Virgil Stoica and Andrei Ilas

Department of Political Science, Alexandru Ioan Cuza University of Iasi, Romania

[virgilstoica@gmail.com](mailto:virgilstoica@gmail.com)

[andre.ilas@yahoo.ca](mailto:andre.ilas@yahoo.ca)

**Abstract:** In the last decade, a considerable amount of research materials have been generated, documenting and analyzing e-Government performance, using a variety of methodological perspectives. However, the administration of central governments and major cities has been the main focus of this research. Much less attention has been paid to rural areas. Despite the fact that rural e-governance can be more citizen-centered than national government, provide services effectively, support economic development and encourage civic engagement, rural communities are considered social homogeneous spaces, with a relatively passive or conservative population, and therefore, having little of positive value to contribute to such a transformation as e-Government is supposed to be. The goal of our research is to assess the level of e-Government in Romania's rural areas by evaluating five components: security and protection of personal data, usability, content, services offered, and democratic participation. We analyzed 198 webpages. From the five dimensions, actually only two were measurable (usability and content), the rest being almost nonexistent. That allowed us to conclude that Romanian rural e-Government is in the first level of development.

**Keywords:** Romanian e-Government, digital divide, rural e-government, digital services, digital democracy

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## 1. Introduction

During the last few years, electronic government has been more and more an issue present on the agenda all over the world. However, the administration of central governments and major cities has been the main focus of research. Despite the fact that rural e-Government can be more citizen-centered than national government, much less attention has been paid to these areas.

The aim of this paper is to explore and to describe the level of rural e-Government in Romania. A sample of 198 rural websites were analyzed using five evaluation criteria: security and personal data protection; usability; content; services provided; and citizen participation. The gathered data are explained and interpreted taking into account the Romanian context and the international achievements. Finally, we will make some policy suggestions regarding Romanian e-Government.

Many authors thought in the 1990s that the implementation of information and communications technology (ICT) would push public administration into a new era. Thus, both governments and individuals would benefit, governmental services being less costly, faster, personalized and accessible at any time from any location. These expectations were only partially confirmed. Actually, a classic issue occurred: the tension between innovation and conservation, a problem which slowed down the adoption of the new technologies (Lanzara, 2009).

It is important to remember that ICT emerged into a favourable environment. The 1990s were dominated by New Public Management (NPM), the administrative theory that was supposed to make governments "work better and cost less", but there was growing discontent with NMP (Denhardt, 2008). Many scholars were attracted by the many advantages of ICT, especially because of its initial ideological neutrality. For their part, the political actors were also quick to recognise the technology itself as a political object (Barry, 2001). In this context, a new administrative paradigm has slowly been crafted around ICT and, a few years ago, lead authors in the e-Government field felt entitled to proclaim the death of NPM (Dunleavy et al., 2006). The next step in this evolution seems to be the transition from e-Government to digital governance - a higher level of e-administration designed to "provide multi-channel two-way service delivery to all citizens" (Milakovich, 2012).

While the change of administrative paradigm is remarkable, it is also important to note that large parts of the global population have rather limited access to e-technologies. This new phenomenon, coined as "digital divide", has been observed through comparisons between countries, but also within countries (ITU, 2011).

During the last decade, an impressive number of researches documented and analysed the e-Government performance of national governments, regions and large cities. The researches indicated that a number of factors are influencing the use of ICTs. For instance, the presence of Internet connections at home is influenced by

income, education, age, race and ethnicity (Mossberger, 2003). It appears that men tend to use the Internet more than women, although gender is not reflected in an Internet access divide (Fallows, 2005). However, when compared with the literature dedicated to cities, especially the large ones, research on rural e-Government is only at the beginning.

## **2. Research on rural e-Government**

Rural e-Government can be defined as the digital interaction between government and the citizens living in rural areas, as well as the businesses and other governmental agencies operating in the same area. In fact, rural e-Government is a part of e-Government and should always be included in any definition of e-Government. However, from a practical point of view, rural e-Government raises specific issues, especially in those societies where the divide between cities and villages is still in place.

The literature is rather scarce when it comes to rural e-Government. Several reasons may be behind this situation. Firstly, rural e-Government could appear a less appealing research theme when compared with national, urban or large cities e-Government. Secondly, a large majority of the global rural population lives in poor countries where even basic Internet access is problematic. Thirdly, the population of well-developed countries living in rural areas has declined over the years, with the differences between rural and urban being less noticeable. Finally, there is a surprising lack of e-Government official data on rural areas.

The few existing scientific papers on e-rural government depict the same image: a significant digital divide between rural and urban areas, especially in developing countries where access to Internet represents a problem (Mahan, 2007). But beyond this general image, the studies on rural e-Government do not fall into the same categories. For instance, the study of e-Government in a small Japanese village led the author to the conclusion that the local authorities are right to configure e-Government "to address local need" (Thompson, 2002). Similarly, the authors of a paper on governmental actor's behaviour in rural Texas courts drew attention to the importance of adapting e-Government to the mandate and responsibilities of the local actors (Doty and Erdelez, 2002). An article on small US municipalities (less than 100,000 in population) concluded that "e-Government adoption is a function of financial, technical, and human resources" (Schwester, 2011). The authors of a UK comparative study suggested that citizens' background is the main obstacle in accessing e-Government services offered by a city, while the geographic location of a village is a deterrent to offering quality e-Government services altogether (Choudrie et al., 2005). We were unable to identify other scientific papers regarding rural e-Government in European Union countries.

To look at successful rural e-Government projects, two countries – India and Australia, both with important parts of their population living in rural or remote areas – are usually mentioned in the literature. In India, where approximately 70% of over the one billion population is living in rural areas, the projects are mostly regional and they are aimed at helping farmers to sell their products, obtain information or establish contact over the Internet (Gorla, 2007). Australia has a relatively small rural population of 2.3 million but scattered all over its immense territory (UN, 2010). In Australia the government launched two initiatives in the area of e-Government health: Health-*Insite*, a public portal that provides health related information, and Australian Childhood Immunisation Register, a national electronic database (Henman, 2010).

Taking into consideration the suggestions and conclusions found in the literature, a new study on rural e-Government is proposed to weigh up the importance of different factors such as the economic development of a country, the national or regional policies, the size and location of the village or its financial, technical and human resources. Being the first of its kind, our research has the more limited goal of assessing the level of Romanian rural e-Government.

## **3. Romanian e-Government**

Romania joined the European Union (EU) on 1<sup>st</sup> January 2007. In order to be admitted in the EU and, later on, as a Member State, Romania had to comply with EU policies on e-Government development by adopting laws, establishing national agencies and implementing national strategies.

Despite wide legislation, an important number of governmental agencies, and generous national policies, the e-Government in Romania is in an early stage of development (Stoica and Ilas, 2012). The e-Romania website designed to offer citizens access to all national and local administrative services is still inactive four years after

its launch. According to the Administrative and Regulatory National Authority for Communications (ARNAC), Romania has 3.26 million fixed-line broadband connections with 2.58 million in cities and the remaining 0.68 million in villages (ARNAC). The 2002 census organized by the National Institute of Statistics (NIS), shows that in Romania 45.1% out of a total of 21.5 million are living in villages (NIS, 2003). These data indicate that in the rural areas there are 6.98 fixed-line broadband connections per 100 inhabitants compared to 21.77 per 100 city inhabitants. The digital gap has seemed to close over the last six years, but the rural areas are still lagging behind the urban ones.

It is interesting to note that the last two governing programmes (February and May 2012) are indirectly acknowledging this situation: the Romanian Government (RG) should support better broadband connections for disadvantaged areas (RG, 2012). However, there is no specification as to whether these areas are rural areas or certain geographical regions of the country.

The Romanian government has been rather shy in directly addressing the rural-urban digital divide issue and in supporting e-Government development in rural areas. However, the government was involved in projects, supported by USAID and the World Bank that indirectly touched on these issues. Even these projects, where external organisations have been or are involved, are enjoying limited success (World Bank, 2012). It appears that both at national and local level the public officials are not able to contribute to the development of rural e-Government. Our research will try to explain why.

#### **4. Research methodology**

In order to assess Romania's rural e-Government level, we have evaluated the official websites of Romanian villages, closely following Mark Holzer and Seang-Tae Kim's model described in their study *Digital Governance in Municipalities Worldwide* (2005). The Rutgers-SKKU E-Government Performance Index used by Holzer in his surveys is a set of scales that highlight the performance throughout the world and foster high expectations for improved web-based municipal service delivery in the near future, in all countries. In order to have better comparability, we decided to follow the same methodology.

Our research examines rural e-Government following a five-level incremental model of e-Government evolution: the first level is that of providing information, the second one adds information exchange, followed by providing services, service integration and, in the end, political participation (Moon, 2002). The criteria used for assessing the villages' websites have five components: security and personal data protection, usability, contents, type of services provided, and digital democracy. The study used 98 measures, the same measures used by Holzer and Kim in their study, forty-three of them being dichotomous. For non-dichotomous questions (mostly 0/2 and few 0/3), a scale of 3 or 4 steps has been utilised (0,1, 2 or 0, 1, 2, 3), where 0 indicates that the site provides no information regarding the asked question; 1 simply indicates that the information exists; 2 indicates that the information can be downloaded (files or folders, audio or video documents); and 3 indicates the possibility of on-line transactions (payments for goods or services, demands for licences, existence of certain data bases, use of electronic signature). The final score is the sum of all items, the maximum raw score being 219, and a maximum weighted score being 100. Weighting was necessary, because each of the five dimensions had a different number of questions (18 in the case of security and 20 for all other dimensions), as well as different scores (25, 32, 48, 59, 55). The five dimensions were given equal weight, not taking into account the number of questions used when assessing it. Thus, after weighting, each dimension was able to take on scores from 0 to 20.

The "security and personal data protection" has been operationalised through several concepts: public statements concerning personal data protection, authentication, encryption, and the management of collected data and the use of cookies. Easy-to-understand and easy-to-use design, length of access page, structure, the extent to which it addresses particular target audiences and the ability to search for information on the site were the concepts behind "usability's" operationalisation. As for "contents", the accent was placed on the possibility of accessing recent information, official documents, reports, publications and audio/video materials. In the "services" category were included the transactions that might occur between local administration and citizens, or between local administration and business owners, as well as lodging requests for various authorisations (e.g. permits, licences). The "digital democracy" category was operationalised as it follows: instruments for citizens to provide feedback to local officials, debates on the village webpage concerning local public policies, and the existence of a system for measuring citizen satisfaction and governmental performance.

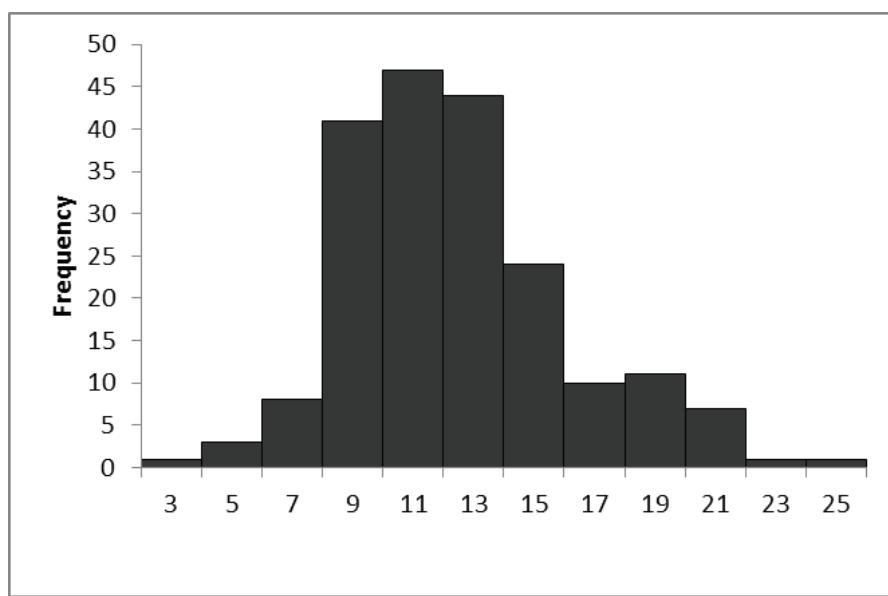
Here are some examples of questions included in our questionnaire. For "security and personal data protection": Is there any note regarding personal data protection? Does the note make any reference concerning the use of cookies? Is there a contact address or an e-mail address for questions referring personal data protection? For "usability": What is the length of access page? Do the accessed links modify their initial colour? Is there any search engine available? For content: Does the site contain recordings of local council meetings? Is there any information on the local budget? Does the site utilise wireless applications? For "services": Is it possible for a citizen to pay taxes on-line? Are there any on-line forms for complaints against administration? Is it possible for a citizen to apply on-line for licences or permits? For "digital democracy": Can a citizen transmit her/his comments or proposals to the local officials? Is there a forum regarding community problems? Is there any e-petition or e-referendum?

This evaluation scale has been applied to a sample of Romanian rural communities that during the referring period (June 1<sup>st</sup> to 30, 2012), had a functional webpage. There are 2856 rural settlements in Romania. At the time of the study, only 1111 of these (that is 38.9%) had functional web pages. A random sample of five rural websites has been extracted out of each of the 40 Romania's counties. In fact, the sample size was only 198 instead of 200, because one county had only three functional websites at the time of the research.

The process of data gathering was accomplished with the aid of our undergraduate and master students of the Political Science Department of Alexandru Ioan Cuza University of Iasi. The evaluation grid included grading examples for each item, the operators being given detailed explanations on the grading system. In order to ensure the reliability of the instrument and its application, each website has been evaluated at least twice by different operators. If the difference between the scores was larger than 5 points (5% of the maximum value of the scale), the website underwent one more assessment.

## 5. Results

Figure 1 presents the histogram of total scores distribution on class boundaries of 2 units. The average for scores is 11.79 with a standard deviation of 4.29 and a median of 10.97. The fact that the median is lower than the average shows that the score distribution leans to the right; the few bigger scores are influencing the average score in such a way that it has a bigger value than the median. The categories with most scores are those between 7 - 13 where no less than 132 villages can be found, which is more than two thirds.



**Figure 1:** Score distribution histogram for Romanian rural websites

The highest score obtained was 24.31 while the lowest score was 2.50. The amplitude of the resulting scores' variation is 21.81. Taking into account that the maximum possible score is 100 and the fact that 194 out of 198 rural websites have scores lower than 20, it is clear that the Romanian rural e-Government is far from being perfect.

The fact that the score average is only 11.51 and that 75 rural websites obtained scores lower than 10 suggests that local authorities are only incidentally interested in e-Government. Because our research examined only a sample and not all rural websites, the mean scores should be regarded as an estimation. However, we can be 95% sure that the real mean of the general score is between 11.00 and 12.03 (Table 1).

**Table 1:** General score and the scores for the five dimensions of Romanian rural websites

	General score	Security	Usability	Content	Services	Digital democracy
<b>Mean</b>	11.51	0.34	7.50	2.42	0.77	0.55
<b>Median</b>	10.97	0	7.5	2.40	0.68	0.36
<b>Standard Deviation</b>	3.67	0.76	2.02	1.38	0.80	0.79
<b>Minimum</b>	2.50	0.00	1.25	0.00	0.00	0.00
<b>Maximum</b>	24.31	7.10	14.38	6.80	3.05	4.36
<b>Confidence Interval (95%)</b>	11-12.03	0.23-0.44	7.22-7.78	2.22-2.61	0.66-0.88	0.44-0.66

When it comes to “security and personal data protection”, the best sites barely reached 7.10 points of a maximum of 20 (Table 1). The average was 0.33. In fact, 139 of the 198 rural web pages do not even mention personal data protection and 41 have only a very brief note. Only eight sites are allowing users to fill in a form on their personal data protection. This absence of concern for information security could be triggered by the fact that the web administrators are seeing the webpages as a one-way platform for providing information and, consequently, the personal data protection is not relevant.

The highest score for “usability” is 14.38 points of a maximum of 20. The average score for this dimension is 7.50 points. Most websites have relatively brief access pages/homepages of no more than two screens in length; the sitemap is absent for the majority of websites, but a navigation bar is available on each page. The home page often displays useless photographs (e.g. mayors participating at different events), which further hinders the access. The audience is never targeted as groups (e.g. locals, tourists, business owners, elders, young people or individuals with special needs). Only a few sites offer the opportunity of filling in online forms. Seventeen official pages have a search engine but without the option of sorting the results by relevance or by any other criterion. Thirty of the websites show the date of latest update; for the rest, this date has to be inferred from the latest press release or document published.

The highest score for “contents” is 6.80, with an average of 2.42. Most websites provide the City Hall address and some contact details, as well as a list (most times a partial one) of the local council decisions/resolutions. Some information on the local budget can be found in only 25 websites. A good part of information regards past events, while future ones are announced in a few words and are related, as a rule, to a village's most festive moments (village holiday and religious celebrations). The minutes of the local council meetings are absent. Almost a third of the websites offer information in at least two languages (Romanian and English), but there are several websites in three, four or even six languages (Romanian, English, French, Italian, Hungarian and German). Only one site presents information about possible natural disasters. No site offers access options for those with sight or hearing disabilities. There are no websites containing information related to day-to-day life aspects, such as traffic information in the area. The most surprising fact is that 27 websites have almost no information: only the name of the community and, in some cases, the address of the local council or the mayor's name. Some websites have menus, but without content.

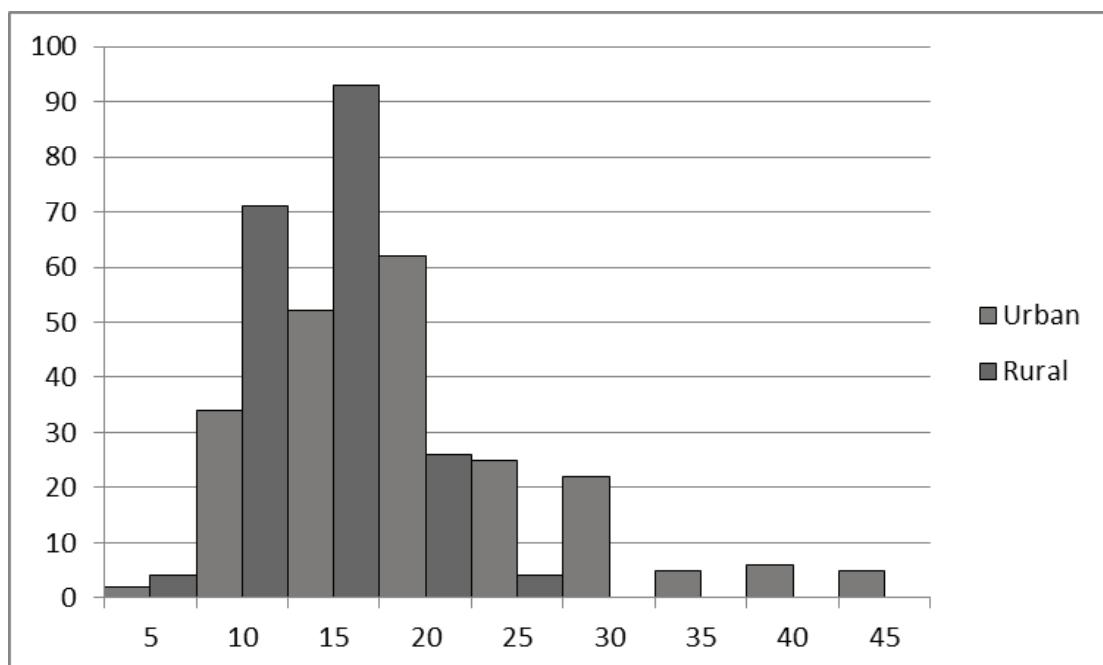
The highest score for “online services” is 3.05 (Table 1) with an average of 0.77. In fact, the websites of 64 rural settlements do not offer any online services. Another 57 websites are offering only one service: either for requesting information or for lodging complaints. Only 17 of the assessed web pages provide access to databases. We are aware of only one Romanian village, Luncavita, where the locals are paying their utility bills using the official webpage as a portal. The village decided to join the National System of Electronic Payment of Taxes and it is mainly the locals working in other countries or parts of Romania that are using this system (Romania Libera, 2012).

The highest score on "digital democracy" is 4.36 points (Table 1). All the other websites obtained scores below 3.27. The average score for participation is 0.55. A number of 95 out of 198 websites offered no online feedback option. Only three websites are providing online forms for comments on the performance of local au-

thorities. Sixteen websites have discussion forums open to citizens, but local officials are rarely present. The websites do not have online opinion polls, do not offer a platform for a digital referendum or for an online petition.

When comparing the five dimensions score (Table 1), it can be noticed that “usability” obtained both the highest individual score (14.38) and the highest average score (7.5). The performance decreases drastically when assessing the “content” (2.42) and goes to merely insignificant for the other three dimensions: 0.77 for “services”, 0.55 for “digital democracy” and 0.33 for “security and personal data protection”. In other words, Romanian rural e-Government scores relatively well on the technical dimension (“usability”) but very poorly on the four substantive dimensions of e-Government.

By comparing the rural scores with the urban ones obtained in a different research made by us, using the very same methodology (Stoica and Ilas, 2009), we observe that Romanian e-rural government obtains lower scores but also much more compact ones (Figure 3). Hence, the average score for rural e-Government is 11.51 compared with 17.65 for urban, while the results are less scattered for the rural areas.



**Figure 2:** Score distribution histogram for rural and urban Romanian e-Government

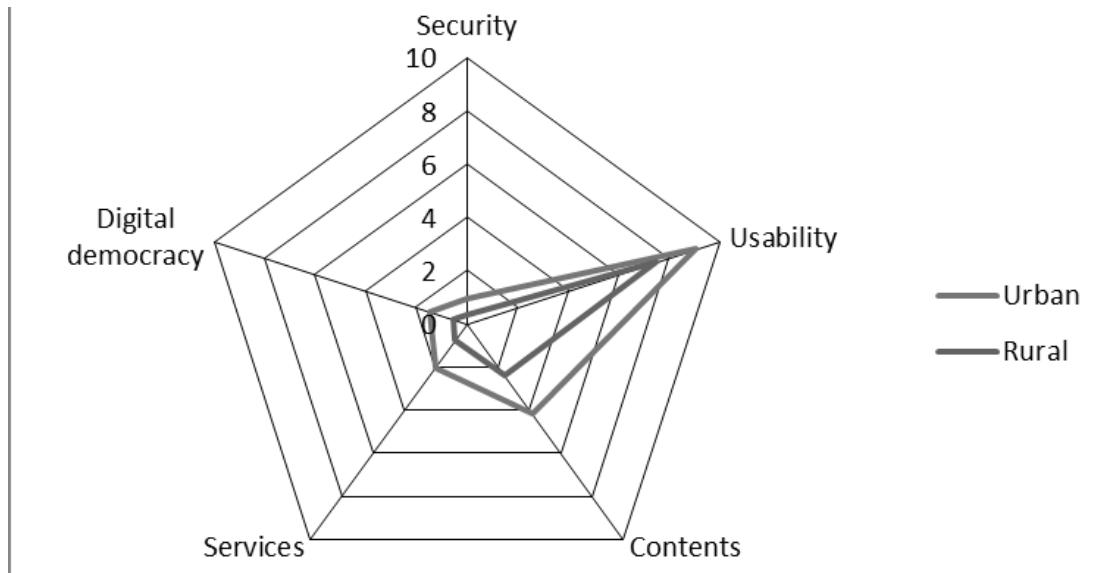
**Table 2:** Rural and urban e-Government performance by dimensions

	Urban	Rural	%
<b>General score</b>	17.65	11.51	65.21
<b>Security</b>	0.94	0.34	35.10
<b>Usability</b>	9.07	7.50	82.69
<b>Contents</b>	4.18	2.42	57.89
<b>Services</b>	2.02	0.77	38.12
<b>Digital democracy</b>	1.45	0.55	37.93

The scores obtained for each dimension of the performance index are lower for rural than for urban. The closest scores are on “usability” (7.50 for rural and 9.07 for urban). For the other scores, the urban scores are several times bigger than the rural ones.

Romanian urban and rural e-Government are identical when comparing the order of the scores obtained for each of the five dimensions: the best performance is obtained for “usability”, followed in order by “contents”, “services”, “digital democracy” and “security” (Table2 and Figure3) This order suggests what is happening behind the webpage. At some moment, the page is created with the goal of openness and attraction towards a great number of citizens (“usability”). It is, after all, a cheap way for local officials to reach the electors. The

page is filled with some information to make it more attractive (“contents”), but without a concern for e-services (“services”), for the feedback that citizens could provide (“digital democracy”) or for protecting the data on citizens gathered while they are using the webpage (“security”).



**Figure 3:** The five dimensions of e-Government score, for rural and urban areas

In order to find out if the villages, the small, the medium and big cities are scoring differently as groups, we have applied an ANOVA test. P-value was almost zero which indicated that there are differences between the average scores obtained by each group.

**Table 3:** Tukey Kramer outputs

Tukey Kramer Multiple Comparisons							
Group	Sample Mean	Sample Size	Comparison	Absolute Difference	Std. Error of Difference	Critical Range	Results
Rural	11.51788	198	Group 1 to Group 2	2.6573687	0.456614702	1.7625	Means are different
Very small cities	14.17525	101	Group 1 to Group 3	5.0839856	0.553879816	2.138	Means are different
Small cities	16.60186	59	Group 1 to Group 4	9.3771212	0.839218373	3.2394	Means are different
Medium cities	20.895	22	Group 1 to Group 5	17.185347	0.721293266	2.7842	Means are different
Large cities	28.70323	31	Group 2 to Group 3	2.4266169	0.611900597	2.3619	Means are different
			Group 2 to Group 4	6.7197525	0.878593745	3.3914	Means are different
Other Data			Group 2 to Group 5	14.527978	0.766748633	2.9596	Means are different
Level of significance		0.05	Group 3 to Group 4	4.2931356	0.932851989	3.6008	Means are different
Numerator d.f.		5	Group 3 to Group 5	12.101361	0.828365457	3.1975	Means are different
Denominator d.f.		406	Group 4 to Group 5	7.8082258	1.041006224	4.0183	Means are different
MSW		27.88978					
Q Statistic		3.86					

Furthermore, a Tukey Kramer test confirmed that these differences are significant statistics. These results suggest that size matters when it comes to e-Government performance in Romania.

## **6. Conclusions**

Despite the declared national interest for a rural e-Government, the Romanian reality is not satisfying: the results of our research allow us to conclude that Romanian rural e-Government is in an initial development stage. In fact, there are very few laws and regulations aimed at local e-Government. Furthermore, there is a significant digital divide between urban and rural communities with the last lagging behind. There is no national strategy designed to close this gap and the rural authorities lack the necessary resources for improving their e-Government capabilities.

Our empirical research showed that only the dimension of “usability” (7.50 out of 20 points) is registering a significant score. There is practically no concern for “security and personal data protection” (the mean score is 0.34). It is almost impossible to identify electronic services for rural communities (0.77), and citizens do not have online opportunities to express their opinion regarding the way the community is run (0.55). The “content” is also extremely poor (2.42 out of 20 points). This suggests how local officials are seeing e-Government: using the community webpage in order to attract citizens and to promote the mayor. This is why “usability”, which is also the easiest dimension, obtained the highest score. In the same vein, “contents” obtained a reasonable score because some information has to be provided in order to maintain users’ interest. This philosophy is conducive to a lack of attention for e-services, for the citizens’ feedback or for protecting personal data.

In a wider perspective, the size does matter for Romanian e-Government performance: a big city is more likely to score better than a medium city which in turn is more likely to score better than a small one. In the same way, a small city is more likely to have better e-Government than a village. This last observation could lead to new practical approaches. In the absence of a national action plan on rural e-Government, the villages could pool their resources and build a single webpage for several communities.

Romanian rural e-Government is much more homogeneous than urban e-Government. We were unable to identify elements that determine a better performance, despite the fact that we tested such independent variables as size, geographical region, distance from a major city, or online presence of mayor. This is probably the main limitation of our study, and further research should use a qualitative investigation in order to identify the performance determinants of rural e-Government.

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# Assessment of Redactable Signature Schemes for Trusted and Reliable Public Sector Data

Klaus Stranacher<sup>1</sup>, Vesna Krnjic<sup>1</sup> and Bernd Zwattendorfer<sup>1</sup> and Thomas Zefferer<sup>2</sup>

<sup>1</sup>E-Government Innovation Center (EGIZ)<sup>1</sup>, Graz University of Technology, Austria

<sup>2</sup>Secure Information Technology Center (A-SIT), Austria

[Klaus.Stranacher@egiz.gv.at](mailto:Klaus.Stranacher@egiz.gv.at)

[Vesna.Krnjic@egiz.gv.at](mailto:Vesna.Krnjic@egiz.gv.at)

[Bernd.Zwattendorfer@egiz.gv.at](mailto:Bernd.Zwattendorfer@egiz.gv.at)

[Thomas.Zefferer@a-sit.at](mailto:Thomas.Zefferer@a-sit.at)

**Abstract:** Due to the increased application of information and communication technologies in the public sector, the amount of data being produced and processed by the public sector has been constantly growing during the past years. As these data can also be useful for the general public and the corporate sector, current initiatives attempt to make these data publicly available. Recent work on this topic has shown that publishing of public sector data potentially raises several issues regarding data integrity and authenticity. These issues render the implementation of solutions based on trusted and reliable public sector data difficult. However, recent work has proposed electronic signatures in general and redactable electronic signatures in particular as adequate means to address these issues. While a variety of redactable signature schemes has been introduced in literature, their capabilities to assure the integrity and authenticity of published public sector data has not been assessed so far. This renders a concrete implementation of solutions based on redactable signatures impossible. To overcome this problem, this paper first identifies and discusses legal, organisational, and technical requirements that need to be met by redactable signature schemes when applied to public sector data to be published. Afterwards, different existing redactable signature schemes are examined and discussed in more detail. Based on the previously identified requirements, the different redactable signature schemes are then assessed in detail. The conducted assessment reveals that sanitizable signature schemes, which represent a subset of redactable signature schemes, are especially suited to meet the predefined requirements. Among the wide set of existing sanitizable signature schemes, the conducted survey has revealed two concrete schemes to be best suited to assure the integrity and authenticity of public sector data to be published. The results obtained from the conducted survey will serve as input and basis for the implementation of solutions based on trusted and reliable public sector data.

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**Keywords:** e-government, redactable signatures, sanitizable signatures, public sector data

## 1. Introduction

The public sector produces, collects, processes, and provides large amounts of electronic data. These public sector data can be of interest also for the general public as well as for the corporate sector. In the area of e-Government, two main approaches have evolved to take up the challenge of providing public sector data. The Open Government Data (OGD) initiative bases on the concept of open data and claims that data should be freely available for everyone's use. In addition, the EU Directive on the re-use of public sector information (PSI Directive) (European Union, 2003) defines a legal framework for the provision of public data within the European Union.

Both approaches define partly different requirements for applications dealing with OGD and PSI related data. Surprisingly, security related aspects such as data integrity or authenticity of data are not part of these requirements. To bridge this gap, supplementary security requirements have been defined in literature recently (Stranacher et al., 2013). In this work, the authors have also proposed a concept to meet these additional requirements in practice. The proposed concept employs electronic signatures to allow for the realization of trusted and reliable public sector data. Furthermore, the proposed concept also includes a mechanism to assure the integrity and authenticity of data even if these data need to be redacted. For instance, a redaction can be necessary if the data contain security-sensitive or individual-related information. For such scenarios Stranacher et al. (2013) propose the use of redactable signature schemes, which allow third parties (redactors) to modify signed data without invalidating the original signature. Redactable signature schemes have already proven their usefulness in different fields of application. During the past years, especially the e-Health sector has turned out to be predestinated for an application of redactable signature schemes (Bauer et al., 2009) (Slamanig and Rass, 2010). So far, several different redactable signature schemes have been proposed and discussed in literature. These schemes differ in various fundamental properties, such

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<sup>1</sup> EGIZ is a joint initiative of the Austrian Federal Chancellery and the Graz University of Technology

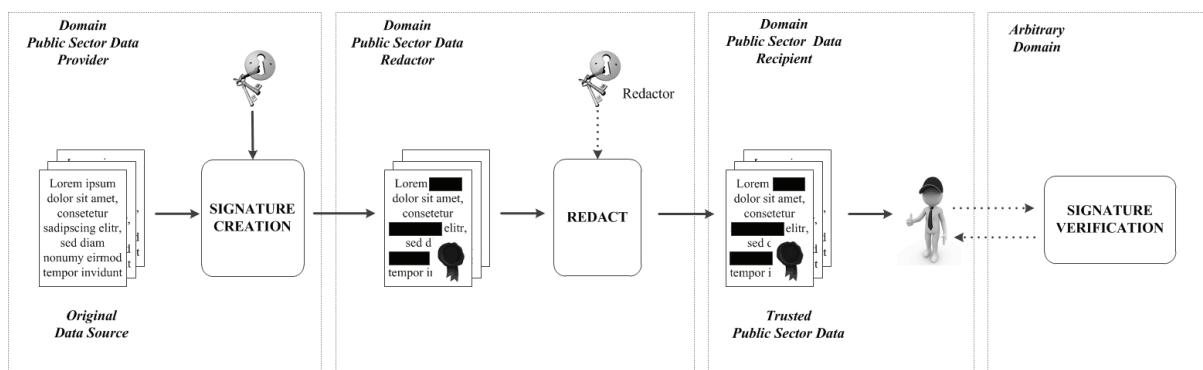
as the possibility to explicitly define a designated redactor, or to allow the redacting of predefined data blocks only. Unfortunately, current concepts that propose a use of redactable signatures in order to assure authenticity and integrity of public sector data lack on an assessment and definition of appropriate redactable signature schemes so far.

In this paper we bridge this gap by assessing existing redactable signature schemes and evaluating their capabilities to meet the requirements of public sector data. For this purpose, we first recap the concept of trusted and reliable public sector data in Section 2. In Section 3, we then derive concrete requirements that have to be met by redactable signature schemes when being applied to the concept of trusted and reliable public sector data. Potential candidates of redactable signature schemes are examined in Section 4. In Section 5, we map the derived requirements to the examined redactable signature schemes in order to assess them schemes' capabilities to meet the given requirements.

## 2. Trusted and reliable public sector data

This section comprises a brief overview of the findings of Stranacher et al. (2013). Since the re-use of public sector information and the open publishing of governmental data do not define new issues, several requirements for such data provisioning techniques have already emerged over the past years. For instance, the Open Government Working Group (2007) has published eight fundamental principles for open government data. While also the PSI Directive includes some general and common requirements for providing public sector data, security requirements have not been defined.

Stranacher et al. (2013) define security requirements, namely data integrity and authenticity, when publishing public sector data. Both requirements ensure data consumers that published data have not been altered and are provided by a trustworthy authority. The authors also propose a concept for trusted and reliable public sector data. They distinguish two main use cases. In the first use case public sector data are published as it is. To ensure data integrity and authenticity, conventional electronic signatures are applied to these data. In the second use case, the public sector data contain personal and private data that need to be anonymized before publishing. Redactable signatures are used in this case. Figure 1 illustrates this use case and shows how trusted and reliable anonymization of public sector data without applying a new signature to the modified data is achieved. Avoiding the re-generation of electronic signatures e.g. might be useful if the person, who has originally signed the data, is not available anymore for re-signing for some reason.



**Figure 1:** Authenticity and integrity for redacted public sector data (Stranacher et al., 2013)

In the following Section 3 we define concrete requirements redactable signatures for this use case. Additionally we give some more details on different redactable signature schemes and their applicability for public sector data in the sections 4 and 5.

## 3. Requirements for redactable signature schemes

The proposed concept of Stranacher et al. (2013) for anonymized public sector data elaborates on the different properties of redactable signature schemes, but lacks on defining concrete requirements for redactable signature schemes applied to anonymized public sector data. In order to close this gap, this section defines legal, organisational and technical requirements for redactable signature schemes.

### **3.1 General legal requirements**

The concept of trusted and reliable public sector data bases on electronic signatures. The legal basis for electronic signatures is formed by the Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures (European Union, 1999). In addition, the national regulatory authorities are responsible for implementation of the Signature Directive on the national level. Therefore, following general legal requirements are defined:

- **Advanced Electronic Signatures:** Such a signature defines, among other things, that the signature is "*uniquely linked to the signatory*" and "*is capable of identifying the signatory*". There a redactable signature scheme must satisfy the requirements of an advanced electronic signature as defined by European Union (1999). This is a prerequisite for accountability and to identify the original signer.
- **Qualified Electronic Signature:** In addition to the requirements for advanced electronic signatures a qualified signature requires to base on a qualified certificate and must be created using a secure signature creation device. These additional requirements are not necessarily needed for the public sector data use cases. Nevertheless a redactable signature scheme may, optionally, meet also the requirements for qualified electronic signatures as defined by European Union (1999).
- **Accountability:** In case of a dispute the signatory must be able to prove that certain modifications have been done by a certain redactor. Accountability can be achieved by technical means (see also technical requirements below).

### **3.2 General organisational requirements**

Beside legal requirements, there exist also some general requirements on organisational level. These requirements concern mainly the role of the redactors and the signatory, i.e. the party, which holds the public sector data. So, following general organisational requirements are defined:

- **Definition and Revocation of Redactors:** Designated redactors should be easily definable by using existing systems (to avoid additional investments) and the signatory should also have the opportunity to revoke redactors.
- **Non-Disclosure Agreement:** Designated redactors must sign an appropriate confidentiality agreement. In particular regarding the data protection as redactors usually have access to private and personal data, which is governed by data protection regulations.
- **Responsibilities:** Responsibilities must be clearly defined both by the signatory and the redactors (e.g. who is allowed to sign/redact, who is responsible in case of a dispute).
- **Service Level Agreement/Security Compliance:** Redactors must ensure to redact data within an appropriate time frame (especially for real time data). In addition, redactors must be compliant to current security regulations as they operate on private and personal data.

### **3.3 Technical requirements**

On a technical level there exists also some requirements, which are tightly bound the particular redactable signature schemes. Therefore, we have defined following technical requirements:

- **Designated Redactors:** Designated redactors must be able to be specified by the redactable signature scheme. That means that the signatory must be able to determine who is allowed to modify the signed data. Persons except the signatory and the designated redactors must not be able to redact data without breaking the originally signature applied. Any change of the data by unauthorized persons must be recognizable.
- **Privacy:** The redactable data as well as the original signature must not allow revealing the redacted message blocks.
- **Designated Parts:** The signatory must be able to specify which data blocks may be modified. Editing unauthorized data must be recognized and must lead to an invalid signature.
- **Accountability:** See definition in legal requirements.
- **Applicability:** The scheme must be applicable on structured data such as XML (W3C Recommendation, 2008).

- **Compatibility:** The signature scheme should be compatible with existing signature standards, such as XMLDSIG (W3C Recommendation, 2008) or XAdES (ETSI, 2010).

#### 4. Examination

Redactable Signatures provide a cryptographic mechanism to allow redactors to apply modifications to signed messages without invalidating the original signature and have been introduced by Steinfeld et al. (2001) and Johnson et al. (2002). This mechanism has many applications in electronic healthcare as shown by Slamanig and Rass (2010) and several other areas presented in Ateniese et al. (2005). A main property of redactable signatures is that they only allow blacking certain parts of the signed data. To remove or replaced designated parts of the signed messages with an arbitrary string, Ateniese et al. (2005) proposed Sanitizable Signatures. Sanitizable signatures can be seen as a small subset of redactable signatures, as they are basically redactable signatures where the replacement part is permanently exchanged.

Figure 1 shows an overview of about the most relevant redactable and sanitizable signature schemes proposed in the last years and their relation to each other. There exist also other schemes (not shown in Figure 1), but either they have been the basis for one of the mentioned schemes or they have been proven as insecure or not applicable. For instance, the authors of Yuen et al. (2008) lacks on accountability of the proposed schema or Pöhls et al. (2011) contains only minor updates on the property transparency (which is not of special interest for our use cases).

For our following examination we have looked initially on the redactable signature schemes proposed by Steinfeld et al. (2001), Johnson et al. (2002), Slamanig and Rass (2010), Chang et al. (2009) and Brzuska et al (2010a). Right at the beginning of the examination we have figured out that all of these schemes do not support the specification of designated redactors. As this is one of the main requirements for the public sector data use cases, all of these schemes are not applicable for these scenarios. Therefore we omitted an in-depth analysis of these schemes and concentrated on sanitizable signature schemes instead.

Figure 2 shows the sanitizable signature schemes we have chosen for our examination (highlighted in grey). A few sanitizable signature schemes we have skipped from our examination due to following reasons:

- Brzuska et al. (2009) proposed a rigorous security model. This model has been incorporated by Canard and Jambert (2010), which is examined below. Therefore we have skipped it from our analysis.
- Brzuska et al. (2010b) proposed an update of Ateniese (2005) which does not permit creating a link between different signatures over the same original message. This functionality is not of interest for the public sector use cases, so we have skipped this scheme.

Following sub-sections give the examination of the chosen sanitizable signature schemes. In addition, we examine on the proposal of Slamanig and Hanser (2013) on Blank Digital Signature, which incorporates the findings of redactable and sanitizable signatures.

##### 4.1 Sanitizable signatures by Ateniese et al. (2005)

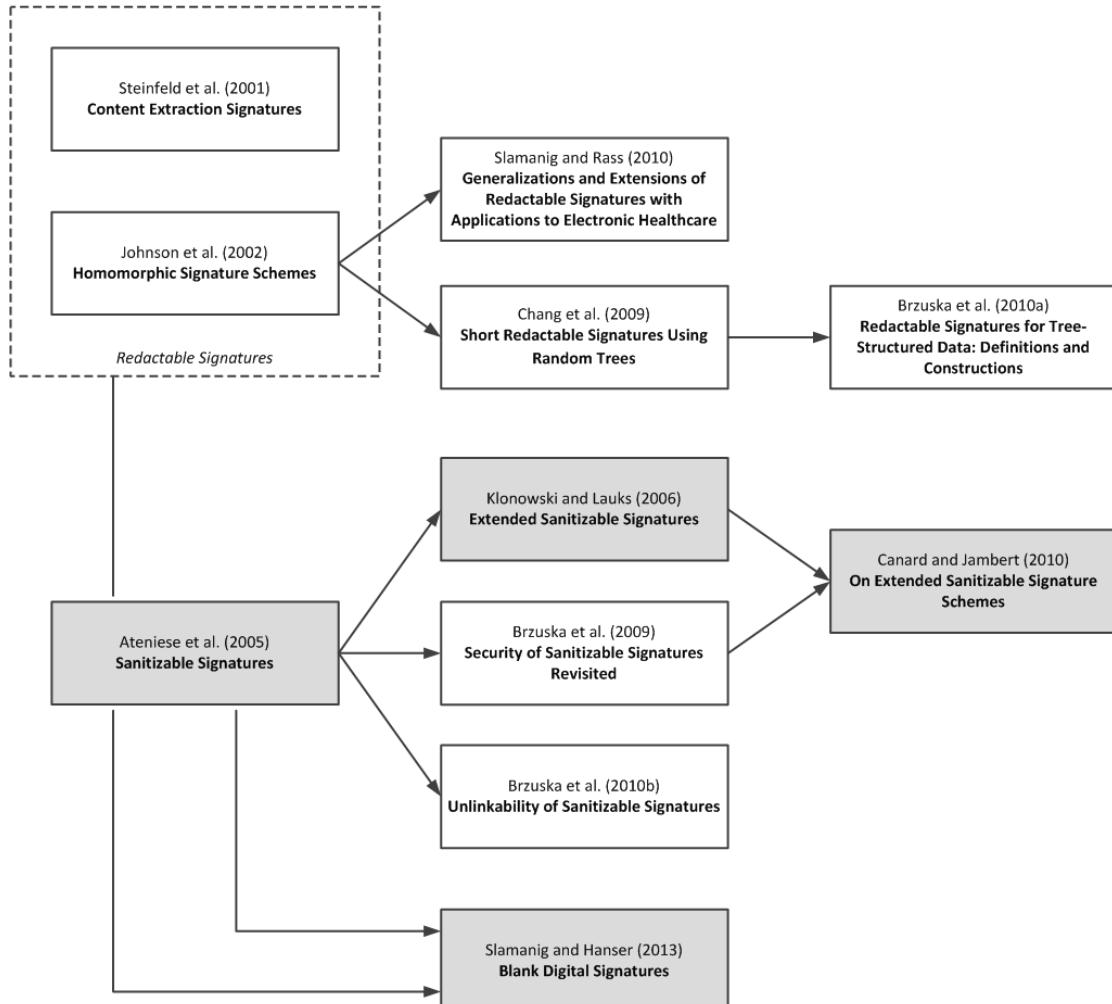
The basic principle of redactable signatures bases upon commitments<sup>2</sup>, which in turn build upon hash-functions. This principle basis upon retaining the original hash values for redacted message blocks and to use them during the signature verification process (instead of calculating a new hash value over the redacted data). This process is described in Stranacher et al. (2013) and in more detail in Johnson et al. (2002) and Steinfeld et al. (2001).

Ateniese et al. (2006) proposed the first scheme for sanitizable signatures, where a designated redactor is able to modify designated parts of a signed message. Here the basic principle bases on chameleon hash-functions instead of conventional hash-functions for conventional signatures. Such chameleon hash-functions are parameterized with the public key of the redactor. Because of the parameterization, the redactor is able to compute collisions. This means the redactor is able to generate messages, which lead to the same hash value

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<sup>2</sup> Commitments are often used in cryptographic protocols. They allow a committer to publish a commitment (= a value), which binds the committer to a certain message, but without revealing it. If a verifier wants to check if the message is consistent with the commitment, the committer may open the commitment to reveal the message.

as for the data, which is going to be redacted. Based on this mechanism the redactor can replace message blocks with arbitrary message blocks and the verification of the original signature will not fail. In this case it is neither possible to detect if a message has been redacted nor it is possible to detect which message blocks have been modified. Therefore the authors propose to add non-redactable meta information after each redactable message block indicating the restriction for the message to be replaced. Obviously, this is a very inefficient solution.



**Figure 2:** Overview about redactable and sanitizable signature schemes

#### 4.2 Extended sanitizable signatures by Klonowski and Lauks (2006)

Klonowski and Lauks (2006) extended the scheme of Ateniese et al (2005). They omitted the added meta information and extended the schema itself to allow the signatory to limit the message blocks which are modifiable by the redactor and to limit the messages which are replaced. This scheme also bases on chameleon hash-functions. For the message replacement restrictions they propose to use accumulators<sup>3</sup> or bloom filters<sup>4</sup>.

#### 4.3 On extended sanitizable signature schemes by Canard and Jambert (2010)

Canard and Jambert (2010) presented a second approach to limit the modification of message blocks and the message to be replaced by the scheme itself. As for the other sanitizable signature schemes, the authors base their proposal on chameleon hash-functions. In addition, they use pseudorandom generators and accumulators to implement the message replacement restrictions.

<sup>3</sup> An accumulator is a one-way hash function which satisfies a quasi-commutative property. See Benaloh and Mare (1994) for details.

<sup>4</sup> Bloom filters are data structures which allow to efficient test whether an element is a member of a certain set or not. See Bloom (1970) for details.

#### **4.4 Blank digital signatures by Slamanig and Hanser (2013)**

Slamanig and Hanser (2013) proposed a new signature scheme, which bases on redactable and sanitizable signatures. They specified a message template, which is defined by an originator and describe a message containing fixed message blocks and multiple choices of message blocks, which are exchangeable. This template is signed by the originator. A proxy<sup>5</sup> is then able to sign an instantiation of this template, i.e. selecting concrete message blocks of the defined choices. Finally, the resulting message can be verified by a third party using the originator's and proxy's verification keys. Their proposal builds upon conventional signature schemes, elliptic curve cryptography and polynomial commitments<sup>6</sup>.

### **5. Assessment**

#### **5.1 Legal and organisational assessment**

In this section, we evaluate redactable and sanitizable signature schemes based on legal and organisational requirements. In order to use redactable and sanitizable signatures for ensuring trusted and reliable public sector data, all defined requirements must and can be fulfilled by the proposed signature schemes.

The European Union has published the EU Signature Directive (European Union, 1999) to define how electronic documents can achieve statutory trust within its Member States. While this directive primarily considers conventional electronic signatures, the use of redactable and sanitizable signatures compliant with this directive has been only slightly discussed so far. Höhne et al. (2012) and Brzuska et al. (2012), for instance, examine legal consequences of redactable and sanitizable signatures. They especially argue that redactable and sanitizable signatures are compliant to advanced electronic signatures but cannot be used for qualified electronic signatures according to the EU Signature Directive. The reason for being not compliant with qualified electronic signatures constitutes missing displaying possibilities for the signatory. According to the Signature Directive, the data to be signed must be viewable by the signatory before the signature creation process. This requirement cannot be fulfilled by redactable and sanitizable signatures as modifications of signed data are possible also after signature creation, which the signatory cannot be aware of at the time of the signature creation process regardless the signatory is able to define which message parts are able to be modified and how they can be modified. Another legal requirement to be fulfilled by the proposed signature schemes is accountability. Accountability means that redactors, who used her private keys to modify signed data, can be determined. This requirement cannot be met by all described signature schemes (see following Section 5.2).

Equal to legal requirements, several organisational requirements must be met by the proposed signature schemes in order to successfully apply redactable and sanitizable signatures to public sector or open government data. In fact, all organisational requirements identified in Section 3.2 are independent of the technical implementation of the proposed signature schemes. While some organisational requirements may be fulfilled using technical means, others require solutions on organisational level. For instance, the requirement on revoking designated redactors can be fulfilled on technical level as all of the proposed schemes rely on a public key infrastructure (PKI) and hence on existing and well-established revocation mechanisms. However, other organisational requirements still require organisational measures. This particularly means that a fulfilment of those requirements requires e.g. some kind of contractual agreements between all involved parties. Within such agreements, especially individual responsibilities, signature validity limitations, or liability questions must be thoroughly elaborated.

#### **5.2 Technical assessment**

This sub-section comprises the technical assessment of the examined sanitizable signature schemes according to the defined requirements in Section 3. In the following, the schemes are assessed in detail and Section 5.2.5 summarizes the findings of this technical assessment.

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<sup>5</sup> For the public sector use cases the proxy can be seen as the redactor.

<sup>6</sup> Polynomial commitments are conventional commitments applied to polynomial functions.

#### *5.2.1 Assessment of sanitizable signatures by Ateniese et al. (2005)*

Ateniese et al. (2005) states “[...] as a secure digital signature scheme that allows a semi-trusted censor to modify certain designated portions of the message [...]”<sup>7</sup>. That means the requirement for designated redactor and designated parts is fulfilled. In addition the privacy is also fulfilled as “[...] the indistinguishability requirement provides for privacy”. The author also state that “accountability follows from the unforgeability requirement”, but this has been proven by Brzuska et al. (2009) as not true. So the Ateniese sanitizable signature scheme does not provide accountability.

#### *5.2.2 Assessment of extended sanitizable signatures by Klonowski and Lauks (2006)*

The extended sanitizable signature scheme of Klonowski and Lauks (2006) provides a designated redactor and designated parts as stated by the authors: “[...] in this scheme the designated censor can change the content of designated (so called mutable) parts of a signed message [...]”. They also state that privacy is fulfilled due to the basement of their extended scheme on Ateniese et al. (2005). Concerning accountability we have to distinguish between the two characteristics of this scheme. The accumulator technique provides accountability whereas bloom filter does not. Nevertheless, the authors miss a concrete security model and proofs for their proposed schema.

#### *5.2.3 Assessment of extended sanitizable signature schemes by Canard and Jambert (2010)*

As this scheme strongly bases on Ateniese et al. (2005), it provides designated redactors as needed by our defined requirements. In addition, Canard and Jambert (2010) state that “[...] to force some admissible blocks of a signed message to be modified only into a predefined set of sub-messages.”<sup>8</sup> and “[...] privacy is also included by transparency in the extended model.”. Thus, the scheme fulfils the requirements for designated parts and privacy. In addition, the authors prove that “Unforgeability (and thus accountability) is reached thanks to the computation of a new tag per message.”. This is one of the major extensions of Ateniese et al. (2005).

#### *5.2.4 Assessment of blank digital signatures by Slamanig and Hanser (2013)*

Slamanig and Hanser (2013) state that “Immutability guarantees that no malicious proxy can compute message templates or templates instantiations not intended by the signer.” and “[...] is called private, if for any polynomial-time algorithm  $A$  the probability of winning Game 2 is negligible as a function of security parameter  $k$ .” It follows that the proposed scheme provides a designated redactor and privacy. The requirement, that designated parts must definable, is fulfilled because of the proposed template mechanism, where the signatory defines a message template. Additionally accountability is also fulfilled as the proxy signs the template instantiations with a conventional signature, which provides accountability.

#### *5.2.5 Technical assessment summary*

The requirements for applicability to structured data and compatibility with existing signature standards can be assessed together for all examined schemes. Pöhls et al. (2011) have shown several implementations of sanitizable signatures based upon XML and the W3C Recommendation (2008) on XML-Signature Syntax and Processing (XMLDSIG). The authors have proven that sanitizable signatures are applicable to structured data and fit into XMLDSIG without invalidating the recommendation. In addition, the findings of Pöhls et al. (2011) may be applied to the examined schemes with slight changes.

Table 1 summarizes the results of the assessment. It shows that Ateniese et al. (2005) lacks on the requirement on accountability. Furthermore Klonowski and Lauks (2006) miss a security model and proofs for the proposed scheme. Therefore these two schemes are assessed to be not suitable for the public sector data use cases.

In contrast, the sanitizable signature schemes of Canard and Jambert (2010) and Slamanig and Hanser (2013) meet all technical requirements. Hence these schemes are appropriate to the use cases of redacted public sector data as defined in Stranacher et al. (2013).

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<sup>7</sup> They used the name censor for the redactor.

<sup>8</sup> Message parts which can be modified by a redactor are often called admissible blocks.

**Table 1:** Technical assessment of examined sanitizable signature schemes

Signature Scheme	Design. Redactor	Privacy	Design. Parts	Accountability	Applicable to Structured Data	Compatibility	Comment
Ateniese et al. (2005)	Yes	Yes	Yes	No	Yes	Yes	
Canard and Jambert (2010)	Yes	Yes	Yes	Yes	Yes	Yes	
Klonowski and Lauks (2006)	Yes	Yes	Yes	Yes <sup>9</sup>	Yes	Yes	No security model and no proofs are given
Slamanić and Hanser (2013)	Yes	Yes	Yes	Yes	Yes	Yes	

## 6. Conclusions

The emerging trend to make public sector data available to the general public and to the corporate sector raises the demand for innovative techniques to meet arising security requirements. Electronic signatures in general and redactable electronic signature schemes in particular have recently been proposed as adequate enabler for such security preserving techniques.

In this paper we have made the next step towards a concrete implementation of these techniques by evaluating different proposed schemes for redactable signatures and by assessing their capabilities to enhance the security of publishing (anonymized) public sector data. The assessment has been based on a set of legal, organisational, and technical requirements, which have previously been defined and discussed. The conducted assessment of existing redactable signature schemes has revealed that especially sanitizable signature schemes, which represent a subset of redactable signatures schemes, are well suited to enhance the security of published public sector data. Among the set of evaluated sanitizable signature schemes, especially two schemes proposed by Canard and Jambert (2010) and by Slamanić and Hanser (2013) have turned out to be able to meet given legal, organisational, and technical requirements.

The results that have been obtained from the conducted assessment pave the way for several future activities in this field. In a next step, the two most promising schemes that have been identified by the conducted assessment will be implemented and integrated into approved electronic signature schemes such as XMLDSIG. This implementation will then serve as basis for the development of solutions based on trusted and reliable public sector data.

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# **Suggesting e-Service Quality Model for e-Governance Service Delivery in Saudi Arabia**

**Gopikrishna Vasista Tatapudi and Mohammed Ahmed Turki AlSudairi**

**Vice-Rector Office for Business Development, King Saud University, Riyadh, Saudi Arabia**

[tgkvasista@gmail.com](mailto:tgkvasista@gmail.com)

[gtatapudi@ksu.edu.sa](mailto:gtatapudi@ksu.edu.sa)

[mas@ksu.edu.sa](mailto:mas@ksu.edu.sa)

**Abstract:** No doubt that government leadership and provision of service quality are crucial to gain the country's competitive edge. But a paradigm shift towards E-Governance does not only engage citizenry in government in a user-centred manner but also help to develop quality government services and delivery systems that are efficient and effective. This paper highlights the aspects of evaluating e-governance through service quality and new service design & development towards achieving one of the Saudi nation's service quality objectives i.e. service fulfillment. It is believed that public value lies in Service fulfillment and can be achieved by empowering individual service user by focusing on self-service aspects and user-driven innovation in public sector in Saudi Arabia. At the initial phase Lovelock and Wright Model is considered for proposal in order to satisfy the customer fulfillment factor of service quality because it promotes a suitable service quality classification scheme that focuses on customer contact during service fulfillment and does not differentiate it against customer contact for service specification. In this regard, it is argued and suggested that maintaining coherence among the factors of proposing service quality framework and its underlying theoretical models is important in a typical research context.

**Keywords:** e-service quality model, e-governance service delivery, Lovelock and Wright model, public services management, referential adequacy, service design and development

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## **1. Introduction**

In the trend of globalization, government leadership and provision of service quality are crucial to country's competitive edge besides knowing how they can influence the government performance (Hsiao and Lin 2008). Regardless of whether a company's core offerings are products or services, superior service quality is essential for excellent performance on an enduring basis. The rationale behind this conclusion is that service quality is much more difficult for competitor to copy than product quality and price (Parasuraman and Grewal 2000).

A shift towards global alignment of business processes and the international benchmarking of standards, facilitating by new technologies has been becoming a trend of adoption by countries aspiring to manage public based on knowledge based economies (Brown, Lauder and Ashton 2008). For example, European Commission has approved a list of 12 public services to citizens as guidelines for benchmarking (Torres, Pina and Acerete 2005).

A key measure of good governance however is through the public sector that is in-charge of delivering transparent and quality services (Naz 2009). It means public sector institutions are required to play a good role in implementing customer oriented services with innovation. It is because public sectors, apart from enforcing public authority, shall provide service quality in compliance with people demand (Hsiao and Lin 2008). The area of service quality and measurement in the public sector has been less well considered. The bulk of service quality literature tends to originate in private sector in profit oriented contexts. The motivation and outcomes in such contexts are often more easily measured. But the introduction of service quality rhetoric in the public sector is a more recent phenomenon that can be traced to new public management movement (Buckley 2003). Though there are implications (Vasista 2012), E-Governance will be able to streamline bureaucratic procedures to make operations more efficient. E-Governance can improve public service delivery (Naz, 2009). The promise of E-Governance is to engage citizenry in government in a user-centred manner and contribute to the development of quality government services and delivery systems that are efficient and effective. Key issues to be considered in E-Governance are the discovery of citizen desires and perceptions and the preparation of a comprehensive plan that can describe the specific citizen-centred strategies for implementing user-centred E-Services delivery design (Bertot, Jaeger and LcClure 2008).

Saudi Arabia's commitment towards providing quality services to public is evident from its declarations and discussions held in Dubai during 2007 about e-government, where it is declared speed, accuracy,

responsiveness and fulfillment are the major objectives of nation's e-government service quality (OECD-DSG 2007). The implementation strategy should consider the support and simplification of government interaction with all parties i.e. government, citizens and businesses, where government interaction stands for the delivery of government products and services, exchange of information, communication, transaction and systems integration (Backus 2001).

Objective of this paper is to highlight and establish the significance of e-governance service quality and new service design and development towards achieving the service fulfillment. Because the public value lies in service fulfillment and can be achieved by adopting the abstraction-standardization-concretization methodology (AlSudairi and Vasista 2013) for implementing self-services and user-driven innovation among the interacting parties. It attempts to highlight the aspects of service quality and simplification of the customer relationships with public administration (Torres et. al. 2005) through e-governance efforts.

## **2. Towards building theoretical framework for e-governance**

E-Governance is relatively a new research area. Vasista (2012), made two considerations while establishing a quality management system for effective public administration. They are: (i) clearly understand how e-governance can be distinguished from e-government and (ii) build a framework that describes challenges and measures in the quality management system. The framework is attempted to build a benchmarking policy and measurement variables for establishing quality management system in public administration based on theoretical ground work from the level of basic definitions mentioned by Loffler (2001). Further the challenges and key functional measures in quality management system of effective public administration are summarized. In cinch, it concludes that while e-government focuses on G2C, considering service provider perspectives of measures, e-governance focuses on G4C by considering the service requester perspectives and adopting citizen-centric approach along with user-centered design for evaluation purposes. E-Service is an increasingly adopted channel for having interactions among stakeholders. E-Government requires advancing from early life-cycle phases of mere information publication towards other phases of e-services development up to the transformation (Luppicini 2005, p. 106) phase of Gartner's e-government maturity model. In addition to efficiency goals, the empowerment of citizens and their satisfaction through service fulfillment is an important consideration to be focused as a part of contemporary goal of public management. Thus customer orientation and citizen-centricity are required to be considered while providing quality e-services to the public (Karlsson et. al. 2012). Authors argue that once the customer-centricity is considered in public administration, it should no more be called as e-government and the term e-governance takes this new portfolio (Vasista, 2012).

In order to achieve public service conformance with customers Request For Proposal (RFP) for service fulfillment and its evaluation, we have made two considerations (i) provide a rationale in terms of pointing to an established service quality theory and its corresponding model; (ii) focus on implementation strategies related to new service design and development that influence the public value, which can be found in effective service fulfillment and integrated public service delivery (Millard, 2006). The following sections deal with these two considerations.

## **3. E-governance service quality considerations**

Public sector services are responsible and accountable to citizens and communities as well as to its customers. Several researchers (Wisniewski and Donnelly 1996; Rowley 1998; Wisniewski 2001; Brysland and Curry 2001) have dealt with service quality in public services earlier. Further studies conducted on service quality in public service include: Ramseok-Munhurrun, Lukea-Bhiwajee and Naidoo (2010) on front line employee and customer perspective; Hsiao and Lin (2008) on customer oriented public service enhancement system; Naz (2009) on E-Governance for Improved Public Service Delivery in Fiji; Bhattacharya, Gulli and Gupta 2012 on service quality for e-government portal from the design and implementation perspective.

According to Reynoso and Moores (1995), issues such as effect of service quality to an organisation from management perspective are equally important as to service quality from customer's perspective (Zailani, Din and Wahid 2006).

Naz (2009) conducted research by proposing hypotheses to assess whether e-governance is positively related to the outcomes of effectiveness, efficiency and equity in services. The research concludes that benefits of public service delivery through e-governance can be much above the citizen expectations in achieving

effectiveness, efficiency and equity that are treated as principal aims of the quality from public management perspective.

Bhattacharya, Gulli and Gupta (2012) conducted a research study and proposed a set of seven items for assessing the e-service quality of government portals. These items can provide insight on users' needs to government portal developers for the purpose of improving the design and implementation of online services. Like many research studies, this research study is no exception to those studies that lack to provide the basis or rationale in selecting service quality dimensions

#### **4. Need of referential adequacy**

Some electronic governance related research studies (for e.g. Bhattacharya 2012; Tan 2012) are found to provide insufficient rationale while constructing their theoretical framework. This is because an inviting research effort must not only be plausible but also needs to have coherence that carries intelligibility and explanatory power with it as a part of providing evidence to support the conclusions for explanatory narrative research. Technology based electronic governance research studies should have a capacity to direct and change human lives meeting their wants and needs (STEM Definition). To claim this power, what is required is the referential adequacy: the capability of expansion of perception and enlargement of understanding along with having a referencing capability to some established principles, theories or models (Yang 2011). Development of theoretical framework should reflect this kind of phenomenon and hence becomes heart of the research (Vasista, 2011).

For example, in case of Bhattacharya et al. (2012) research study, the proposed model with selected list of e-service quality dimensions for e-governance did not claim the link to any established underlying theories or models. In case of the Tan (2012) research study on e-government customer service, though framework is established supporting by the customer service life cycle (CSLC) model given by Ives and Mason (1990), the 'retirement' component of the customer service life cycle model is however replaced with a set of IT-mediated service delivery dimensions that in turn do not have a reference to any established service delivery model (2012, p. 4). In the process of customizing the framework, researcher did not take enough care in synchronizing the lower replaced component i.e. web service delivery component to maintain such interrelationship among three abstraction levels that can be identified from the given service delivery model. This deficiency of lack of fit of the proposed component is identified by authors as a flaw of building theoretical framework from the research methodology perspective.

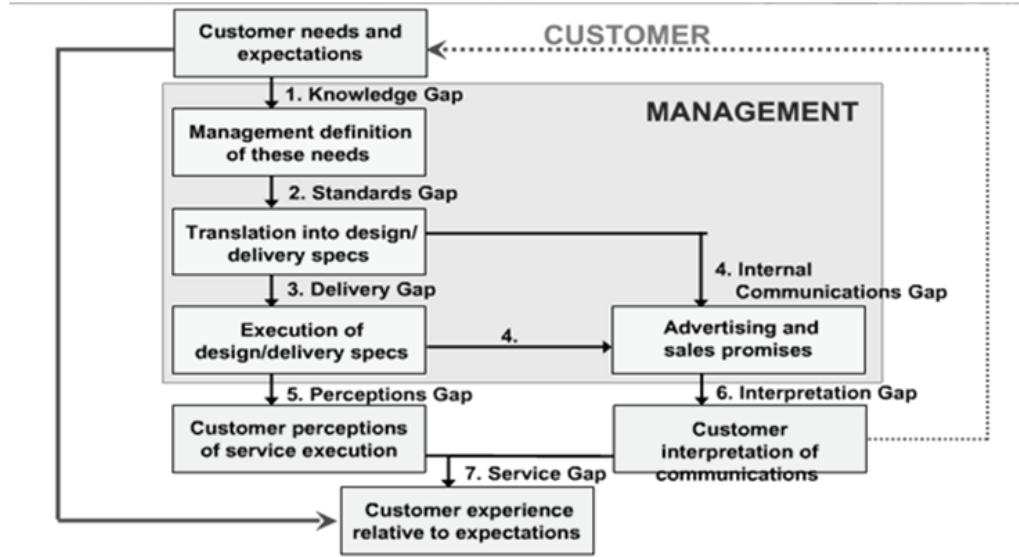
In order to cover such faults in the research study, *authors at the initial phase have identified and assumed that Lovelock et al. (1998) service quality gap model can be a more suitable strategic service quality model to be proposed for the adoption and to derive benchmarking factors for Internet Portal Service Quality based E-Governance Service.*

#### **5. Influence of e-governance service quality on citizen satisfaction – proposition of Lovelock and Wright model adoption**

In benchmarking studies of e-governance with service quality approach of evaluation, careful consideration to the perception and expectation of its users is justified because perceived service quality is found a critical determinant of web site success. This is because web site service quality is defined as 'consumers' overall evaluation and judgment of the excellence of quality of e-service offerings in the virtual market place' and as 'the extent to which a web site facilitates efficient and effective shopping, purchasing and delivery' (Connolly and Bannister 2008). Parasuraman and Grewal, (2000, p. 168) emphasized that the cumulative insights from their conducted studies support the general notion of perceived quality enhancement through service quality, which in turn, contributes to customer loyalty. Further they found that there is a consistency in the research work studies between the quality-value-loyalty linkage and service-profit chain. Citizen orientation influences e-service quality of e-government portals making it dynamic percept (Bhattacharya et al., 2012). This led researchers to identify the e-service quality assessment to act as polymorphic way for the purpose of reflecting the needs of the citizens and other stakeholders using e-service.

Managers in service sectors are under increasing pressure to demonstrate that their services are customer-focused and that continuous performance improvement is being taken through customer service delivery. It is essential for the service organisations to properly understand the customer expectations, perceptions, and

experiences from the customer service delivery perspective and identify service quality gaps (See Figure 1) within the scope of a given set of financial and resources constraints. This information then assists managers in identifying cost-effective ways of closing service quality gaps and prioritizing these gaps in view of making critical decisions (Shahin 2005).



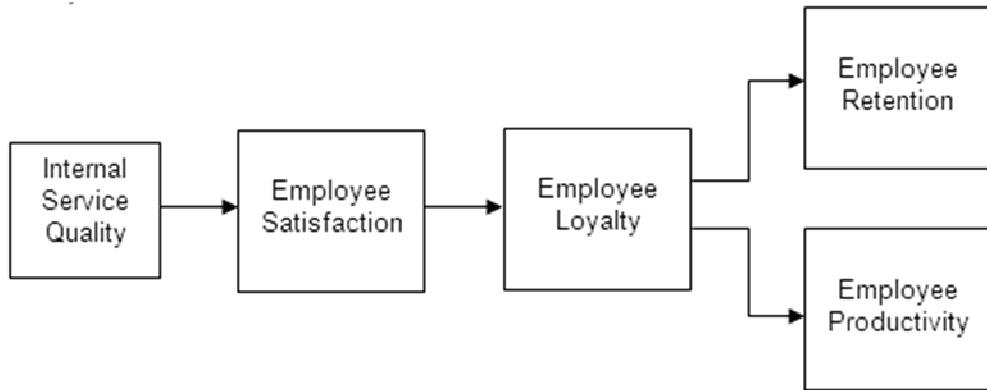
**Figure 1:** Lovelock et al. (1998) service quality gap model (Source: Adopted from Lovelock and Wirtz 2007)

Specific to current context, the role of political parties is to gather public service perceptions about public service value and form a public service policy based on public consensus. The role of government is to understand public service expectations and verify its feasibilities and compliances whether or not within the scope of its relevance to underlying articles of the constitution and law.

Gap analysis approach is introduced independently in the service development control. Audit of government initiatives in the area of trade in services sector has revealed that there are significant gaps. Gap analysis provides an approach and means to align the strategy for services to the economic priorities set by the government (Mayer 2005). Gap analysis indicates where the service quality gaps occur. The gap approach allows managers to track the impact of any improvement initiatives that have been introduced to close the identified gaps. In cinch, the gap analysis approach offers considerable potential to assess whether and how to apply it for service development and improvement. Repeating the survey and re-analysis gap scores will help managers assess the impact of improvements (ACS-Account Commission for Scotland 1999).

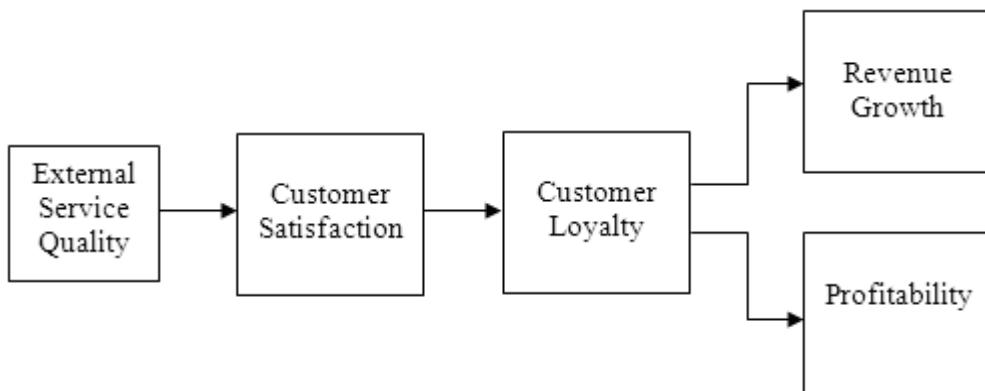
Managing e-governance service value chain in terms of service quality can be well understood when the service fulfillment is explained by positioning its portfolio associated with facilitator, an intermediary component (Millard, 2006) between service provider and service requester. From the perspective of designing a strategy for digital society (AlSudairi and Vasista 2012), the overall service quality can have two views: internal service quality (see Figure 2) and external service quality (See Figure 3).

Internal service quality is related to service provider end. It means organisations have to focus on employee satisfaction and employee loyalty which leads to employee retention and employee productivity (de Vries 2003).



**Figure 2:** Influence of internal service quality on the employee side of service-profit chain (de Vries, 2003).

External service quality is related to service requester end. It also means organisations have to focus on customer satisfaction and customer loyalty which leads to revenue growth and customer profitability (de Vries 2003).



**Figure 3:** Influence of external service quality on the customer side of service-profit chain (de Vries, 2003).

Correspondingly it is identified that a gap of alignment between internal service quality and external service quality can exists from the organisational service development perspective. This is where a third component is required to be bridged so that the organisations can get the advantage of matching capability between the internal service quality and external service quality.

*In summary a correlation between service facilitation and service fulfillment will bring value to create a basis for e-governance service fulfillment (See APPENDIX). Public Private Partnership, eCRM, New Service Design and Development are domains that take the portfolio of arranging this facilitation and acts as a platform for conducting and achieving service fulfillment with speed (IBM-OPAL).*

## 6. New service design and development

While organisations have seen some value in citizen satisfaction, internal efficiency, (Zailani, Din and Wahid 2006) and reduction in costs, governments are also required to understand the dimensions of website service excellence that citizens value, as it has a potential to enhance service quality, citizen satisfaction and the capacity of new public management for achieving good governance.

User-Centric E-government requires shared understanding of the interests, perspectives, values and benefits sought from e-government by various stakeholder roles to be considered as a part of evaluation of long term-success of e-government enterprise (Rwlley 2011). A survey among most innovative European e-Government service designers showed that they mainly consult users when evaluating prototypes. Prototyping is a design tactic that provides various perspectives of users as a part of requirements engineering efforts in the context of designing high quality e-government services. It is an approach that brings compliance with the needs and wishes of citizens, based on user-centered design (Velsen et al. 2009). User participation approach in terms of participatory design, user-centred design and user innovation has potential to meet the strategic e-service

goals. There are two e-service goals that are closely associated with each other: (i) to develop e-services that are usable and (ii) to develop e-services that are relevant to the user (Karlsson 2012).

Management of new service design and development has become an important competitive concern in many service industries. Technology is changing the way services are designed and delivered in the process of establishing customer-supplier relationship, which is the basis for service supply chains (Menor, Tatikonda and Sampson, 2002). Customer service is a key component of a firm's value proposition and a fundamental driver of differentiation and competitive advantage in every industry (Brohman et. al., 2009). Further, Brohman et. al. (2009) have proposed a new design theory for service systems that goes beyond the limitations of traditional CRM approaches and thus forms a basis to provide a solution to gap. It is a design theory that moves the Network based Customer Service Systems design and development beyond firm-centricity enabling organisations to define customer value holistically. 'ET3' attribute of Plomp and Pals (1989)'s definition of intervention of technology, supports this view at the upper abstraction level (Luppincini 2005). New design theory relies on Service-Dominant Logic. The importance of the notion of process completeness is emphasized to describe the degree to which a firm's service delivery workflow can match to full range of needs specified by customers (p. 411). It is a capability of the firm that is able to orchestrate the fulfillment of global expectations cutting across service boundaries to achieve process completeness based on one or combinations of four strategies viz., transaction, process, alliance and agility. Their proposed architectural design reflects the adoption of Service Oriented Architecture consisting of service-provider, service requester and service facilitator components. Their naming convention called 'Broker' (p. 417) is what can be called as 'Service Facilitator' component. A broker is a common mechanism for handling the match of appropriate resources to fulfill a client's requirements (p. 420). Lovelock (1983) has given a service classification scheme in which no differentiation is made between customer contact during service specification and customer contact during service fulfillment (de Vries 2003, p. 57). Service specification process in front office forms the link between service marketing and service production. Hence their integration is seen as a strategic activity (de Vries, 2003 p. 58). Recent computer science literature recognizes that, in order for computer applications to become more customer-driven, there is a need to examine the translation of specifications from business domain to service domain under system's perspective (Brohman et. al. 2009) with interaction facility.

Dynamic bundling concept reflects this strategy as a form of design strategy by dynamically packaging services based on matching customer service specifications in terms of pricing and other personal specifications mentioned during interactions (Luppincini 2005). Dynamic packaging encompasses the automated recombination of complementary depending on marketing mix rules and general business rules (Brohman et. al. 2009). Our service facilitator is a component in the service holistic system that executes agility strategy by performing the search and evaluation systems in terms of identification of suitable offers to be bundled to match customer specifications. For this purpose design and development of broker interface, adoption of SOA architecture and Business Process Management (BPM), data warehouses and data mining or business intelligence (BI) techniques (Brohman et. al. 2009) service delivery orchestrator (SDO), semantic capability (semantic web services/SWS) and cloud computing (CC) environment is what can be suggested. Complexities associated with government work procedures have always been barriers to easy access of government services for citizens and other stakeholders. However government portals envelop the size and intricacies of government department dependencies, representing government-on-line in many ways. They allow for all kinds of self-services, from searching for information to services involving complex transactions like e-filing of income tax. The same portal can also serve as a convenient platform for providing new business permits, uploading or downloading tenders, bidding for government auctions or promoting businesses to government (B2G) transactions. Precisely government portals offer an opportunity to reorient services around the needs of the citizens while consolidating back office responsibilities (Bhattacharya, Gulla and Gupta, 2012).

## **7. Conclusions**

Lovelock et al. (1998) service quality gap model seems to have potential to adopt as an e-governance service quality model for deriving benchmarking factors to assess and measure government performance. This is because the model is covering the management aspects, the service quality aspects, the citizen or customer perceptions, their expectations and experiences towards service delivery. Dealing with these aspects has a match with the basic understanding of the derived e-governance concept (Vasista 2012). Lovelock Model is mentioned because it focuses on customer contacts during service fulfillment and do not differentiate it against customer contact for service specification (de Vries, 2003 p. 56 & 57, UvA-DARE) Rigorous research

efforts must qualify for developing a theoretical framework that supports referential adequacy from the research methodology perspective. Thus selecting stray service quality dimensions and items with no referencing to an established theory and model cannot gain significance in research studies. Building conceptual framework from basic definitions and establishing rationale based arguments will provide significant basis for selecting and suggesting suitable models to the current research problems at hand. The implementation strategy can however depends on architecture (Papazoglou, Georgakopoulos and Honey, 2003; Kinsman, 2012), design (Brohman et. al. 2009), development of self-service portal (Cloupia), service delivery orchestrator (Cloupia) and On-Demand Workflow Resource Provisioning (Dirnemann, Juhnke and Freisleben (2009).

## 8. Future research

Research is required (i) to propose and describe a hypothetical theoretical framework by deriving benchmarking factors for Internet Portal Service Quality in public sector (ii) to test the proposed hypotheses on achieving citizen satisfaction. E-Governance Service Quality Dimensions and relevant items are required to be tested against citizen perceptual data for closing Service Quality Gaps based on Lovelock et al. (1998) model. Correlations are required to be tested against performing quantitative research.

## Acknowledgements

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## Appendix 1

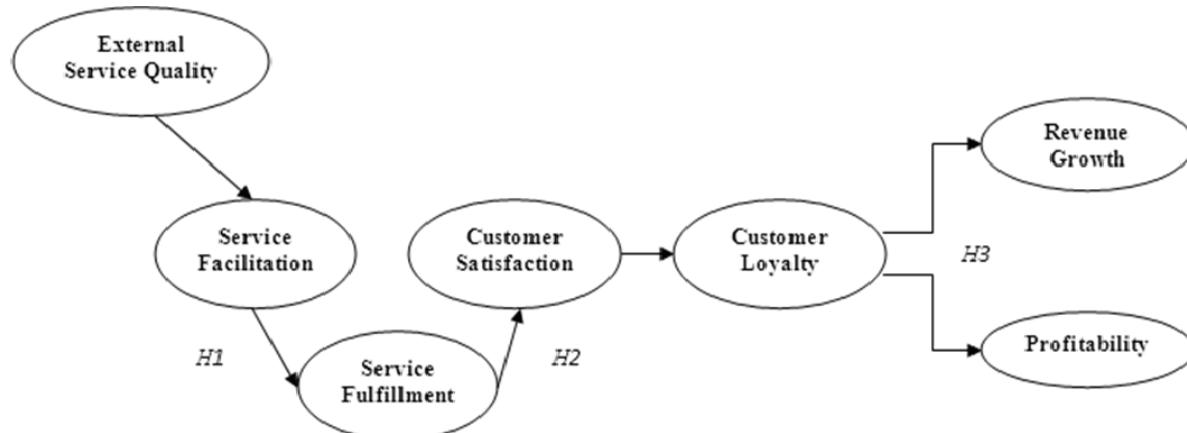


Fig. A1 Conceptual Diagram of Influence of External Service Quality on Customer Satisfaction and Loyalty

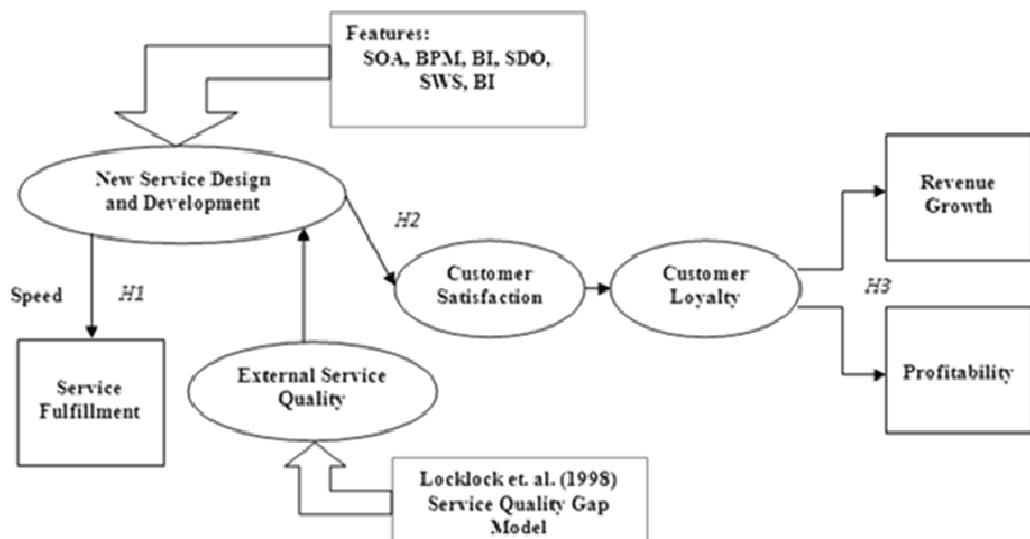


Fig. A2 Design perspective of Influence of External Service Quality on Customer Satisfaction and Loyalty

**Table A1. Hypothesis while suggesting Service Quality for e-Governance**

H. No.	Conceptual Perspective of Hypothesis	Design Perspective of Hypothesis
H1	<i>Service Fulfilment is an effect of Service Facilitation influenced by External Service Quality</i>	<i>Service Fulfilment with speed is an effect of New Service Design and Development influenced by External Service Quality</i>
H2	<i>Customer Satisfaction is an effect of Service Fulfilment that leads to customer loyalty</i>	<i>Customer Satisfaction is an effect of Service Fulfilment that leads to customer loyalty</i>
H3	<i>Customer satisfaction and loyalty can produce revenue growth and profitability</i>	<i>Customer satisfaction and loyalty can produce revenue growth and profitability</i>

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# **Virtual Democracy and Models of Political Democracy: Reflections on the Case of the First Conference on Virtual Transparency and Social Control**

**Luiza Teixeira**

**Escola de Administração de Empresas de São Paulo da Fundação Getúlio Vargas (EAESP-FGV) and Universidade Estadual de Santa Cruz (UESC)**

[luizareisteixeira@gmail.com](mailto:luizareisteixeira@gmail.com)

**Abstract:** The centrality on the use of Information Technologies (ICTs) in contemporary society has brought a lot of changes in economic, social, political and philosophical dimensions, encouraged mainly by the diffusion of the Internet (PINHO, 2011). In a short period there has been the emergence of a new virtual environment of interconnected communication, with the emergence of a new model of socialization, production and trade, according to Benkler (2006), radically different from the industrial model. In this paper, it is questioned how the changes brought by the diffusion of Information Technologies (ICTs) are related to democracies. We seek to understand, then, if the use of ICTs provides further democratization, and if the population can take advantage of the information available on the network. We bring to the debate, therefore, the relationship between two very different though complementary themes: democracy and the internet. It is understood that the use of ICT has opened up a wide range of democratic possibilities of action, and has established different forms of interaction between government and society. In Brazil, the 1988 Constitution, known as "Citizen Constitution", created a favorable environment for the development of experiences related to participation, using the internet as a way of deepening the interactions between society and State. This paper aims, therefore, at analyzing what the potential use of Information Technology in the redefinition of democratic practices. In order to do that, first a brief literature review of the different traditions of democracy political thought is presented, giving special attention to the reflection on the redefinition possibilities of democratic practices, intending to promote cultural pluralization and the recognition of new identities. It also figures among the objectives of this paper to present how literature discusses the use of ICT in democracy. Then we present an analysis of the I Virtual Conference on Transparency and Social Control, using the Cube Model of Democracy, proposed by Fung (2006), which considers democratic practices in three different dimensions: who the participants are, how communication and decision-making occurs, how discussions can promote public policies. It is believed that this model can lead to some answers related to the initial questionings, as it directs to a reflection on participation experiences, in particular, and its real impact in relation to legitimacy, fairness and effectiveness of the experience. The analysis using this model is important for understanding the different possibilities and varieties of participation, and, thus, comprehending different compositions related to the impact of the relationship between government and society.

**Keywords:** virtual democracy, models of political democracy, participation

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## **1. Introduction**

The centrality on the use of Information Technologies (ICTs) in contemporary society has brought a considerable number of changes in economic, social, political and philosophical relations. Those changes are encouraged mainly by the diffusion of the Internet (Pinho 2011). In recent years, it is possible to observe a radical change in the organization of the way in which information is produced. Then, it is possible to observe two consequences on the economies of different groups of countries. On one hand, the developed societies advance to an economy based on information, with an emphasis on financial services, software development, science and culture, but on the other hand, the low costs of information and communication technologies enable much of the world population to access these means (Benkler 2006). This leads to the development of a new communication interconnected virtual environment, where there is the emergence of a new model of socialization, production and trade, which is radically different from the industrial model (Benkler 2006).

This paper aims at to portraying how the changes brought by the diffusion of Information Technologies (ICTs) are related to democracies. We try to understand whether the use of ICTs provides further democratization, and if the population is able to absorb the information available on the network. Therefore, the relationship between two very different though complementary themes is brought to debate: Democracy and the Internet. Democracy is a concept originated in classical Greece around the fifth century BC. The scope of the concept of Democracy is quite broad, complex and contradictory. According to Bobbio (1998), the theory of Democracy converges in three major traditions of political thought: the classical or Aristotelian theory, the medieval theory, with Roman origin, and the modern theory, born in the Modern State.

However, the Internet is a recent issue, and has started being spread out in the late twentieth century, reaching a greater range at the beginning of the XXI century. In Brazil, for example, the Internet has left the scope of the universities, and became available commercially in 1995. Thus, studies on ICTs' use and its societal implications are fairly recent. Cunha (2008) highlights the growing space that the internet theme is gaining in academia, and draws attention to the emergence of a scientific area facing the field of Information Systems, with research groups and academic seminars focused on the research theme. It's worth noting that many issues can be related to the use of ICT, allowing different possibilities for scientific research. It is possible to study, for example, the impact of ICT use in the environment, in banking, or even, investigate the possibilities of including traditionally excluded groups by means of ICT.

The establishment of ICTs use to democracy occurred naturally, as, historically, democracy has always been on a search process for reinvention, and, in fact, it seems to have been reinvented more than once, in different places (Kostakis 2011). However, ICT use has opened a wide range of possibilities for democratic action, as it brought up different forms of interaction between government and society. This variety of uses and interactions provided by ICTs brought out a different conceptualization regarding the relationship with democracy. Several authors, from different schools of thought, adopt different terminology to refer to practices related to this issue (Kostakis 2011; Cunha 2008; Benkler 2006). In the literature on ICT use in democracy we find different terminologies, such as, *e-democracy*, *virtual democracy*, *e-governance*, *e-government*, among others. However, it is not the objective of this paper to explore the differences in the use of these terminologies, but to reflect how democratic experiences, using ICTs, contribute to the deepening of democracy.

In Brazil, the democratization process involved a deepening of democracy, with the inclusion of institutional mechanisms that provided increasing civil society participation (Teixeira 2002). The 88 Constitution, also known as the "Citizen Constitution", is a project that emerged from the struggle against the military regime. It inserted new institutional forms of participation, which included the implementation of institutional requirements in order to continue the political decentralization process, and it also involved the creation of collegiate institutions to collaborate with the formulation, execution and monitoring of public policies. The return to democracy in Brazil was marked by beliefs that relate democracy strengthening to the consolidation of traditional participation (as voting, elections and parties), but also to the expansion of new participatory channels. And these channels should allow citizens to strengthen corporate bonds and intervene in the formulation and control of collective decisions (Faria 2010).

Simultaneously with the implementation of the changes brought by the new Constitution, there was the widespread use of internet in different areas. Public administration experiences that articulate the use of ICT to develop new democratic practices have been multiplied over the years, so that, currently, most municipalities have their municipal institutional sites, where they publish public information. As a federal experience, there is the Transparency Website, which provides network information on a series of public expenditures, such as expenditures and resources transferred by the Federal Government. Institutionally, several policies have been implemented to make public information available on the network, such as the Law on Information Access (12 527, 18/11/2011).

This paper aims, therefore, at analyzing the potentialities on the use of Information Technology in the redefinition of democratic practices. Therefore, it is intended, firstly, to submit a brief literature review on the different traditions of political thought about democracy, with a reflection on the possibility of redefinition of democratic practices, in order to achieve a cultural pluralization, and to promote the recognition of new identities. It is also intended to present how literature discusses the use of ICT in democracy. In this regard, we present a case study analysis of the I Virtual Conference on Transparency and Social Control, using the Democracy Cube Model, proposed by Fung (2006), which considers democratic practices in three different dimensions: who the participants of the practice are, how communication and decision-making are structured, and how the discussions can promote public policies.

## **2. Democracy and its different political traditions**

We initiate the literature review presenting a brief historicization of the concept of democracy. The historicization of the term is intended to clarify its evolution, from the perspective of theoretical currents, and

how it reflects the theoretical debate nowadays. For Cohen and Arato (1992), the historicization of a concept can help deepen the understanding of the relevant conceptual models in use today.

Bobbio's Dictionary of Politics (1998) distinguishes three major political thought traditions in the theory of democracy: the classical or Aristotelian theory, the medieval theory of Roman origin, and the modern theory, born with the Modern State. In classical theory, democracy is defined as government of the people, of all citizens, distinguishing, thus, the monarchy, government of one person, and aristocracy, government of few people. This line of thought has been the basis of Western thought, and has received contributions and theoretical sophistication over time. The second theoretical current highlighted by Bobbio (1998) is the medieval theory, whose main dimension is popular sovereignty, where power derives from the people and becomes representative. This current establishes the notion that people only transfer temporarily the exercise of power to a ruler, but this power is revocable. So, the ownership of power remains with the people.

The third theoretical tradition highlighted by Bobbio (1998), the modern republican tradition, begins with the thought of Machiavelli, who founded the concept of republic as the opposite of principality. In this current the power would not be concentrated in the hands of a single person, but distributed by various collegiate institutions. This reinforces an image of modern democracy as a *polycentric* regime, versus the tyrannical regime, approaching the idea of polyarchies theory developed by Robert Dahl (1997). It is noteworthy that, although, there are conceptual distinctions between Democracy and Republic, during the development of modern theories, they appear as overlapping concepts. While it is possible to speak of an aristocratic republic, in literature, the principle of republic is almost always the classic principle of democracy.

The modern tradition adds a number of theories of opposing doctrines with regard to fundamental values, as liberal and socialist doctrines. Held (1996), in his book, Models of Democracy, presents four classic models – Classic Democracy, Republicanism, Liberalism, and Direct Democracy – which some aspects are similar to the first and the second theoretical traditions described by Bobbio (1998). Nevertheless, Held (1996) also presents five contemporary models: Competitive Elitist, Pluralism, Legal, Participatory and Deliberative Democracy.

It is worth noting that the model presents a general summary of a tradition, which means that it is not an attempt to represent accurately the particular positions and the many important differences among the political theorists examined. In Table 1 a summary is presented of the Models from the twentieth century, based on Held (2006).

**Table 1:** Models of democracy from the twentieth century

MODELS	PRINCIPLE(S) OF JUSTIFICATION
COMPETITIVE ELITIST DEMOCRACY	Method for the selection of a skilled and imaginative political elite capable of making necessary legislative and administrative decisions.
PLURALISM	Secures government by minorities and, hence, political liberty. Crucial obstacle to the development of excessively powerful factions and an unresponsive state.
LEGAL DEMOCRACY	The majority principle is an effective and desirable way of protecting individual from arbitrary government and of maintaining liberty. However, for political life, like economic life, to be a matter of individual freedom and initiative, majority rule must be circumscribed by the rule of law. Only under these conditions can the majority principle function wisely and justly.
PARTICIPATORY DEMOCRACY	An equal right to liberty and self-development can only be achieved in a 'participatory society', a society which fosters a sense of political efficacy, nurtures a concern for collective problems and contributes to the formation of a knowledgeable citizenry capable of taking a sustained interest in the governing process.
DELIBERATIVE DEMOCRACY	The terms and conditions of political association proceed through the free and reasoned assent of its citizens. The 'mutual justifiability' of political decisions is the legitimate basis for seeking solutions to collective problems.

### 3. Virtual democracy

The concept of virtual democracy also involves authors from different theoretical traditions, so from different models of democracy. Van Dijk (2000) uses six ideals types, five of them from Held's models, "as an explanatory basis for views which actually can be observed in the design and use of ICT in politics" (p. 8). The author uses two dimensions to typify the differences between the models: the first, involves what should be

the goals and the means of democracy, if opinion formation or decision making; and the second, if the goals should be reached by the ways of representative or direct democracy. So, he describes how the use of ICT is designed and used in each of the models. The models are: Legalist democracy, Competitive democracy, Plebiscitary democracy, Pluralist democracy, Participatory democracy and Libertarian democracy.

According to Van Dijk (2000) following the Legalist model ICT is used and designed to maintain the political system using more effective and efficient manners to process and organize information. The applications of ICT involves computerized information campaigns, civic centers and information centers, mass public information systems registration systems for the government and computer-assisted citizen enquires. In the Competitive model, ICT is used in election and information campaigns aiming at targeting a selective audience of potential voters. In this model ICT is always used focusing in maintaining voters. In Plebiscitary democracy ICt is used to amplify the voice of the citizen. The application of ICT involves registration systems of the votes and opinions of citizens. In Pluralist model the applications are used to reinforce information and communication in civil society organizations, or between them. So, it makes use of e-mail, discussion list, teleconferencing and decision support systems. In Participatory democracy the ICTs applications should inform and activate the citizenry. In this model the applications are developed to facilitate opinion formation, learning and active participation. According to Van Dijk (2000) Libertarian democracy "appeared as a dominant model among the pioneers of the Internet community" (Van Dijk 2000: 14). In this model citizens have to be well informed by "advanced, free and unprejudiced information systems" (Van Dijk 2000: 14), they must be able to discuss in teleconversation systems, and they must be able to expose their opinion and vote.

It is important to reflect about the different models of democracy when conceptualizing virtual democracy. To Rothberg (2008) the term distinction and definition is related to democracy concept, and how the conception adopted will address to citizen participation. The author also presents an opposition between democracy models. In models of deliberative and participatory democracy, it is believed that citizens should have access to comprehensive information about the policies developed to different society sectors. It is expected that citizens can form reflected opinions. This belief is opposed to procedural models and competitive democracy. In these models, first, with regard to the procedural model, democracy is reduced to a minimum set of procedures, such as free elections, the right to vote, and freedom of expression, without requiring the citizen to seek for more information. While the competitive model focuses on the centrality of democratic procedures and its notion of the democratic nature of a political system is based on the voting and the change processes in elected positions.

The distinction we want to establish here refers to the fact that, in competitive and procedural democracy models, it is not necessary engagement with public life, or citizen political engagement, since the performance of democracy depends on the rulers and not the behavior of citizens. In the other hand, in participatory democracy, citizens need information to understand the demands and evaluate the legitimacy of their expectations comparing to the needs of others. As well, in the deliberative democracy model, citizens should seek for the information needed to understand a subject in particular, to influence in the decision making (Rothberg 2008). Therefore, the ideological approach of this paper is closer to the deliberative and participatory democracy models. Consequently, the framework used enables the analysis of the quality of citizen participation and the quality of decision taken.

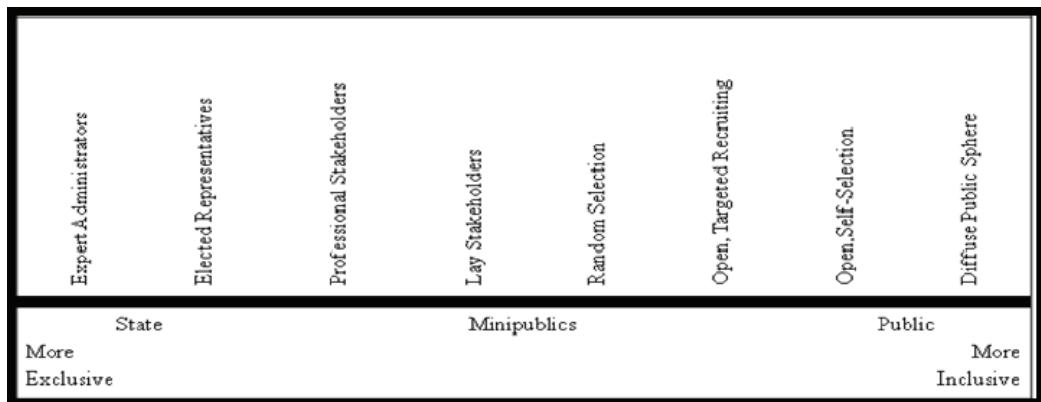
#### **4. The democracy cube**

In this section we present the analysis model developed by Fung (2006), the Democracy Cube, which describes a range of institutional possibilities for political participation from three dimensions: 1. Who participates, 2. How participants communicate and make decisions, and 3. What is the connection of the findings and opinions with the public policy or public action.

For the author, the complexity of modern states, regarding participation, is explained by three factors: firstly, there are no forms of direct participation in the democratic governance of modern societies. Secondly, public participation has advanced in multiple purposes and values in contemporary governance. Finally, the mechanisms of direct participation would not be an alternative to the representation system, but rather a way to complement them. Public participation should be strengthened by working in synergy with the representation and public administration, in order to produce more desirable practices, and collective

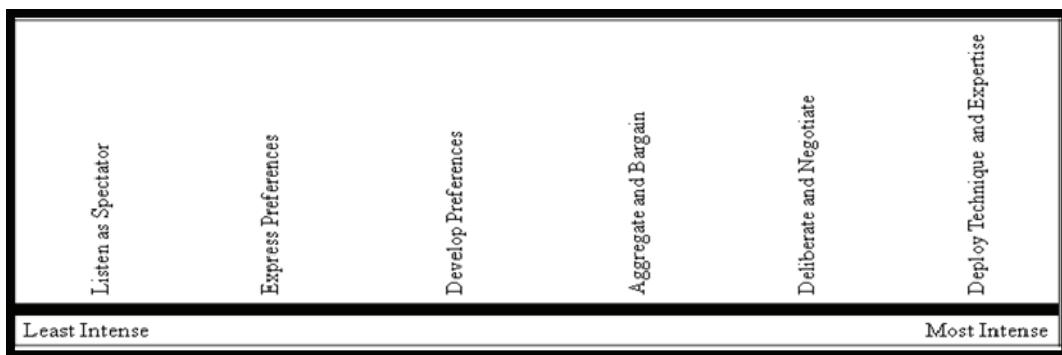
decision-making. So, the proposed model analysis describes an institutional design space that maps arenas of decision-making in three dimensions.

In the first dimension, who participates, the focus is to analyze how the selection of participants occurs in the participation experience. It is important to know whether participants are representative of the population, or the public in general. Or even, if these people have sufficient information and expertise to make consistent judgments and take good decisions. Therefore, it is important in this dimension to analyze who is eligible to participate and how individuals can become participants. For the analysis of public participation initiatives, Fung (2006) describes eight mechanisms of selection of participants, forming a spectrum ranging from a more inclusive mechanism, composed by all audiences, to a less inclusive mechanism, composed by the State Technical as shown in Figure 1, below:



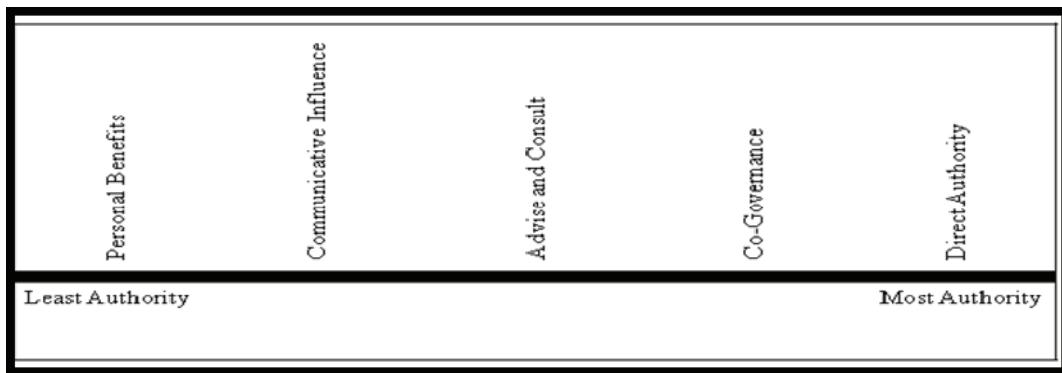
**Figure 1:** Participant selection methods (Fung 2006: 68)

The second dimension of the cube refers to the way the communication and the decision making occurs in a collective way. This dimension analyzes how participants interact in a discussion or decision space. Fung (2006) defines then, six modes of communication and decision making, ranging from the citizen role as a mere listener, in a public hearing, until the whole decision-making by public officials. The six modes of communication (the first three) and decision (the other three) stand in a scale ranging from lower intensity to higher intensity. The intensity indicates the level of investment, knowledge and commitment required of participants. The categories presented by Fung (2006) are described in Figure 2, below:



**Figure 2:** Modes of communication and decision (Fung 2006: 69)

The third dimension of the cube, extent of authority and power, analyzes the impact of public participation in the Government action. Five categories are presented to explain how participation influences the public officials' decision making. The categories vary according to the degree of authority conferred to the decision taken by the citizen. On one side of the scale, in the first three mechanisms, participants have less authority and power in decision making. In the other end of the scale, in the last two mechanisms, participants have more authority and power in decision making. The five categories are described in Figure 3, below:



**Figure 3:** Extent of authority and power (Fung 2006: 70)

Integrating the three dimensions proposed by Fung (2006), it is possible to analyze different practices of democratic participation. We present a case study of the I Conference on Transparency and Social Control, specifically concerning the virtual mode. A case study is a research strategy which focuses the dynamics presents within single settings (Yin 1984).

National conferences are organized forums, resulting from other conferences concerning the local, municipal, regional, state and even virtual levels. It is a process in which society is invited to develop guidelines for public policy development in the country in several thematic areas.

The Conference on Transparency and Social Control (known in Brazil as *Consocial*) has emerged as an initiative from the First National Seminar on Social Control participants, which was promoted by Union General Controllership (CGU), in 2009. As a result of this seminar, participants requested the convening of a national conference on transparency and social control. In December of the following year, the President convened the First National Conference on Transparency and Social Control (CGU 2011). During the year of 2012 CGU sponsored and organized the conference, including all the stages, along the country.

The Virtual *Consocial* is one of the existing modes in the process of this major conference. The other existing modes of the *Consocial* are: municipal, territorial, state, thematic and free conferences. All the existing modes precede the national Conference, and those minor conferences work as a preparation field for the national conference, with the election of representative delegates, and the voting of proposals on the theme. In Brazil there have been other conferences processes to discuss public policies to several areas, such as health, education, social action, among others. However this is the first virtual conference performed.

The virtual conference took place from March 19 to April 8, 2012, in the website [www.edemocracia.camara.gov.br](http://www.edemocracia.camara.gov.br), and was attended by 2,960 people across the country, including Brazilians living abroad. The participants contributed to the formulation and prioritization of 150 proposals, sectioned in four Sub Topics. From the observation of the functioning of this experience, we intend to analyze the three axes proposed by Fung (2006) on the Democracy Cube Model.

## **5. Analyzing virtual *Consocial***

The Conference was divided into four sub topics, approaching different aspects of the theme, as: 1. Transparency promotion and public access to information and public data; 2. Mechanisms of social control, engagement and empowerment of society, in order to control public management; 3. The role of public policy councils as instances of control; 4. Guidelines for the prevention and combating corruption.

In all stages of the conference, participants used a Base-Text, containing the presentation of relevant concepts in each Sub Topic. This presentation involved a contextualization on the topic, and the indication of the applicable law. Each sub topic part ended with questionings about possible actions to be implemented in each field. So participants were invited to elaborate proposals to the sub topic they participated in the discussions during the conference. In the end of each conference, there was the prioritization of a specific number of proposals.

The virtual conference was divided into three stages: the first stage focused on proposals elaboration, the second focused on the choice of proposals, and the third focused on the conference evaluation. In the first stage, initially, there were some discussion forums containing studies and legislation about the axes of the conference. The discussion forums relied on a mediator to lead discussions on the subject, and guide the proposal elaboration. In the second stage, the focus was the prioritization of proposals, so participants could allocate up to 20 points for the proposals they considered most important in the four themes. The third stage focused on the results systematization, the presentation of prioritized proposals, and the evaluation of the conference.

Analyzing the first dimension in the Democracy Cube, which is who participates; at a first sight we could say that the selection of participants in Virtual Consocial is the *Diffuse Public Sphere*, because participation is open to everyone. This is the least restrictive mechanism, because it includes all people. But, by analyzing it more carefully, we can conclude that the participant selection was *Open Self Selected*, because, even though participation was opened, only people that, somehow, are involved with the theme participate. Part of the population does not get involved in this process. And, to begin with, there wasn't a massive campaign to inform the population of the featuring conference.

Observing the participants profile, posted at CGU's website, answered by 205 participants, out of 2,960, the idea of participant selection being *Open Self Selected* is reinforced. 64% of the participants had already participated in other conferences. 37% were attending post-graduate studies, 29% had a college degree, and 24% were attending college. Considering the social reality in Brazil, it is easy to conclude that this is a very specific group, more informed than the majority of the citizens.

The second dimension of the cube, which refers to the way the communication and the decision making occurs, the Virtual Consocial is in the fifth stage, *Deliberate and Negotiate*, out of six, toward a most intense participation. In this stage, people are able to deliberate to discover their needs individually and in groups. So, it is possible to state that in Virtual Consocial the views and preferences of the participants in a collective vision were observed. The tools available in the website supported the negotiation and deliberation.

The most used tool was the forum, organized in accordance with the different sub topics, and mediated by a team hired by CGU. Altogether there were 12 discussion forums, 4 specific forums for proposals elaboration, on the four sub topics. In these four thematic forums mediation team sought to stimulate the participants to systematize their ideas into proposals collaboratively. All ideas presented were converged into proposals, and it is possible to visualize the processes that were registered in the discussion forums. The other forums supported parallel discussions. In these spaces participants performed campaigns around their proposals, raised questions about the selection of guests for the National Stage, requested clarification on general issues, sent criticisms etc. During the first stage of the Virtual Conference, 405 active participants (15% of those enrolled) sent 3,624 messages in the forums. According to the evaluation research, 69% of the participants said that the tool Forum facilitated conversations and the creation of proposals.

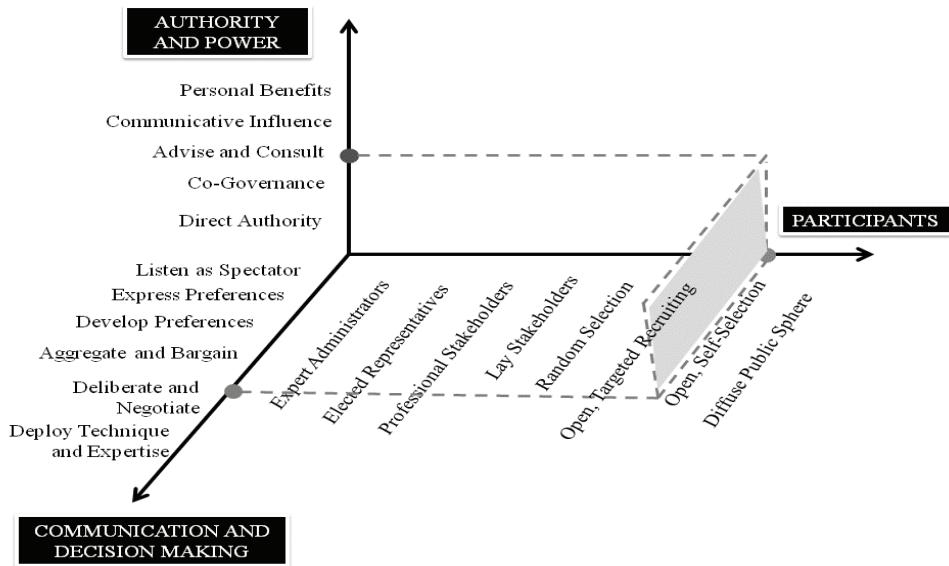
Other tools available were: chat rooms, to engage participants to talk to each other, and to discuss the topics with invited experts; virtual library, with articles and other supporting documents; and the tool for prioritizing proposals, developed especially for the second stage of the Virtual Conference, where participants' points could be distributed among the proposals they considered most relevant. During the conference, there were 9 chats, with around 40 minutes each, and with the participation of approximately 25 people. All the tools available were well evaluated by the participants.

Using these tools, participants elaborated 150 proposals related to the four sub topics. Out of the 150 proposals, 80 were prioritized by participants, 20 for each thematic axis. These proposals were sent to the National Conference, held in Brasilia in May 2012, with the final product being the National Plan on Transparency and Social Control. Therefore, it is possible to say that the virtual conference process involved negotiation and deliberation to achieve the result of 80 proposals.

The third dimension of the cube, extent of authority and power, is more difficult to analyze because its final result is still being discussed by the government. The virtual stage had 29 of its proposals incorporated into the 80 proposals of the National Plan, equivalent to 36%. Although the objective of this conference process is to guide policy making, the National Conference final report mentions the intention of preparing a Law Project

over the theme, which has not been done yet. So, so far, the conference role can be defined as advising and consulting.

Bringing the three dimensions together, we get to the following Figure 4.



**Figure 4:** Virtual Consocial democracy cube

## 6. Conclusion

This paper aimed at discussing: a) how the changes brought by the diffusion of Information Technologies (ICTs) are related to democracies; b) if the use of ICTs can provide further democratization; c) and whether the population is able to understand and make a good use of the information available on the network. The literature reviewed does not show a consensual opinion on the potentialities concerning the use of ICTs to promote more public participation.

Therefore, in order to respond to some of these questionings, we presented an analysis of the I Virtual Conference on Transparency and Social Control in Brazil, using the Democracy Cube Model proposed by Fung (2006). The results of the analysis demonstrate great potentiality of participation promotion and citizen engagement. However, two of the three dimensions analyzed in the Democracy Cube present limits. In the first dimension, we could notice that the selection of participants could include a greater variety of public. The participation is opened to everyone with access to the internet, but the profile of participants indicates a very specific group, that does not match with Brazil's social reality, where the majority of the population does not reach college level. In the second dimension, referred to modes of communication and decision making, it is possible to observe a lot of negotiation and deliberation during the virtual conference, which clearly demonstrates that there is no limitation in this respect.

The third dimension presents the greatest limitation. It is not clear to the population in general what will be done with the result of the entire conference process that involved municipalities and states from all over the country. It is known that, in Brazil, conference processes concerning other issues led to the formulation of public policies, such as the United Public Health System. However, transparency and social control does not seem to be an issue in which public policies can be clearly structured.

In fact, the internet emerges as a good tool for promoting participation. Nonetheless, we believe its potentialities can be better explored. In order to engage citizens to participate, it is necessary to broadly publicize actions as the Virtual Consocial. It is also important to let people know what exactly will be accomplished with the results of the participation processes, so as to keep people motivated.

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# Organisational Possibilities for a Public Administration Community Cloud

Konrad Walser and Olivier Brian

Bern University of Applied Sciences, Switzerland

[konrad.walser@bfh.ch](mailto:konrad.walser@bfh.ch)

[olivier.brian@bfh.ch](mailto:olivier.brian@bfh.ch)

**Abstract:** Starting with the concept of cloud computing, it is interesting to consider the various characteristics, structures and conceptual bases which community clouds may assume in public administration. This article structures organisational variants with different advantages and disadvantages. The variants are as follows: broker model, open community model, consortial cloud organisation, cloud masterprovider, standard-based cloud, non-community cloud, community cloud based on minimum regulations and shared service cloud. The article substantiates, on the basis of balanced arguments, advantages and disadvantages of the different types for public administration. The article also clarifies which types of community cloud are of special interest for public administration.

**Keywords:** community cloud, cloud organisation models, public administration, e-Government

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## 1. Introduction

### 1.1 Presentation of the problem

Swiss e-Government is facing important discussions around the issue of how e-Government solutions should be operated, and what new organisational forms are required by an e-Government that covers all federal levels (Fraefel et al. 2012). Such considerations are generally made by technophiles, and those working in administration find it particularly difficult to make rational decisions based on knowledge. It is therefore essential to have information in this context relating to considerations such as organisational forms of e-Government and IT sourcing. Where possible, these considerations should be made from the perspective of the actual business the administrations undertake. A concept that is currently being widely discussed, and that will be addressed in this context, is that of cloud computing, for which e-Government offers ideal cases for application. In Switzerland, for example, an identity and access management service is currently being operated from the cloud (Englert and Seeger 2011). Initial discussions around cloud computing in the area of administration, however, focus on areas of concern. Risks such as the loss of data sovereignty and provider independence are causing this new IT sourcing concept to be met with scepticism. Despite the various definitions of cloud computing, it is clear that a cloud solution is more than a web service or traditional type of outsourcing. According to the NIST definition (NIST 2011), it must be possible to call up a cloud solution via a network. The cloud solution must also enable resource pooling, be able to adapt flexibly to requirements, be offered as a measurable service and be billed according to usage. The objectives of cloud computing correspond to the current requirements of the business like cost savings, the ability to adapt quickly to the IT needs of the business, ongoing needs-oriented and flexible availability etc. The fact that there is a high level of interest within the IT industry concerning the commercialisation of cloud offerings cannot be completely dismissed. Considerations about the introduction of cloud solutions from an administrative perspective include the following: the IT is not agile enough; it cannot meet the constantly, ever faster changing business requirements on time or in a flexible enough manner. It is not only the risks of this still new technology that must be considered when using cloud computing. There must also be an assessment of the risks, opportunities, costs and benefits. This article contains an analysis from the perspective of cloud use by authorities. The organisational units included in the considerations exist at various federal levels: federal government, states / cantons and municipalities / parishes. The article deals with the following question: how is it possible to operate a cloud service with a community organisation that is based on the authorities' requirements? What are the specific features of a community cloud in the public sector? How and in what form (in terms of different cloud services) can (a) community cloud support public administration? Which reference and organisation models lend themselves to organising and operating a community cloud?

### 1.2 Objective

The community cloud concept is presented in this article. Which explains, in an organisational sense, how different cloud providers (service providers: (SP)) within a community cloud can organise themselves for their

clients (administrative units and also third parties). Central from an organisational perspective is to establish who the "contact person" is within the community cloud for the external service recipient (SR), and the institutional framework that the community cloud must have in order to provide an effective and efficient service to the public administration.

### **1.3 Methodical procedure**

The methodical procedure for compiling the findings from this article is based on a qualitative process for developing possible organisational variants of a community cloud for authorities / public administration.

Expert interviews, based on key words / results, were conducted and some of them were held with the same people several times. Interviews were conducted with the organisation that commissioned the work that underlies this article (IT steering unit at the Federal Department of Finance, Architecture Division) and with organisational and e-Government experts. The interviews for this study are based on a very widely supported cloud strategy for Switzerland which is currently in the consultation process (ISB 2011). This research shows possible organisational measures for implementation that complement (ISB 2011). The intention is to use the results presented here as the starting point for a possible pilot project for a community cloud for the Swiss authorities. From the commissioning entity's perspective and based on a definition of the concept, the method aimed to gather the requirements for creating a community cloud, and then use these to define organisational models for implementing the community cloud for public authorities. Further research investigated the question of how the community organises itself. This was based, among other things, on the results from a research project that looked at sourcing options from Swiss parishes (Csoka 2006), which were partially used as the basis for this development of proprietary community cloud models. Additional considerations were based on Carr's publication which describes how infrastructures can be used to generate and distribute electricity. (Cloud models from other domains: electricity, transport infrastructures etc. (Carr 2008)). The corresponding broker model is based on an idea of a spin-off from the ETH Zurich (cloud force). The aforementioned bases were used to define models that, in interviews with the commissioning entity, were tested and validated in terms of their completeness and usability for public authorities. This showed that the results were valid and reliable. The effective implementation / use of the relevant models for public authorities was also tested. For reasons of space, this will be discussed in a subsequent article.

## **2. Introduction to the subject matter**

### **2.1 Definition of cloud computing**

This article is based on the NIST Cloud definition:

*"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models." (NIST 2011)*

This definition comes closest to the concept of cloud computing and is often cited in literature and in practice. Cloud computing can thus be described as a special form of outsourcing (Motahari-Nezhad et al. 2009). It has specific features and characteristics that each have their own advantages and disadvantages. Only when a service exhibits all of the properties listed in the following table can it be referred to as an integrated cloud offering as per the NIST definition.

**Table 1:** characteristics of cloud computing

Characteristics	Description
On-demand self-service	IT is used as a service and be called up easily without any form of manual interaction.
Broad network access	The service is available via a network, independent from the end device. The connection must be available and high-performing as per the service.
Resource pooling	The required resources are made available by the provider for different clients. This is made possible by technologies such as virtualisation and multi-client capability (multi-tenancy).
Rapid elasticity	The resources required are made spontaneously available as needed and, in the event of non-use, released without any manual intervention.

Characteristics	Description
Measured service	The service used must be commensurable with the resources required. This enables usage-based billing.

## 2.2 Cloud service models

The following section deals with different cloud service models and their respective advantages and disadvantages.

**Table 2:** Advantages and disadvantages of different cloud service models

Type / Brief description	Advantages	Disadvantages
Infrastructure as a Service (IaaS): The client is offered computing, storage and network capacity. Using this infrastructure, the client operates its own platform, software and operating systems.	High scalability of the required systems, as per the need; redundant data storage; physical separation of stored and used data; no maintenance costs for setting up and operating the infrastructure. OPEX instead of CAPEX; Pay-as-you-Go. OPEX stands for Operational Expenditure. This covers expenses for the operational business. CAPEX stands for Capital Expenditure. This covers investment expenditure for longer-term assets.	Location of the data for public and private clouds not always evident; strongly dependent on availability of infrastructure and networks; lack of or deficient demarcation / isolation of data manipulation; possible unauthorised access to data due to incorrect configuration; warranty and liability in the event of breach of confidentiality, security and data integrity.
Platform as a Service (PaaS): Includes a complete platform with development tools. Such solutions are used for proprietary developments or for a special software that runs on the platform. The underlying infrastructure is made available and administered by the provider.	Low administrative expense, as user does not have to provide or implement the necessary infrastructure; development in the team (also geographically distributed). One single platform with minimal costs (standardisation); no maintenance costs for setting up and operating the platform and its tools; no maintenance costs for setting up and operating the platform and its tools; OPEX instead of CAPEX; Pay-as-you-Go	Vendor-lock-in; lack of portability; lack of interoperability; no standardised technologies; lack of flexibility; requirements of proprietary applications or development environments.
Software as a Service (SaaS); complete applications are made available, generally via a web interface. The client has no influence on the platform and the underlying infrastructure.	Separability / multi-client capability of the applications; quickly ready for use / faster project initiation (time to market); no maintenance costs for operating the business functionalities; OPEX instead of CAPEX; Pay-as-you-Go; lower total costs (TCO); mobility / location independence.	Selection of the right provider; lack of portability; lower ease of integration into existing application landscapes; fewer adaptation options, due to inherent standardisation; poss. longer response times; impact of security gaps when using joint SaaS solutions; no use without internet access.

Table 3 gives an overview of service models, together with a brief description of these and an explanation of the advantages and disadvantages of the different models (EuroCloud Swiss 2012).

**Table 3:** Possible organisational models for cloud offerings

Organisational model	Brief description
Private cloud	The solution user is explicitly an organisation or an organisational unit. A private cloud can be operated both internally and by an external provider. The benefits of the private cloud approach can only be partially exploited, but it is possible to make extensive customisations.
Community cloud	In contrast to private cloud architecture, the service is used by several groups. These are defined. This service can, however, also be offered by a community i.e. by several solution providers.
Public cloud	The service offered is available to the public and is generally only offered by one provider. The benefits of scalability and resource pooling can be best exploited.
Hybrid cloud	The hybrid cloud offers a combination of the different organisational forms described and their advantages and disadvantages. For example, data can be stored internally in a private cloud, whereas the application is run in a public cloud.

### **2.3 Community cloud approach**

In this section, the theoretical approach for a community cloud is explained in more detail. This special type of cloud brings with it additional problems and questions that need to be addressed. Possible forms for the organisation with their advantages and disadvantages are reviewed. The provision of cloud services within a community depends on the type of service model (IaaS, PaaS, SaaS). A distinction between public clouds and private clouds is made in cloud literature. In between, there are various mixed forms (hybrids) which combine the advantages and disadvantages of public and private clouds. A community cloud requires the following parameters (IDABC. 2004): defined number of SRs or SPs, number must be greater than two; shared vision and strategy; legal basis; harmonised processes and organisation; semantic agreement for collaboration; compatible technology. A central issue for the community cloud is that of the legal body responsible for the governance and management of the cloud solution (Johannsen and Goeken 2011). A legal body may be necessary to enable contracts and service level agreements for the relevant services to be concluded. Transferring the services into a community cloud is a type of outsourcing with special challenges (Johannsen and Goeken 2011). The involvement of several stakeholders with different interests complicates the organisation. There is also a technical dependency between the providers. An SaaS provider is thus dependent on the platform and infrastructure, even though it can obtain these as an isolated service. If the service is provided in geographically different locations, this requires a correspondingly high-performing network connection between the data centres and the SR, to guarantee the availability of the data on the one hand and the desired performance of the service on the other. The advantage of using several providers is a greater availability of the overall system, whereby the individual providers do not have to offer any maximum availability. Each provider contributes towards to the overall high level of availability (Chakravartin 2010). The pooling effect can also be better exploited which may lead to cost savings for the providers. However, there are also difficulties associated with sharing the service between several providers. Duties, competencies and responsibilities must be clearly agreed between the providers, as circumstances may arise where there is no longer an individual contact person (if no institutional cloak is created for the community cloud). To create the community and ensure that it survives, specific rules for collaboration must be defined, together with objectives in and for the community. Policies and principles of governance for the cloud must be defined by all parties involved. Guidelines within the community prevent one service provider from taking over the entire service and obtaining a monopoly. However, if the demands and requirements of the community towards the service providers are too high or not lucrative enough, there will no longer be any providers willing to work with the community. For an organisation, whether it be a company or a public authority, to be able to run a cloud solution successfully, it is essential to define roles with corresponding duties, competencies and responsibilities (governance). An appropriate concept for governance and roles is particularly vital in the cloud environment, where transparency is veiled by the cloud (Retarus 2012). Alongside the SR that uses the services delivered by the SP, two further roles are also described. A broker can assume a mediating role within a community acting as an intermediary between the SR and the SP. A consortium consists of representatives from the SR and the SP. This committee provides a platform for the exchange of information and decisions that have to be made throughout the entire community. In order to shape an organisation successfully, the following is required from all parties involved (Rüter 2010): co-operative behaviour – interest in a long-term business relationship, and the willingness to invest in this beyond the actual terms of the contract; mutual trust – the expectation that the business partner will act with good intent and fulfil the agreed arrangements as far as possible; flexibility – the willingness to adapt the agreed arrangements if circumstances change; open and honest communication – inform the business partner in a proactive, proper and timely manner.

### **2.4 Roles**

Starting from the development of the organisational models for the community cloud presented in the next chapter, the following roles, which helped to structure the models, can be derived. The **SR** receives the service to the desired extent and with the appropriate quality from the SP. In most cases, the SR pays the SP for the service consumed. The SR can also present itself as an SP towards third parties with the related services. The **SP** produces the desired service and can perform them in the market for one or more SRs. How the SP delivers the performance and which service it generates is dependent on its product portfolio and strategy. The SP can also obtain services from third parties in order to perform its own service. For an SP to become involved within a community, there must be an incentive that could also bring it added value. Synonyms for SP are provider and supplier. **Brokers** mediate the provision of services of a specific quality between the SP and the SR. Depending on the characteristics, they are organisational and / or technical mediators. The **consortium** can consist of representatives of the SR and the SP. It can develop and specify necessary standards and guidelines.

## 2.5 Community cloud organisational models

Various models with different operational and organisational structures can be used for organising a community cloud. The design options are described below by means of ideal types including advantages and disadvantages. Depending on the scenario, a combination of organisational forms may also be selected. Successful control, communication and co-ordination between the stakeholders are critical for the correct organisational form. These activities will turn out differently depending on the model used.

Analysis has shown that the characteristics of the IT service providing can be described as follows: "Characteristics of the IT service providing: here it is about analysing whether outsourcing parts of the IT belongs to an existing strategic scenario in an administration. The following can be asked here: is the IT outsourced completely or in parts? Yes or no? An investigation of the institutional form of the service provider to which the IT is outsourced: here it is essentially about clarifying the institutional form i.e. whether the service provider was institutionalised as having internal, overall or external administration and the nature of possible current or future developments" (Walser and Breidung 2010).

ITIL (Bon et al. 2009) distinguishes three different types of service providers. Type I is described as functionally integrated SP, Type II is defined as a shared service center, and Type III means total outsourcing.

Starting from these three different service providers, possible ideal community cloud organisational forms are described in table 4 (Brian 2012). These are ideal solutions that only reveal the relationship between the SP and the SR. A combination of the different organisational forms is possible and partly even necessary.

**Table 4:** Ideal community cloud organisational forms

Type / Description	Advantages	Disadvantages
Broker model: SR obtains services via a central broker who coordinates with the SP. It could also be possible to have several brokers who offer different services.	The broker acts as a central contact point, which simplifies communication (reduction in transaction costs). All coordination is done via the broker. Simple to achieve a market overview through limited number of providers (brokers).	SR dependent on broker. Neutrality of the broker must be ensured. Clarification of broker's liability. Broker as intermediary. Limited number of brokers. Low level of competition within the community.
Open community model: Anyone who complies with the rules defined by the community can get involved. Rules are created by the community and can be influenced by the members.	Different providers can easily become involved in the community. Providers can enhance communities through their key competencies. Solutions are available to the whole community.	Communication / co-ordination complicated by loose organisation. Individual solution users have little influence on the community. Continuity dependent on members. Impact of innovative ideas complicated by community rules. From the members' perspective, the community may develop an unfamiliar momentum of its own. Legal form of the community not clarified.
Consortial cloud organisation: Consortium of providers / users makes a community cloud available. Synergies (e.g. redundant data centres) can be exploited. Services provided by the consortium are defined / offered.	Shareholdings in the consortium clearly defined. Wider support possible through involvement of different parties. Communication / co-ordination. Occurs within the consortium.	Decisions and advances must be made via the consortium or within the context of the rules agreed in the community. Disadvantageous for providers who do not belong to the consortium. Possible price fixing within the consortium. Parties involved represent wishes of their organisation, not very objective.
Cloud master provider: Consists of a main provider supported by other providers (sub-contractors); wide support / consideration of other providers. In contrast with brokers, the main provider can itself contribute certain functionalities to the service.	Clear contact person for communication / co-ordination / control. Main provider can pass on risk to sub-contractor. Additional offerings through sub-contractors that the main provider cannot provide.	Strong dependence on the main provider. Clarification of liability of main provider for sub-contractors. Main provider has an effective monopoly and can strongly influence the sub-contractors.

Type / Description	Advantages	Disadvantages
Cloud with standards and guidelines: SRs form a consortium that defines standards, guidelines and requirements for the community cloud. Providers must comply with the guidelines. Regulation by awarding lots. Regulation must be clear and easy to implement for commerce. Congruent products are offered due to clear norms and standards.	SR can freely select from the offering. Service provided is comparable. SP can decide how to structure service. Service delivery measured and compensated. Direct control and communication SR with SP.	Communication and co-ordination occur redundantly via relevant SP. Standards for SP complicated to define and can only be monitored with great effort.
Standard-based cloud: Authorities define standards. Providers are entitled, if they comply with standards, to play a part and sell services. Analogy with grid computing.	Simple selection of SP by certificates or labels. Potential for computing power in the community. Open structure enables participation of many providers. No dependence on one provider.	No actual organisational form possible. Rather anarchistic organisation. Time-consuming to ensure traceability.
Non-community cloud: Cloud for authorities offered by individual providers. If cloud is used, provider must be preferred.	Defined contact person available for all issues. Contact person available in event of problems. Changes do not have to be made via the community. Central competencies: know-how can be gathered with provider. Internal process providers can be quickly and efficiently compiled.	Monopoly; substitute offering not possible. Pricing, innovation and market regulation completely in power of providers. Pooling effects; only limited exploitation of characteristic pooling effect. Too-big-to-fail problem: provider must be carried by the authority. Bankruptcy / failure to provide service with major consequences for authorities not acceptable. Vendor-lock-in: high dependency of providers. Deployed technology can be determined by provider. Change to another provider complicated and requires major effort.
Minimal regulation: Higher position prescribes minimal regulation standards that must be followed. May include selection procedure or categorisation of data. Each SR decides within minimal regulations how and where it deploys the cloud.	Fast adaptation of offerings to market. Slight restriction in autonomy of SR. Clear principles and guidelines.	Few synergy uses in cloud. Selection procedure and market analyses performed by all SRs themselves / redundantly. SR critical mass not achieved, act as small buyers in market.
Shared service centre: SR simultaneously acts as SP in the market or organisation. Shared services offered obtainable by several SRs. Core competence of the organisational unit can be made available to others.	Organisational units concentrate on core competencies. Clear responsibility of the SP. Direct billing for services between organisational units. Existing competencies are retained.	Role separation between SP and SR in the organisational unit. Role conflict within the organisational unit. Difficult to ensure an overview of offerings across different organisational units.

The different approaches shown in table 4 are assessed in view of their usability in public administration in the following chapter.

### **3. Cloud computing in Swiss public administration**

As part of qualitative research, the sourcing approaches of four Swiss cantons of different sizes and two Swiss cities (one large and one medium sized), were examined. It turned out that none of the cantons and neither of the cities use or have a community cloud. However, the degree of virtualization (private cloud) with differences is quite high, and tends to increase with the size of the IT department and the degree of virtualization. The majority of the cantons and cities which were investigated do not develop services themselves, assigning development to external companies. Most of the cantons and cities operate IT themselves. In one case, every request for a new service or application is checked, to ascertain whether it can be assigned externally or internally regarding development or operation. The construction or consolidation of their own data centers seems to be an issue. In one case, an external data center has been rented. In another case, one public administration rented out its own data center infrastructure for financial services. In a broader sense, the maturity of ICT ser-

vice providers is too low for community clouds to have been realized until now. Generally cloud offerings are not considered systematically, but rather case by case. Based on one interview with a big city, the following reasons were mentioned for not taking outsourcing into account: the security argument, partly from ignorance, as well as data ownership, which is not the case with some providers.

#### **4. Summary and outlook**

The appropriateness of the selected community cloud organisational models in terms of their practicability for public administration is summarised: *Broker model*: this leads to lack of market transparency from SR perspective. *Broker model*: this leads to lack of market transparency from SR perspective. The SPs have no direct client contact. There is a danger that, due to non-transparent prices, the broker model will not lead to success. However, it does lead to a reduction in transaction costs for the SPs and SRs (depending on the number of SPs / SRs). *Open community model*: a disordered or uncontrolled organisation dominates. There is no pattern for order. The SPs organise themselves. Problems arise from the question of contact persons and clear governance from the SR's perspective. If need be, this model can be extended through a consortium. *Consortial community cloud*: the consortium ensures that all parties / stakeholders are represented. At most there is the danger that larger providers are disproportionately represented or have the decisive power. Smaller, less powerful providers may be excluded. However, the SPs and SRs can be well controlled due to the involvement of all involved parties. *Cloud master provider*: there is a monopoly with lock-in danger for the SR. However, there is better clarity with regard to the offering; sub-contractors may face pricing pressure through the cloud master. *Cloud with standards and guidelines*: this solution is linked to the SP. Quality pressure is exerted on the SP in this model. The SP is also required to set guidelines. Guidelines may be: cloud strategies, cloud policies, cloud standards etc. A lot has already been done in this area in Switzerland (EuroCloud Swiss 2012) (Fischer 2012) (ISB 2011) and the USA (Kundra 2011). *Standard based cloud*: this model is linked to the SR. This model gives rise to transparency of quality and performance. *Non-community cloud*: this organisational model gives rise to a kind of pseudo-monopoly and a problematic lock-in effect. The model creates an open market, but there is the danger that pricing models are not transparent (non-comparability of the offerings) and that the actual services delivered by the SP are obscured. However, it should result in a very clear service catalogue. It is also very difficult to exert control over the location where the data is stored (state interests, data protection etc.). The *minimal regulation organisational model* is a liberal type of model. Protecting state interests (data within the state) is (depending on the provider) rather difficult. The question is how effective relevant rules are and what role standards can play. *Shared service cloud*: the SPs act as owners. This may mean a reduction in the number of SRs involved in a community cloud (small SPs are sidelined, large SPs have supremacy). From an administrative perspective, the broker model (reduced transaction costs), consortial community cloud model (good pooling of offerings, clear governance, ideally suited for strong, federally organised, decentralised administrative organisations) and cloud master provider model (coherent offering, but with the issues of monopoly / lock-in / possibly difficult governance) are of particular interest for the reasons stated in brackets. Due to the federal structures, the cloud master provider model is only a realistic option if it involves an independent provider that doesn't already work for the administration. This raises the question of whether there are suitable providers and if possible sub-contractors would participate. From a governance perspective for the SP, models with clear contact persons from the SR are certainly an advantage.

The following can be concluded: the benefits promised by cloud computing meet the current IT requirements of business and also public administration as shown by a short survey. However, IT has yet to reach a state of maturity where it can fully exploit the promised benefits of the cloud. The expectations of IT are to save costs, be more efficient and simultaneously react more flexibly to constantly changing requirements. In view of the maturity level of the SR in the administrative environment in the areas of IT, business IT alignment and supplier management, these partly conflicting objectives are almost incompatible with the SR's current IT landscape. It will therefore be difficult to deploy cloud computing, regardless of the new community cloud solutions.

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# **IT Project Governance - why IT Projects in Public Administration Fail and What can be Done About it**

**Konrad Walser**

**Bern University of Applied Sciences, e-Government-Institute, Bern, Switzerland**

[konrad.walser@bfh.ch](mailto:konrad.walser@bfh.ch)

**Abstract:** Based on literature review, this article investigates the reasons why IT projects in public administration fail in terms of IT governance. COBIT control objectives and management guidelines provide indicators for possible improvements. This then suggests a separate project governance model based on checks and balances between the following stakeholders: administrative management, project-initiating centre, finance department and project management. On this basis, a large IT project initiated by the Swiss federal administration, that has since been stopped, is analysed with regard to the interactions presented in the model. In summary, the project governance model is useful when evaluating projects, for example with regard to checks and balances from an administration management point of view.

**Keywords:** IT governance, project governance, project governance model, checks and balances, tasks, skills and responsibility

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## **1. Introduction**

### **1.1 Presentation of the problem**

The size and complexity of IT projects in public administration (PA) are increasing due to e-Government and networking. This increases the risks associated with the projects. E-Government and large projects in the field of administration bring, seen from a management / governance perspective, changes on the business and IT side for the project and IT management of the PA. From a risk management perspective, it must be assumed that information technology (IT) projects could fail (cf. for reasons e.g. (Alfaadel et al. 2012), (Bronte-Stewart 2005), (Evangelidis 2002), (Graeme and Fernandez 2008), (Heeks 2003), (Mertens 2008), (OECD 2001), (Van der Westhuizen and Fitzgerald 2005), (Young 2003)). The following research questions are relevant for this article: Why do IT projects in PA fail? What is responsible for the failure of IT projects in public administration? What can be done to prevent the failure of IT projects in public administration from a governance perspective?

### **1.2 Aims and objectives of the article**

The article initially deals with creating a governance model for projects from a PA perspective, as a central sub-area of corporate and IT governance (ITG). The article also explores governance tasks and mechanisms, as well as checks and balances (CaB) between the corporate functions of management, finance, the department that commissioned the project and the project manager. Furthermore, the model will be verified on the basis of a large project that was stopped in the Swiss federal administration. The core of the article deals with achieving a systematic improvement in (IT) project governance in PA, which is currently often poor, and systematically reducing (IT project) risks in PA.

## **2. Assertions on the issue in literature and IT governance frameworks**

### **2.1 Conclusions from literature**

Starting from Weber (1988), who lived and worked in the first half of the twentieth century, and his bureaucracy model, Jain (2007) investigates, in terms of the characteristics it defines, the reasons for the failure of e-Government projects that arise from the bureaucracy model developed by Weber (1988). The following conclusions can be drawn from the article from Jain (2007): „IT can be used to override and reform features of Weberian bureaucracy such as hierarchy, division of labor and rigidity of rules; according to the other theme, these very features have the potential to render E-Government projects unsuccessful.“ Administration consists of organisations with a strongly hierarchical structure: it is dominated by functional and responsibility-oriented silos which are built on the legally defined duties of administrative units. This makes it difficult to implement organisation-wide solutions. The rules for acting and behaving are rigid. This means that, in terms of IT project management and from a governance perspective, the behaviour of people in the project environment is more weighted toward conformance than performance. As Jain (2007) states it: „There is no doubt that E-Government is here to stay and is the way of the future. Also, there is no doubt that E-Government impacts

bureaucracy in various ways [...]. However, there is also a danger that organizations could be tempted to adopt the ‘idolized’ approach to the use of ICTs [...] to achieve organizational transformation. This approach sees ICTs as providing simple answers to what are complex organizational and cultural issues”. Jain (2007) adds further: “The findings [...] suggest that the issue of how E-Government and bureaucracy impact each other in reciprocal ways is quite complex. The current status of research into this issue does not offer adequate clarity into the underlying processes at work or the likely outcomes to be expected. Future research efforts are thus required to get a better understanding of these issues.” In terms of the failure of projects in PA, the following assertions from (Mertens 2008) can be cited: politicians like to profile themselves they like to be quoted in press when there are setbacks in IT projects; deadline pressure created by budget plans, -laws that are often more oriented around calendar years and legislative periods; assessment criteria and restrictions in IT projects in PA are more diverse than in private sector; executives/specialists working in IT in PA are paid below average; performance-related element of compensation comparatively low; proportion of those with law degrees among employees is high, as is their influence; danger that tenders and contracts are over-specified from a legal perspective; attempt to transfer risk from public contracting authority to private contractor receives too much weight; data protection plays major role which can lead to sub-optimal economic and IT solutions.

## **2.2 COBIT and its statements on IT project governance**

COBIT 4.1 operates the ‘Manage Projects’ process as PO10 (ITGI 2007). COBIT stands for Control objectives for information and related technology. The control objectives of this process are not listed here but presented in Figure 1 because of space reasons. Additionally it can be deduced from the RACI chart (RACI stands for responsible, accountable, consulted, informed) per COBIT 4.1 (ITGI 2007) for PO10 that CEOs (chief executive officer) and CFOs (chief financial officer) (administrative management board (AM) with IT representation/CIO (chief information officer) and finance) have to assume responsibility for the projects. As the CIO sits in the AM, the AM can influence programme and project management. The Business Executive is the responsible person from the contracting authority. Depending on the different distribution of power scenarios, there are more or less decentralised or autonomous administrative units in the area of IT management in PA. Centralised administrative units with little autonomy are easier to manage and require other types of business IT alignment mechanisms than heterogeneous, decentralised and autonomous administrative units. Management and audit functions must influence compliance with centrally prescribed standards, policies and guidelines. The Standard ISO/IEC 38500 talks in this context about direct, monitor and evaluate activities. This article explicitly deals with the overriding governance and not the actual execution of the projects.

## **3. Development of an (IT) project governance framework**

### **3.1 Possible measures for rectifying problems**

The following measures can be initiated to get a better handle on (IT) project governance in PA. The presence of a CIO on the administrative management board (Ward and Mitchell 2004) is imperative, and the separation of power in projects is of central significance. Having the CIO as a member of the management board ensures that IT is represented at management level. As such, IT management and project governance receive more weight. If there is no CIO, non-delegable responsibility for IT must be transferred to another member of the management board. Administrative information management as a key competence of PA is to be understood as the comprehensive, (non) electronic management of information for operating the administrative business. It includes ITG, IT (service) management, IT strategy and enterprise architecture management. IT Projects should be seen as undertakings derived from the IT strategy and enterprise architecture. Projects should have a clearly defined/described remit. A business case must be created for all of them. In light of future challenges in administration, responsibilities for IT are under consideration. The role of the CIO as the AM member responsible for information management ensures that the issue of IT is incorporated into the executive decision-making process. The administrative business side has clear responsibility for IT. To date this has seldom worked. The separation of powers in the area of project management is key to ensuring that duties, competencies and responsibilities (DCR) in PA are regularly defined and allocated. It must be ensured that the allocation of DCR is done in such a way that it creates a system of CaB. This reduces the likelihood of IT projects failing. In the sense of power separation between the management board, finance department, project management and the commissioner of the project, a decision square is established for which CaB models are created. Depending on the project size, these ensure either that projects do not fail or, if necessary, can be stopped at an early stage. This pattern of CaB, ultimately providing better project governance, will later be addressed in more detail.

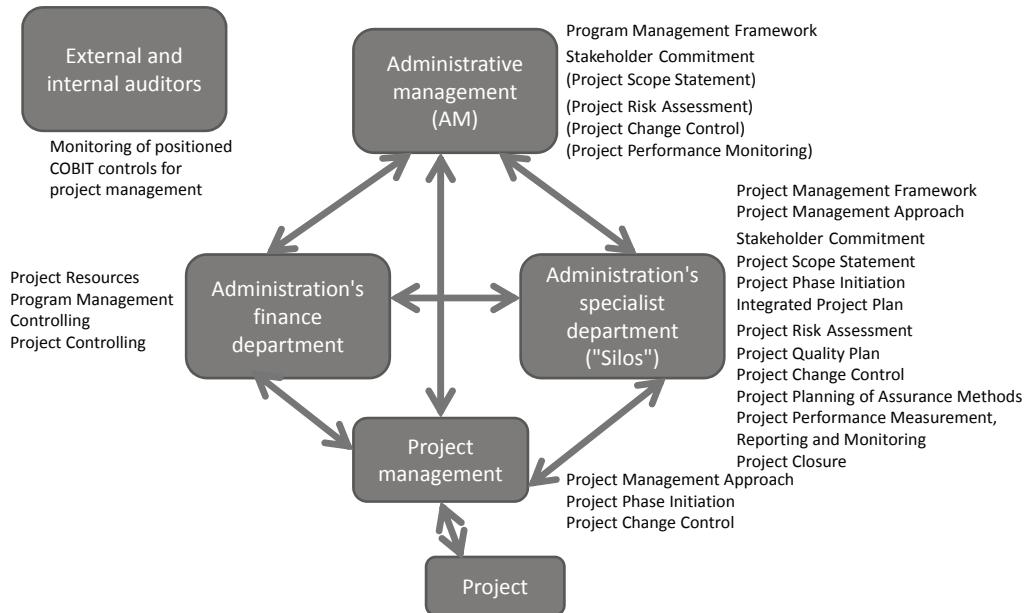
### **3.2 Separation of management and governance duties**

From a project management perspective, two fields of activity, which must be systematically separated, should be discussed. In line with the new development of COBIT 5.0 (ISACA 2012), this is to be done where governance and management duties are systematically separated. It is fundamentally possible to distinguish between various points of view (different role bearers) in a project management context, which can be incorporated into the project and project management. Initially, an external view from outside the administration should be identified, e.g., by different stakeholders. These can include external auditors who carry out external reviews on behalf of relevant stakeholders and inform them of their findings. Furthermore, a differentiation is needed between the external view from outside the project and that from within the administration itself. This latter includes internal auditors, management, finance, and specialist departments that commission projects. The internal project view includes the parties directly involved in the project i.e., service recipients, service providers, the project organisation itself and external contractors who execute the project. These different points of view must be sensibly delimited to derive the separation of the governance duties on the one hand and CaB on the other hand. External contractors who execute parts of the project must also be delimited. In summary, the three points of view should be delimited as follows for projects: project governance from an external view, project governance from an administrative management view, and project governance from a project management point of view in terms of the collaboration between the parties directly involved in the project. This article deals with the interim view between external and internal views.

### **3.3 Model development for the division of power in (IT) projects in public administration**

As mentioned above, four stakeholders and their relationship in connection with (IT) project management will be investigated in more detail, initially in terms of their functions and roles: administrative management, finance, project-initiating department and project management. Management is responsible for awarding the contracts for projects. It is responsible for developing an administrative strategy and the derived IT strategy, programmes and projects. It is responsible for reviewing project applications in terms of their conformity with the administrative strategy, conducting a general review of the resource applications and the final approval of resource allocations. It oversees the handling of the business case and approves its delivery. Furthermore, there is an analysis of the function and role of finance departments with regard to IT projects. The finance department plays a central role in assessing business cases for projects in terms of efficiency and effectiveness gains and is responsible for defining suitable measures for (non-)realisation. At the request of the administrative leadership, it provides resources for the administrative department that made the project application. It is responsible for an on-going financial review of the progress of the project and for reporting this to the administrative board. It notifies management in the event of non-compliance with the financial specifications outlined in the business case. It sanctions the failure to achieve the project objective(s) linked to financial resources as detailed in the business case. If the finance department itself initiates a project, a specialist department must assume the role of counterpart for monitoring the business case. The following analyses the function and roles of specialist departments in (IT) projects. The specialist department has functional responsibility for the project in terms of optimising administrative procedures. It also has functional responsibility for the (initial) creation of a business case for the project. Further to this, it is responsible for clearly defining requirements for the project and communicating on project-related issues with the finance department and the other stakeholders. The specialist department also has responsibility for executing the project within the agreed time, with the agreed quality and using the agreed resources. Project management is responsible for executing the project appropriately and in line with the requirements. However, it is not responsible for creating the business case. There must be a feedback process for clarifying the project requirements and ensuring that they are understood.

Figure 1 presents the relationships between the central stakeholders. The reason why IT is not addressed (but correlated) in the model in Figure 1 is, that projects can have a greater or lesser IT element, but are primarily based on the business. Major responsibilities must be established on the business side. It is therefore not relevant initially that IT is not in the foreground.



**Figure 1:** IT project governance model, relationships to be analysed for administrations, organisational objects and related COBIT controls

#### 4. Case study: Swiss federal tax administration – Insieme

Since 2001, a strategic project at the Swiss Federal Tax Administration (FTA) entitled "Insieme" has had a series of false starts. Insieme stands for: programme for innovations in the areas of IT, process and organisational systems in the Swiss Federal Tax Administration (Dijkgraaf 2007). The aim of the project was to modernise and consolidate the STOLIS and MOLIS tax administration systems of two main departments at the FTA. FTA is a department of the Federal Ministry of Finance (FMF).

##### 4.1 Press reports on project Insieme

The project has since been stopped in September 2012 (Vogt 2012). Reasons of space only allow a brief summary of the press reports. 2012, the agency director of FTA and the head official responsible for procuring IT services were dismissed: the allegations centred on corruption and nepotism ((Aebi 2012), (Balmer 2012), (Blick 2012), (Vogt 2012)). The son of the aforementioned head official is a shareholder/employee of a company that operated body leasing for the project. The prices for the body leasing were excessive. There was significant interlacing of the networks between external companies and internal employees that was difficult to penetrate (Von Burg and Stoll 2012). During the project, procurement legislation was deliberately breached numerous times. A never-ending issue for the finance delegation is the IT systems in the federal administration: the delegation noted that they regularly had to deal with IT projects that created additional costs due to insufficient leadership structures and project organisation (Vogt 2012). Under the title "Leading officials wanted to cover up IT problems", Blick in 2012 used reproduced documents to argue as follows: the tax administration wanted to cover up the failure of project Insieme. This is apparent in the minutes from a meeting that was also attended by two representatives from the general secretariat of the finance minister.

In summary, the press reports suggest a serious lack of management and governance, and possible indications that there were no effective and efficient CaB mechanisms in the system in which Insieme was executed. Governance was not exercised and did not function as there was no appropriate system of CaB.

##### 4.2 Insieme: Evidence from audits

It is astonishing that there is evidence that head officials and (parliamentary) committees from outside the Swiss Federal Tax Administration drew attention to the problematic conditions (finance delegation from the Swiss federal councils (Findel), Swiss Federal Audit Office (cf. if not otherwise stated ((EFK 2010), (EFK 2008), (EFK 2011), (EFK 2012), (Parliamentary Service of the Swiss Confederation 2012)) and criticised a revision of the relevant conditions, but did not achieve any results. Some of the important generic results from the inves-

tigation into the issue of procurement conducted by the finance delegation from the Swiss federal councils are addressed in the following section.

In 2010, a survey had already shown that a significant volume of contracts, particularly in the area of expert contracts, had been awarded by private contract, and that the federal law on public procurement had not been complied with in every case. At the end of 2011, the Federal Assembly submitted the planned measures for improvement to the Findel: the instruments of public procurement should be improved, DRC defined more precisely, and the controlling function expanded. Findel welcomed the measures for improvement, but insisted on the creation of a nationwide solution. An announcement on the parliamentary website (cf. source above) further documents the investigations of the Findel as follows. During an informational visit to the Federal Tax Administration (FTA) and a discussion with representatives from the FMF, the Findel was informed about the status of the Insieme IT project. It noted with concern that new drastic changes had to be made in project management. After three years, the project architecture was reviewed again and the remaining financial conditions could only cover the elementary project objectives. Although the FTA strives to comply with the deadlines and financial conditions, this is at the expense of strongly reduced project and requirement objectives. In particular, the fundamental idea of the project, namely to unite the processes across the entire FTA, is threatened (cf. parliamentary service of the Swiss Confederation 2012). The annual report from the Findel draws the following conclusions about the Insieme project: The project aims to cover a whole range of additional functionalities, and to integrate a variety of further decentralised IT solutions into the new system. Shortly after the start of the project, there were major problems in the collaboration between the appointed external companies that ultimately led to the abandonment and then restart of the project. Even the second attempt at the project encountered significant difficulties, as an EFK audit from 2009 shows (cf. source above). In particular, the EFK considered the project organisation and project management to be inadequate. An informational visit in 2011 showed that, since autumn 2010, the situation had not improved, but instead had actually worsened. Drastic changes were again made to project management. Key decisions, such as the underlying project architecture, were challenged again after the project had been running for three years. The finance delegation was particularly concerned about the fact that the finances which remained could only cover the elementary project objectives. From the finance delegation's perspective, the significant efficiency benefits planned by the FTA – fewer interfaces, prevention of duplications, reduced error rate etc. – are questionable. In autumn 2011, the following was revealed in an audit. The problem areas confirmed the finance delegation's unease. The project's fundamental aim to unite the processes throughout the FTA was no longer ensured, as project objectives had been heavily curtailed. Furthermore, the sizeable heterogeneity and lack of internal specialist competence was complicating project management. The EFK also identified significant inconsistencies in the procurement function that led to the recommendation to initiate an administrative investigation.

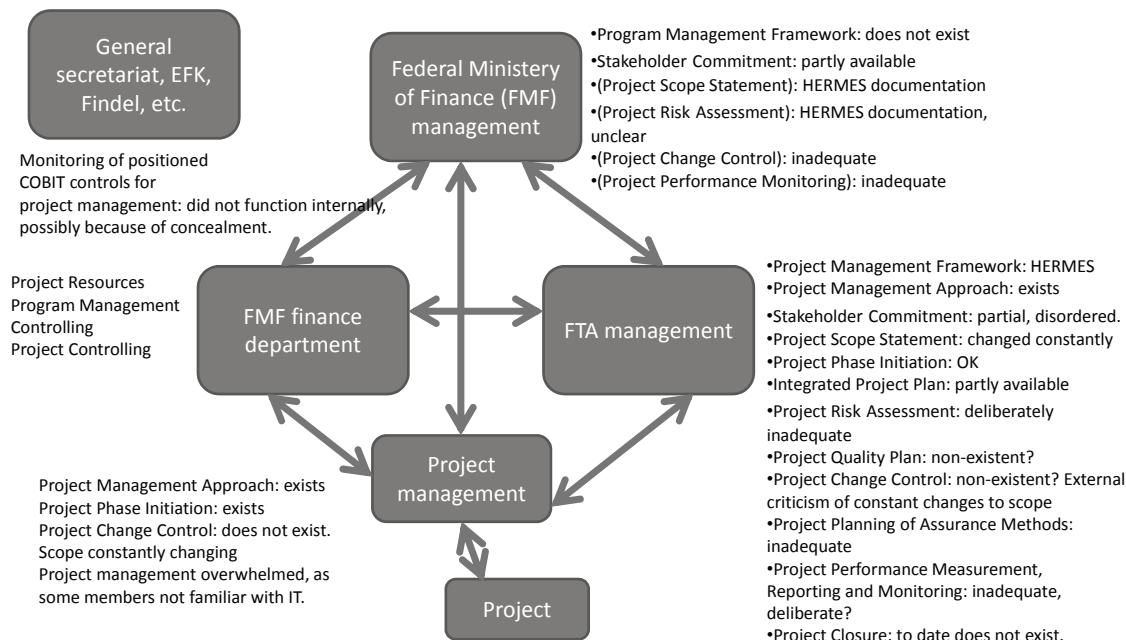
It can be concluded that, the project failed to balance deployment of resources, deadlines and functionalities. The finance delegation was very concerned about the project status. "Once again it is evident that the federal government is unable to cope with handling projects of this scale. Important questions of management and financial responsibility are not clearly defined in the FTA". It can be concluded that various external bodies had drawn attention to the shortcomings. However, management of the department had failed, over a very long period of time, to take any measures to end the questionable activities. The governance was dysfunctional for long periods of time. There were evidently no CaB or routines in place that could have put an end to the behaviour of the guilty employees. The structures outlined above for negotiating a business case did not exist, nor did structures for complying with/executing it.

## **5. Conclusions on project governance based on the model**

The following can be quoted as a key sentence regarding project governance from the 2011 annual report of the Findel, which states the circumstances as they are: "Important questions about management and financial responsibility within the FTA are not clearly defined, the project has lasted too long and important aspects of the project architecture have been repeatedly called into question." Based on this project and the latest developments around it, the CaB criticised in this article and their deficiencies can be analysed on the basis of documents without any direct internal knowledge of the project. There are governance rules relating to tenders for procurement, but nobody internally takes responsibility for enforcing these rules. There are evidently mechanisms by which misconduct is established and criticised (internal indicators within the department, EFK, finance delegation of the federal councils), but it is clear that nobody assumes responsibility for making correc-

tions. There appear to be huge gaps between the department leadership (minister/department level) and the head of the bureau which cannot be overcome, and corruption and abuse of authority can remain unpunished for many years. This is of considerable concern with regard to missing CaB mechanisms.

The various aspects mentioned can also be addressed starting from the project controls from COBIT 4.1 (cf. Figure 2). Aspects from the case study presented here are added to the relevant controls in the form of comments. The specialist departments (and external inspection authorities) are presented in the same way as the actual organisational units of the FMF. The analysis of the relationships between the parties involved in the FMF analogous to Figure 2 is as follows: analysis of the relationship FMF management - FTA management: the authorities in the department have always had a certain independence. There is no tight leadership via central IT control by the general secretary office (it has few employees although it is a large department) to which IT management was delegated and/or handed over. The director of the department (minister) also changed three times during the project. This also applies to the general secretaries. None of this was conducive to tight leadership in the area of IT and confirmed, among other things, Mertens' theory (2008) referred to earlier in the article. Only the current department head took the information from external inspectors seriously and acted (cf. Volksblatt 2012). It highlighted that the relationship between the new department head and the head of the bureau was poor because conformance on procurement practices was not achievable via directives. Not much can be said about an analysis of the relationship FMF management – FMF finance department. However, it is almost certain that no business case was created and more importantly enforced. As stipulated in this article, an appropriate code of practice is very uncommon in administrative practice as is the absorption of resource benefits from projects.



**Figure 2:** Annotation of the controls per COBIT 4.1 based on quoted sources and using developed project governance models (CaB); HERMES denotes the project management method of the Swiss Confederation)

Analysis of the relationship FMF management - project management: for hierarchical reasons, a direct relationship is not present, desired or permitted. This is typical within administration. It is not known whether internal whistle-blowers from the project contacted the department management. However, based on the various reports from whistle-blowers relating to Insieme that were released to the press, it can be assumed that such contact could have been made (rub 2012). Analysis of the relationship project management and parties involved in the project: the project management was composed of professionals with little idea about IT but very good specialist knowledge. Parties involved in the project are partly external IT specialists. This meant that project management, sub-project management and project employees had a poor relationship with each other which had direct influence on the business IT alignment problem. Analysis of the relationship FMFmanagement - FTA management: apart from the regular resource conferences about the FMF as a whole, no specific comments are made based in the aforementioned quoted sources on the relationship between

FMF finance and FMF management. As per the reports and analyses mentioned above, it appears that nobody from an internal FMF perspective took a stand or refused to accept the project procedure. Analysis of the relationship project management - FTA management: given the loose connection between the authorities (each very autonomous) and the FMF management (cf. Aegerter 2012), it appears that little control was exercised here. There is also an IT controlling division within the FMF general secretariat and the federal government, but it appears that they too did not receive any requests for change. The internal government IT controlling mechanisms failed completely.

## **6. Summary and outlook**

New approaches are urgently required from a project governance perspective. In this article from the perspective of organisational hierarchy a mid-level project governance model was developed and illustrated using an example. Governance from within the project itself as practised to date is not sufficient. It is of central importance that governance from the perspective of the interplay of CaB between administrative management, the commissioning administrative authority, project management and finance department is given closer focus in research. This article explains how the interplay of CaB between the internal and external positions mentioned actually works. The framework for CaB has been validated by a current project at federal level (Project Insieme at the FTA) that, over the past few months, made the headlines in Switzerland due to a complete lack of governance and was ultimately stopped. This highlights the problems which arise when administrative management governance possesses neither the necessary management qualities nor the appropriate IT governance instruments to gain control of the project by mediating between the business and IT. It is clear that these aspects are not properly addressed in projects in the field of federal administration. Furthermore, administrative departments and cadres seem to lack the ability to govern and to evaluate complex IT projects and judge them competently e.g. when dealing with project applications, business cases etc. Questions are/were also not asked as to whether the objectives are realistic and achievable, and whether there are sufficient resources and knowledge in the PA organisation. Efficient and effective business IT alignment is not guaranteed. Looking forward, it is clear that more case studies relating to the issues dealt with here and for the purposes of model validation should be investigated. Overall, the framework constructed for substantiating (IT) project governance is feasible. Based on the current work, the positioning between motivated governance outside the administration, internal project governance and the interim layer with the strong position of management in the project governance environment seems to be constructive for further research in the area of project governance. Despite the plethora of literature on the subject of project management, the latter currently receives remarkably little attention. However, this applies in many cases not *only* to public administration but also to the private sector.

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# A Grounded Theory of Government Website Promotion

Fang Wang and Ying Wang

Business School of Nankai University, Tianjin, China,

[wangfangnk@nankai.edu.cn](mailto:wangfangnk@nankai.edu.cn)

[wangying.cool.6@163.com](mailto:wangying.cool.6@163.com)

**Abstract:** The low utilization of government websites is a problem that exists in many countries. There are few studies on the promotion of government websites up to now. In order to improve the utilization of government websites, it is necessary to explore the mechanism of government website promotion. Considering that this is a problem that has not been fully studied, a grounded theory approach is adopted. Semi-structured interviews were conducted with 24 employees who maintain portals or departmental websites of local governments at different levels, 22 citizens and 1 worker of a company that provides services of website building. In addition, related online discussions were collected as supplementary data. After iterative comparison and analysis of collected data, a concept map depicting government website promotion was generated and some promotion strategies were put forward.

**Keywords:** government websites, website promotion, grounded theory, SEO, e-government

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## 1. Introduction

Government websites are online extensions of government entities. With the development of e-Government all over the world, the number of government websites has increased dramatically in recent decade. According to the statistics of the website of Zhaozhengfu (a website for government website finding, <http://www.zhaozhengfu.cn/>), the total number of government websites had reached 81,725 by the end of April 2011 (Zhao Zhenfu.cn, 2011), accounting for 4.4% of the total number of websites in China. However, although there had been 485 million internet users in China by July 2011 (CNNIC, 2011), a large percent of netizens hadn't visited government websites (Wang & Chen, 2012). According to the Assessment of Chinese Government Websites released in 2008, 57.5% people surveyed had never visited government websites, and 29% had never heard of government websites (Fan, 2012). A Survey on the Utilization and Impacts of the Internet in Chinese Cities showed that more than 75% of Chinese city people didn't know about e-Government, and 45.6% had never visited government websites in 2007 (Guo, 2007). In 2011, the Survey Report on the County E-Government Construction of Fujian Province showed that 81% of people surveyed had never visited county government websites. Among all the problems that hindered the utilization of e-Government by companies, the lack of sufficient promotion accounts for 62.3% (Research Group on the E-Government Construction at County level in Fujian Province, 2011).

Same problem also exists in developed countries. According to the report of British Central Office of Information (2010), the UK Trade and Investment website averaged 28,000 visitors per month, accounting for 5.3% of the total number of British netizens, and each visitor cost 11.78 pounds according to the figure of over 4 million pounds of building cost (BBC, 2010). In 2007, 66% of the netizens in the United States had visited government websites at different levels, e.g. local, state or federal governments (Susannah, 2007). According to Rainie and Smith (2008), a record-breaking 46% of Americans used the internet to get political news and share their thoughts about the campaign in 2008.

Governments have realized the unbalance between huge investment on and low utilization of government websites. The General Office of the State Council of China released a notification on April 21, 2011, requiring that government websites must ensure timely public access to government information and online services and those without good management must be closed (State Council, 2011). The Labor Government of UK reviewed 1,795 websites and closed more than 1,000 "vanity sites" from 1999 to 2010 (BBC, 2010).

The low utilization implies the necessity of marketing for government websites. Scholars in political science, public administration and organizational sociology have paid attention to marketing in the public sector. "For the future, it is by no means clear that ... a full marketing approach is relevant for public services" (Connolly 1991, p.5). Public service organizations are increasingly turning to marketing professionals as "managerialism" takes over "administration" (Butler & Collins, 1995). Laing (2003) suggested that there be a need for contextually anchored research exploring the evolving experiences and behaviors of consumers and professionals within particular public service settings from a marketing, rather than public management,

perspective. “Local government has become more adept at the use of promotional techniques, though it must now operate under strict legal guidelines to prevent political bias in the information it provides” (Walsh, 1994). In the field of e-commerce, website promotion means a continuing process to attract potential consumers to visit a website. Skills such as search engine optimization (SEO), web content development and search engine submission are introduced in related handbooks, e.g. Galon (1999), Lee and Seda (2009), etc. However, definitions of concepts such as promotion, marketing and optimization involved in government websites are still ambiguous. Few academic studies have been conducted on government website promotion. A single perspective is not enough for exploring the comprehensive problem of low utilization of government websites (Wang & Chen, 2012). Online discussions about government website promotion remain scattered and fragmental in general. An in-depth academic study is necessary. This study intends to explore the mechanism of government website promotion in a holistic way. Around the main target of this study, five research questions are put forward:

- (1) How do citizens find government websites?
- (2) What are the standpoints of government agencies on website promotion?
- (3) What internal and external factors influence the promotion of government websites?
- (4) What are the core theoretical elements of government website promotion?
- (5) What are the appropriate promotion tactics for government websites?

## **2. Research procedure**

“The goal of grounded theory is to generate a theory that accounts for a pattern of behavior which is relevant and problematic for those involved.” (Glaser , 1992, pp. 93). Considering that theories for internet marketing are not completely applicable in public sector, and theories of marketing in public sector are not mature enough for empirically studying the present problem, a grounded theory approach is selected.

### **2.1 Data collection**

Data were collected mainly by interviews. 48 interviewees were selected, including 24 government employees who were in charge of government websites at different levels of China governments, 22 Chinese citizens and one technician from a company for website service provision. 24 government employees comprise 5 females and 19 males. 19 citizens are registered blog users on the Science Net (<http://blog.scientificnet.cn/>), who are professors or doctoral candidates. The other four includes two farmers, an officer of a university and a manager of a private clinic. All the interviewees have experiences with the internet. 45 of them have at least a college education.

The interview outline for government employees covers but is not limited to following four aspects: (1) How do you evaluate the utilization rate of your site? (e.g. Who from where visit the site? What are their main purposes of visiting the site? What functions of the site do they use most or least?) (2) What factors do you think influence the utilization of your website? (3) Do you think that it is necessary to improve the utilization of government websites? Why? What measures have you adopted to attract visits? (4) What factors do you think influence the promotion of your website? The questions for citizens are: (1) Have you ever visited government websites? What was your purpose? How do you know them for the first time? (2) How do you evaluate the utilization rate of government websites? Do you think that it is necessary to improve the utilization of government websites? Why? (3) What measures do you think are good for promoting government websites? And the questions for the technician from the company are: (1) Do you have any technical solutions for improving the utilization of governmental websites? (2) How did your previous customers improve the utilization of their websites? (3) Are there any experiences from businesses for reference?

From August 2011 to June 2012, online communication, face-to-face talks and telephone calls were conducted with interviewees. Online interviews were mainly carried out through Tencent QQ (an instant message tool) and the blog of ScienceNet. Face-to-face interviews were finished mainly by one-to-one talks during two large-sized national conferences for persons in charge of government websites. All the interviews were recorded and audio records were transformed into text format within 24 hours. Besides, online discussions on government website promotion, as well as experiences of users with government websites, were collected as supplemental data. 30 pieces of data in total were collected from forums, blogs and websites related to website operations.

## 2.2 Data analysis

The process of grounded theory research can be divided into four stages: creating categories and their properties, integrating categories and their properties, confining theory and writing theory by constant comparing and analyzing the data (Glaser, 1967). The core research work could be divided into five steps: open coding, theoretical coding, selective coding, sorting memo, writing theory and verification (Pace, 2004).

Open coding is a process of decomposing, testifying, conceptualizing, and categorizing the data. A category is a conceptual element of a theory and an abstract representation of something the researcher identifies as being significant in the data. For example, Table 1 shows the comments of the informants for the identification of the concept "understanding of the essence of government websites". Table 2 shows the comments for the identification of the concept "necessity of government website promotion" and its properties. At this stage, the other concepts we identified are promotion, government services, commercial promotion, information openness, users, government, public demand, promotion means, reasons for having not promoted, traditional media, promotion effect, SEO, promotion funding, page views, etc.

**Table 1** Comments used for the identification of the concept "understanding of the essence of government websites"

Interviewee	Comments	Concept identification	Codes
No.3	As a window to display the image of a government, the government website needs to demonstrate a good appearance.	Government	Understanding of the essence of government websites
No. 9	A government website is an online electronic government. This means that it is government in essence.	Online government	
No. 10	The government website is not a media, although playing the role of propaganda in part. It concentrates more on function construction.	Not a media	
No. 12	Government website integrates advantages of multimedia (text, audio, video, message delay, communication, interaction, etc). It has the absolute advantage in broad coverage and large audiences. Except for its own functions, it also sets up a public communication platform for other media.	A public communication platform	
No. 11	A government website is a "business card" of a city or a department.	A business card of a city or a department	
No. 33	A government website is an "integrated application system of crossing departments".	A system of crossing departments	
No. 36	Local government portal is a "medium" at first.	Medium	

As shown in Figure 1 and Figure 2, "promotion", "government website" and "users" were selected as core categories. Other concepts were classified into these core categories as their sub-categories or properties. For example, the "necessity of promotion", "conditions for promotion", "promotion strategies", "promotion effects", and "obstacles to promotion" were taken as properties of "promotion". "Commercial promotion", "traditional channels" and SEO were taken as dimensions of sub-category "promotion strategies". Four concepts "understanding of the essence of government websites", "website functions", "website type" and "characteristics of websites" were identified as sub-categories of "government website". Concepts "government", "media" and "public facility" emerged as dimensions of the category "understanding of the essence of government websites". "User type", "awareness", "user needs", "using habits" and "satisfaction" were identified as the properties of "users", etc.

In this study, interviewee 9 (a government webmaster) talked of the reasons why they have not implemented website promotion, "the first reason is the lack of expenditures, and the second is the lack of leader's supports... In fact, it is not exact to say that leaders reluctant to promote. ... Even if they require promotion, it is not a good time at present." Interviewee 17 talked of the influence of the type of government websites on promotion, "We need to think about the property of a government website. If it is a portal, promote it. The promotion may bring direct economic benefits, such as investments or travels. If it is a website for the scholars to apply for research projects, users will find it without any promotions." Interviewee 11 talked of the context

of the SEO of their website, "We didn't do SEO. We only made a street billboard for e-Government, the slogan is 'E-Government is ubiquitous'."

**Table 2** Comments used for the identification of the concept "necessity of government website promotion"

Interviewee	Comments	Concept identification	Codes
Inf. 9	The promotion of government website is the promotion of <u>government itself</u> . ... Services that governments have provided need to be <u>known by more people</u> .	awareness	User's awareness
Inf. 2	(Government website) <u>needs</u> promotion. Today, as the fluidity of the population increases, one may need to <u>know something about several cities</u> during a short period for various purposes. Government websites of these cities are his/her first channels to choose. It <u>will not be easily found without promotion</u> no matter how wonderful a government website is.	Necessity User needs To be found easily	Necessity of promotion User needs
Inf. 4	Not only (government) websites need promotion, but its newly added functions also need <u>timely promotion</u> ...to make the public know and use them.	Awareness of new functions	Necessity of promotion
Inf. 5	Government websites need promotion. Otherwise, don't mention outsiders, and I am afraid that <u>internal employees don't know it</u> .	Making known by internal employees	Necessity of promotion
Inf. 11	A government website is also a website. The fundamental purpose of all the websites is to <u>get awareness and satisfaction of users</u> . Only by this, could it play full roles. But the improvement of users' awareness and satisfaction needs website promotion.	Awareness Users' satisfaction	Necessity of promotion Users' awareness Users' satisfaction
Inf. 13	Personally, I think that governments needn't spend too much on website promotion because services provided on government websites have somewhat <u>authorities</u> and <u>don't face competition</u> .	Public nature	Promotion strategies

### 3. The grounded theory of government website promotion

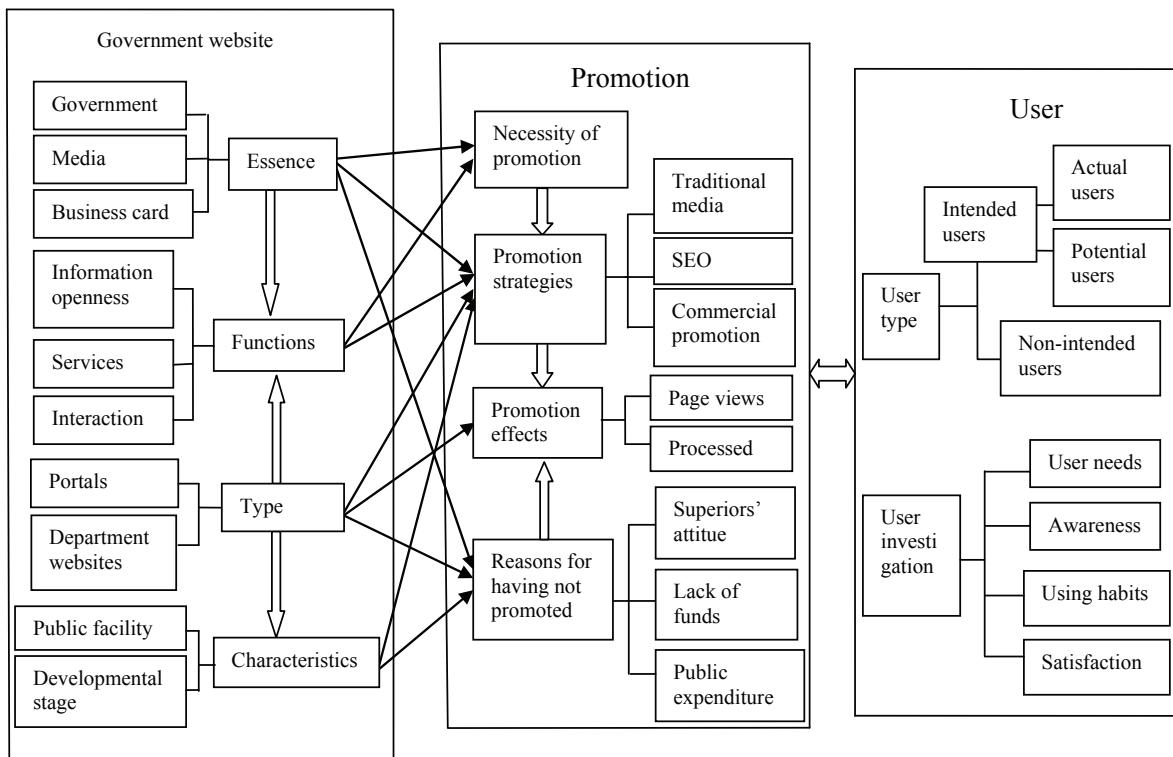
We present a concept map depicting the mechanism of government website promotion in Figure 1. Figure 1 consists of textboxes and arrows. The textboxes display categories and concepts that emerged from data and online discussions. Three core categories "government websites", "promotion" and "users" as well as their sub-categories were shown in three big boxes. Arrows show the relationships between concepts. Unidirectional arrows show the positive or negative influence of one concept on another. Bidirectional arrows show the interaction between two concepts. Figure 1 displays the relationships emerging from data rather than logical relationships between concepts. As shown in Figure 1, the propositions around government website promotion can be divided into three groups: (1) influences of government websites themselves on their promotion; (2) users' influences on government website promotion; (3) elements of government website promotion.

#### 3.1 Influences of government websites on their promotion

##### 3.1.1 Essence of government websites

"A government website represents a government itself ". The relationship between citizens and government websites is the relationship between citizens and governments in essence. "Providing public services is the responsibility of government websites since all the funds for the establishment, operation and maintenance of government websites are from public revenues," one interviewee commented. Government websites should make efforts to provide services for all the citizens who need government information or services, which are very different from business websites that aim to satisfy needs of people who can afford. The utilization of the funds invested on government websites must comply with the requirements of public expenditures. Therefore, marketing strategies adopted by government websites must match the public nature of government. A netizen criticized the event that the government of Hebei province bought Baidu paid-search service for higher ranking

in 2008, "the government should spend the money collected from taxpayers in helping those people who meet difficulties in reality rather than pay for top ranking in Baidu search engine." (Guo, 2008)



### 3.1.3 Type of government websites

Government websites could be classified into two types: portals and departmental websites. A portal often bears the responsibility of displaying regional image and providing comprehensive information and services, while a department website primarily provides specific services for intended users. Two types of government websites have different functions and intended users. Marketing of a government website means making more intended users to know and use it. In order to reach the goal, different promotion strategies should be chosen for different types of government websites.

## 3.2 Users' influences on government website promotion

### 3.2.1 Potential users need the promotion of government websites

Timely communication is helpful to improve trust and cooperation between the public and the government, which can be facilitated by government websites. However, as abovementioned, a large number of citizens still don't know much about government websites at present. The lack of public engagement can lead to a lack of mutual understanding and trust between government and citizens and all too frequently impacts negatively on the outcomes of e-Government projects (Hui & Hayllar, 2012). As an employee said, "the government website provides large amounts of information, service items and interactive channels between government and citizens, which are closely related to people's lives and needs, but the common awareness of government websites is not high. Low utilization of government websites leads to a serious waste of resources. There exists an awkward situation that government websites don't know public demand and citizens don't know how to acquire information and services from government websites." Suitable promotion strategies will help a government to make out who are the intended users of its websites and how to make them aware of the services delivered online.

### 3.2.2 Characteristics of intended users influence the adoption of promotion strategies

Scholars of e-Government have studied little about users, remarkably distinct from those in LIS field. In fact, not all the citizens or netizens of a country are actual users of government websites. Before adopting promotion strategies, it is necessary for the departments that are in charge of e-Government or government websites to investigate intended users' needs, awareness of government websites and previous habits of using government information and services, and practical users' satisfaction with government websites that they have visited. Based on the stages at which citizens link with government websites, the intended users of government websites can be classified into three types: potential users who are non-netizens, potential users who are netizens but haven't visited government websites, and actual users who have visited government websites. For the first group, traditional media and message of mobile phone are suitable promotion measures. For the second group, online promotion is advisable in addition to traditional measures. For the third group, directional notice and RSS can be adopted for informing the newly published service items on the website.

Different websites have different intended users. Generally speaking, the users of local government portals have strong regional characteristics. "The major targeted users of local portals are regional natives. Therefore, satisfying demands of local people should be a fundamental strategy of local government portals."(Jia, et al, 2010) Along with the increasing of population movements, users of local government websites not only include indigenes, but also those who migrate to other areas for education or job, as well as tourists, investors and buyers. Departmental websites with specific functions, such as the website of NSFC, possess specific users. A government website needs to understand the characteristics of its intended users when choosing promotion strategies. Take a website of government procurement for instance. The scope of its user is very small, mainly covering some government officials and suppliers, so links, content cooperation, blog and BBS could be adopted as its promotion strategies.

## 3.3 Conditions for and constraints on government website promotion

### 3.3.1 Development stages of government websites

In general, the promotion of websites of a government experiences three stages. Firstly, at the primary stage of e-Government development when people know little about government websites, news report on traditional media is advised for both portals and departmental websites. Secondly, when e-Government

develops more mature, SEO and other appropriate online promotion measures are needed for newly established government websites. A master of a government website said: "When a new website that intends to provide services for a large number of citizens is set up, promotion is necessary." Thirdly, when a website is known and visited by more and more people, more attentions should be paid to improving its critical functions and website usability in order to optimize the user experiences. Just as an interviewee said, "when you improve the functions of government websites, citizens will be attracted naturally." At the same time, promotion should be launched at potential users who objectively need to use but haven't visited a specific government website.

### *3.3.2 Understandings of the superiors*

The reason for the feedback of "never heard of government websites" from respondents is that governments lack the same driving force as that of companies in promoting their websites (Ma, 2007). Large number of studies declares that informatization is a "project of the head" in either governments or businesses. Data showed that the superior's decision is the direct drive of government website promotion. A government webmaster said, "Because the chief leader doesn't understand the necessity and urgency of website promotion, no promotion actions were taken". At present, the main incentives for superiors to attach importance to website construction are website evaluations and rankings, which are launched mainly by consulting companies or special government agencies. Nevertheless, none of present evaluations involves the criteria of promotion capability.

### *3.3.3 Restriction of the budgets*

Some interviewees from government websites spoke of another reason for having not conducted website promotion, "lack of advertising money". They fall into an error of thinking that website promotion equals to spending money in advertising. Other interviewees think that government websites are not business websites, and neither have advisement expenditure, nor need promotion. But according to an informal report, the average expenditure of a government website is 300, 000 Yuans. Even the construction of a simplest government website needs 100,000 yuans (Xie, 2011). How to promote government websites within existing provisions is a subject worthy of study.

## **3.4 Promotion of government websites**

### *3.4.1 Foundations of government website promotion*

As abovementioned, government websites have properties of mass media, which are promoting channels themselves. Therefore, to strengthen their functions means to improve their capabilities of promoting themselves. Some interviewees from government websites don't think that promotion is as urgent as strengthening their smart functions at present. "Generally speaking, government websites don't need advertisement. If does, what needs to do is to inform the public of our service items and let them know what affairs they can deal with via government websites." "Government websites shouldn't pursue page views without effectiveness....Strengthening information openness and improving service functions are the best ways to promote a government website" (Tang, 2008). "As long as users can find what they need on a website, can deal with affairs via the website, the number of its clicks will rise naturally." "The most important thing is that the website is really useful and can be used to handle affairs". Government website promotion should proceed with the delivery of specific services. An interviewee said, "... The promotion of a government website should be a part of its everyday concerns instead of a singly-ranked affair.... Of course, some specific activities can be promoted solely..... Website promotion should be implemented together with other promotion activities of the government.... Take the railway ticket sale in 2012 for instance. When various mass media taught the public to buy train tickets via a special government website, this website was promoted spontaneously."

### *3.4.2 Strategies for promoting government websites*

By analyzing data iteratively, two types of promotion channels were identified. One is traditional media, including television, radio, newspaper, street sign, light box, car ads, electronic screens, brochures, packages, etc. Governments supervise media and can influence their behaviors in some way. For example, governments can promote new online services through press conferences. The director of Zhengzhou e-Government center

said that their "online polity-ask platform" didn't adopt any special promotional strategies but news and reports on mass media and interpersonal communications among platform users, and have produced good results.

The other type of promotion channel is the internet, including blogs, BBS, micro blog, SNS, encyclopedia of search engines, Q&A, net favorites, bookmarks, etc. (Cui, 2011). Search engines like Baidu has optimized most of the government portals and ranked them top in search results, but some small-sized government websites failed to receive such special treatments. SEO is a frequently adopted strategy that improves the ranking of a target website in the retrieval results of a search engine by utilizing its technical rules. SEO for government websites includes two types of strategies: internal SEO and external SEO. Internal SEO includes website structure design, website code optimization, internal link optimization, website content optimization, keyword optimization (including the use of long-tail theory), navigation design, and optimization of website user experiences, etc. External SEO includes outside link optimization and external data analysis, etc.

#### *3.4.3 Effects of government website promotion*

Low utilization is not equivalent to low utilization rate. When we talk about low utilization of a government website, we should specify the maximum number of potential visitors over a given period. If we also know the number of potential users of a government website, it is a relatively simple matter to evaluate its utilization rate and to judge whether its utilization really is low.

Interviewees generally agreed that page view is a valid indicator for measuring the effectiveness of government website promotion. In addition, revisiting times and staying time can also reflect the attraction of a website. However, clicks can't fully reflect the actual profits brought by a promotional strategy. The number of affairs that have been processed online successfully and comments of actual users could be taken as indicators. The effectiveness of a specific strategy can be measured by the change of the values of these indicators before and after promotion is implemented.

## **4. Conclusion**

A grounded theory is generated from the data by constant analytical comparison (Glaser and Strauss, 1967). A grounded theory is a holistic conceptual framework instead of a set of research findings. In view of the insufficient research on the low awareness and low utilization of government websites at present, this study adopted grounded theory approach. By iteratively comparing and analyzing the interview data, a grounded theory of government website promotion is concluded as follows:

The public nature of governments determines the essence of their websites. In order to provide public information and services efficiently, government websites need to adopt non-commercial promotion measures. Because different government websites burden different responsibilities, have different intended users, and are limited by special development stages, understandings of the superiors and budgets, they should choose suitable promotional strategies according to their practical situations. In general, powerful functions are foundation of government website promotion. As public organizations, governments could employ traditional media and adopt free online promotional means, especially SEO to improve the awareness and utilization of their websites. In addition, the evaluation of the effectiveness of government website promotion should not only focus on page views, but also pay more attention to public satisfaction and practical transactions that have been fulfilled via government websites.

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# A Pragmatic Approach to the e-Government Maturity in Poland – Implementation and Usage of SEKAP

Ewa Ziembra and Tomasz Papaj

University of Economa, Katowice, Poland

[ewa.ziembra@ue.katowice.pl](mailto:ewa.ziembra@ue.katowice.pl)

[papaj.tomasz@gmail.com](mailto:papaj.tomasz@gmail.com)

**Abstract:** The goal of our research was to explore and diagnose e-Government maturity in Poland. First, the paper explains the nature of e-Government and identifies major types of e-Government services. Second, various models of e-Government maturity are identified, especially the five level maturity model used in the European Union. Next, the benchmarking indicators of e-Government maturity in the European Union countries are shown and the European Union strategic plans for the maturity of e-Government are presented. Then, the diagnosis of e-Government services use in the context of their maturity, by the example of Poland, is established. The paper concludes with a discussion of research findings and recommendations for successful e-Government maturity development. Finally, the future works are propounded.

**Keywords:** e-government maturity, e-Government services, levels of e-government maturity, e-government maturity models, SEKAP, Poland

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## 1. Introduction

Socio-economic development triggered by information and Information and Communication Technologies (ICTs) is not possible without an effectively operating government and especially without an electronic government (e-Government) (Hanna, 2010; Ziembra, 2012). E-Government involves rethinking government organizations and processes, changing behavior, and ICTs use to make government services more efficient and easier to access for citizens, enterprises and government agencies (Andersen, Medaglia, Vatrappu, Henriksen and Gauld, 2011; Irani and Love, 2008; Pina, Torres, Royo, 2009). Hence, the creation of an e-Government requires an increase of ICTs role in public management and their use in order to rebuild government processes and organizations as well as to allow an access to electronic government services (e-Government services) (Aldrich, Berlot, and McClure, 2002; Anttiroiko, 2008; Lisiecka and Papaj, 2009; Sahu, Dwivedi and Weerakkody, 2009; Ziembra, Papaj, 2012). Those services are rendered at different levels of maturity, which represent different levels of technological sophistication, stakeholders' orientation and an administrative change (Andersen and Henriksen, 2006; Almarabeh and AbuAli, 2010; Ziembra and Papaj, 2012). Implementation of e-Government services at the highest level of maturity has become a priority issue for many countries, regions and cities, as it has become for Poland and its many regions (voivodships) (COM, 2010, 2010a; Strategia..., 2008, 2009).

**The goals of our research were to: (1) explore e-Government idea and different kinds of e-Government services; (2) identify models of e-Government maturity; and (3) assess the implementation and use of e-Government services in Poland in the context of their maturity.**

First, the paper explains the nature of e-Government and identifies the major types of **e-Government services**. Second, various models of e-Government **maturity** are identified, especially the five level maturity model used in the European Union. Next, the benchmarking indicators of e-Government maturity in the European Union countries are shown and the European Union strategic plans for the maturity of e-Government are presented. In the paper special attention is paid to the maturity of e-Government in Poland, in particular Silesian voivodship. **Hence, the diagnosis of the e-Government implementation and use by the example of the Electronic Communication System for Public Administration (SEKAP) is established.** The paper concludes with a discussion of research findings and recommendations for successful e-Government maturity development. Finally, the future works are propounded.

We are confident that the obtained results will prove to be helpful for researchers and scholars in developing studies on e-Government. Moreover, they can be useful while undertaking empirical activities aimed at e-Government development.

## **2. Literature review and related works – maturity models of e-Government**

### **2.1 An overview of e-Government**

Such a novel and eerily actual topic of e-Government has become the subject of broad research among many renown academic institutions and practitioners' forums in the world. The concept of e-Government was coined by several researchers and scholars (Anttiroiko, 2008; Brainard and McNutt, 2010; Cordella and Lannacci, 2010; Hanna, 2010; Serrano-Cinca, Rueda-Tomás and Portillo-Tarragona, 2009; Siau and Long, 2006; Tolbert and Mossberger, 2006; Zhao, 2010; Ziembra and Olszak, 2012). Furthermore, since 2003 the Gartner Group (Baum and Maio, 2000) and the Deloitte (Deloitte, 2000) has laid the foundations for e-Government and creating solutions for its development. Moreover, such organizations as: the European Commission (COM, 2010), OECD (*The E-Government...*, 2001) and the World Bank (*A Definition...*, 2003) are involved in the discourse on e-Government.

Those above literature findings allow us to draw the following connotation of e-Government. E-Government is embedded in combinations of political conditions as well as cultural, technological and organizational changes designed to support and drive a profound transformation in government agencies (Cordella and Lannacci, 2010). According to Tolbert and Mossberger e-Government has been proposed as a way to transform and improve relations between government agencies and citizens as well as increase citizens' trust in government (Tolbert and Mossberger, 2006). E-Government requires ICTs use to rebuild government processes and to deliver government information and government services to citizens, enterprises, employees and government agencies (Brainard and McNutt, 2010; Serrano-Cinca, Rueda-Tomás and Portillo-Tarragona, 2009; Siau and Long, 2006; Ziembra and Papaj, 2012). Hence we can identify four main domains of e-Government: improving government processes (e-administration), providing government services electronically (e-Government services), improving democratic decision making (e-democracy), and developing cooperation and partnerships between government stakeholders (e-governance) (Anttiroiko, 2008; Serrano-Cinca, Rueda-Tomás and Portillo-Tarragona, 2009).

To sum up, in our opinion e-Government is multidimensional by nature and requires consideration of organizational, technological, social, cultural, and economic issues. A more detailed definition of e-Government applied here is the following: e-Government means the ICTs utilization and accomplishing organizational, process, legal, competence and cultural transformation in government agencies, in order to make e-Government services electronically accessible to various external and internal stakeholders (citizens, enterprises, and government agencies). It creates five forms of relations between government agencies and their stakeholders: Government-to-Citizens (G2C), Citizens-to-Government (C2G), Government-to-Business (G2B), Business-to-Government (B2G), Government-to-Government (G2G).

### **2.2 Levels of e-Government maturity models**

E-Government services can be available at different levels of maturity (Karokola and Yngström, 2009; Reddick, 2004). The term "maturity" relates to the degree of interaction between government agencies and their stakeholders, the way of delivering government information and services electronically, the degree of technological sophistication as well as the degree of formality and optimization of government processes. Hence methods of evaluating the readiness of government agencies to render e-Government services to different stakeholders and at different levels of maturity are a key ingredient in the successful development of e-Government. Ergo, researchers and practitioners have developed various models to analyze and improve the maturity of e-Government (Almarabeh and AbuAli, 2010; Andersen and Henriksen, 2006; Baum and Maio, 2000; Beynon-Davies, 2007; Deloitte, 2000; Irani and Love, 2008; Kachwamba and Hussein, 2009; Kachwamba and Hussein, 2009; Infinedo and Singh, 2011; Davison, Wagner and Ma, 2005).

Existing e-Government maturity models can be categorized into three groups: governmental models, holistic approach models for e-Government projects, and models of e-Government evolution (Dong-Young and Gerald, 2010; Valdés, Solar, Astudillo, Iribarren, Concha and Visconti, 2011; Concha, Astudillo, Porrúa, Pimenta, 2012). The first group of models (governmental) has been created by governments, consultants and scientists to facilitate the identification and improvement of e-Government maturity levels by government agencies. For example, these models provide a common framework to identify, describe and asses the capabilities required to deliver service to citizens and they can be used by government agencies to identify their current business-

layer interoperability maturity. Holistic approach models for e-Government projects are designed to be applied in e-Government services development projects. They support the integrated modeling of e-Government services and their adjustment following the digital progress in order to provide electronic services pertinent to arising needs. Furthermore, these models identify various indicators, determine whether an e-Government project will be successful and they focus on ex-post and ex-ante assessing (after and before implementation) benefits and impacts of e-Government projects and proposals. Models of e-Government evolution enable to evaluate the readiness of government agencies to render e-Government services to different stakeholders and at different levels of maturity. It is a key ingredient in the successful development of e-Government. These all models integrate the technological, organizational, operational, and human capital capabilities of e-Government. Moreover, they have gained popularity as a tool for comparing and benchmarking the advance and success of e-Government implementation.

### **2.3 European Union maturity model of e-Government**

The described above maturity levels of e-Government are coherent with the European Union proposal. A model developed by Capgemini is used in the European Union countries in order to assess the maturity of e-Government sophistication (*The user...*, 2007; *Digitizing...*, 2010). This model reveals the degree of technological sophistication and the degree of organizational transformation in government agencies. In particular, the five levels in this model reflect how businesses and citizens can interact with government agencies and how government agencies can cooperate and communicate. Those levels are the following:

- Level 1, called information, corresponds exclusively to the online availability (usually on the government websites) of the general information (e.g. information about necessary documents) required to start the procedures to obtain government services;
- Level 2, called one-way interaction (downloadable application forms), involves the possibility of obtaining paper application forms from the publicly available government website in an electronic way (e.g. by downloading and filling in application forms electronically) which are necessary to start the procedures related to government services, but handing in the documents takes place in the traditional way;
- Level 3, called two-way interaction (electronic application forms, e-forms), represents the possibility of taking forms electronically in order to obtain government services. It is also possible to check, advice on and deliver the application forms to government agencies electronically. However, the delivery of government documents, certificates, receiving decisions, decrees and the payment of dues and fees all take place in the traditional way;
- Level 4, called transaction (full electronic), means a full electronic delivery of government services. Forms necessary to obtain government services are delivered to government agencies electronically. However, government documents as well as the payment of fees or dues can also be arranged electronically; and
- Level 5, called personalization (targetisation/automation), represents full electronic government services and introduces two concepts: pro-active and automatic. Moreover, there is no need for citizens and business to request government services and they can obtain some government services and appropriate government documents automatically. There is the possibility to receive application forms that have already been filled in by government agencies (the appropriate data for application forms are usually in governmental databases) to the extent permitted by law. Examples of these kinds of government services are: tax and contribution declarations, which can be filled automatically because government agencies have the appropriate data in governmental databases. The 5th stage of maturity was introduced in the European Union in 2007.

The 4<sup>th</sup> and 5<sup>th</sup> levels can be referred to as “full online availability”. E-Government service at a maturity level lower than above mentioned levels does not mean that the stakeholders are not able to complete it electronically. For example, 3<sup>rd</sup> level of e-Government services denotes that the stakeholders may obtain information on this government service, download appropriate application forms, fill them in and submit electronically but also that they have to reach the premises of the responsible government agency to receive official permits, certificates, decisions or any other documents afterwards. Government services at the 5<sup>th</sup> level of maturity are the most mature and of destination. Their implementation, however, is a very complex and a difficult undertaking, requiring a variety of problems to overcome of organizational, legal, informational and technological nature (*Digitizing...*, 2010).

## **2.4 Maturity of e-Government in European Union state members**

The five level maturity model (described above) is used in the European Union to asses e-Government development in individual countries. The e-Government benchmarking has been based on the measurement of 20 key government services for citizens and enterprises in terms of online sophistication and full online availability (*Digitizing..., 2010; Reis, 2005; Matei and Savulescu, 2011*). Those service are: (C.1) income taxes, (C.2) job search services, (C.3) social security benefits, (C.4) personal documents, (C.5) car registration, (C.6) building permission, (C.7) police statement, (C.8) public library catalogues, (C.9) personal certificates, (C.10) enrolment in higher education, (C.11) announcement of moving, (C.12) health-related services, (B.1) social contributors to employees, (B.2) company tax, (B.3) VAT, (B.4) company registration, (B.5) submission of statistical data, (B.6) customs declarations, (B.7) environment-related permits, (B.8) public procurement. The online sophistication indicator represents the extent to which the 20 key government services allow for interaction and/or transaction between government agencies and citizens or enterprises. Whereas, the full online availability indicator displays the extent to which there is fully automated and proactive delivery of the 20 key government services. Certain services are limited to an appropriate level, according to their character and required government processes and procedures, and confined by law.

The benchmarking of e-Government services has been systematically carried out in the European Union from 2001. The maturity levels of the 20 key government services are measured and the indicator of full online availability is calculated (*The user..., 2007; Benchmarking..., 2009; Digitizing..., 2010*). The online sophistication ranking assesses government services delivery against the 5 levels of the maturity model. Whereas the full online availability indicator (measured introducing a threshold to the 5-level maturity model which is mostly above the 4<sup>th</sup> or 5<sup>th</sup> sophistication level, depending on the service in question), the EU27+ average stood at 82% in 2010. The benchmark reveals that in Italy, Malta, Austria, Portugal and Sweden all 20 government key services are now 100% accessible electronically. For Poland the indicator reached 79% in 2010 (*Digitizing..., 2010*).

Moreover, Eurostat has been measuring the indicator showing the percentage of 20 key government services, which are fully available online, from 2001. The measurement methodology is the following: if 13 of the 20 government services in a country were measured as being 100% available online and one government service was not relevant (e.g. does not exist), the indicator is 13/19 which is 68.4% (Eurostat, 2012). Unfortunately, the maturity of e-Government is lower in Poland than the EU average and in the preeminent countries in this category. In 2006 it amounted to 21.25% with the score for the EU27+ – 58.27% and the average for the four EU countries that are the leaders in this category – 100%. In 2009 it amounted to 55.26%, with the average for the EU27+ – 72.87% and the average for the four EU countries that are the leaders in this category – 100%. In 2010 the indicator was appropriately – 78.75%, 84.28%, 100% (Eurostat, 2012).

In 2010, for the first time, the benchmark took an in-depth look at the difference in performance at subnational NUTS (Nomenclature of Territorial Units for Statistics) (*Digitizing..., 2010*) levels in addition to the aggregate country level. It indicates the discrepancy between e-Government service maturity at different levels (national, regional and/or local) and investigates further the governance efficiency within and across government agencies, and this is the field which may undergo deeper studies. Moreover, the European Commission has recommended to shed light on e-Government services which are mostly used by enterprises, their degree of sophistication, and in relation to the main barriers to their usage. In its opinion, current reflections and tests on measurement should be pointed to measuring the 20 basic government services at a city and regional level (*Benchmarking..., 2009*).

The European Union strategic plans for the maturity of e-Government services in the coming years are set out in “The European eGovernment Action Plan 2011-2015” (COM, 2010b). This Action Plan determines key objectives for the European Union state members, in particular by 2015, 50% of EU citizens and 80% of EU enterprises will have used e-Government services. Those e-Government services will enable entrepreneurs to set up and run business anywhere in the European Union and will allow citizens to study, work, reside and retire anywhere in the European Union. These plans are the part of the European Commission activities to support the implementation of the Europe 2020 strategy (COM, 2010a), in particular the flagship initiative called "A digital agenda for Europe" to enhance the development of high-speed internet and produce the advantages of a unified digital market for households and enterprises (COM, 2010).

### **3. Research methodology**

Our research was cognitive-experiential in nature. The cognitive study was based on a critical analysis of international literature and an analysis of European, Polish and Silesian initiatives for the development of e-Government. In order to present the practical dimension of e-Government called SEKAP, a case study and an action research have been used. The aim of action research is to find "a solution to a local problem in a local setting" (Ellis and Levy, 2009, p. 329; Leedy and Ormrod, 2005, p. 114). A case study is used to "explore, describe, or explain phenomena by an exhaustive study within their natural setting" (Ellis and Levy, 2009, p. 327). In our study these methods refer to analyzing and diagnosing the e-Government maturity in the Silesian voivodship. We work as experts for the Silesian Centre of Information Society (SCSI) on a regular basis. The SCSI is the coordinator of e-Government development in the Silesian voivodship. Further, we have used methods of creative thinking and logical deduction to formulate recommendations on e-Government development.

Studies on the use of SEKAP were conducted on September 30<sup>th</sup>, 2012. For this purpose data from 121 government agencies that provide e-Government services through SEKAP have been analyzed. In total, in the Silesian voivodship there are 203 government agencies, thus 57% of all government agencies providing services through the SEKAP system. Data on the usage of SEKAP are collected from the SEKAP database. We have used Excel software for these data analysis.

### **4. Research findings – the diagnosis of e-Government maturity by the example of SEKAP**

#### **4.1 Nature of SEKAP**

An example of an e-Government implementation in the Silesian voivodship is the Electronic Communication System for Public Administration called SEKAP (Ziembra and Papaj, 2012).

The Silesian voivodship was chosen because it is one of the most economically developed regions in Poland. It is simultaneously characterized by both: the highest level of population density and industrialization in the country. The region has been well-known for heavy industry for many years and is undergoing transformation into an information region. Recently many new software companies, institutes of tertiary education, research and high technologies centers have been created here. Hence, not without reason, the Silesian voivodship is regarded as a strategic region for domestic as well as international investors. It is thought that its further expansion will be determined also by the development of e-Government that makes government services more efficient and easier to access for citizens, businesses as well as government agencies. Creating the e-Government at the highest level of maturity has become a one of the priority issues for the Silesian voivodship.

SEKAP is a result of strategic innovative project, that was carried out by the municipal and district authorities of the Silesian voivodship in 2005-2008 (Ziembra and Papaj, 2012; [www.sekap.pl](http://www.sekap.pl)). It enables the provision of e-Government services including five forms of the relations between government agencies and their stakeholders: C2G/G2C, B2G/G2B, G2G. The e-Government services are provided at different levels of maturity, from the information level to the transaction level.

Currently (2009-2012) a project called "Development and Dissemination of the Electronic System for Public Administration in Silesia – SEKAP2" is carried out. Within this framework, work is conducted on the improvement of SEKAP, e.g. the main objective is increasing the maturity levels of e-Government services.

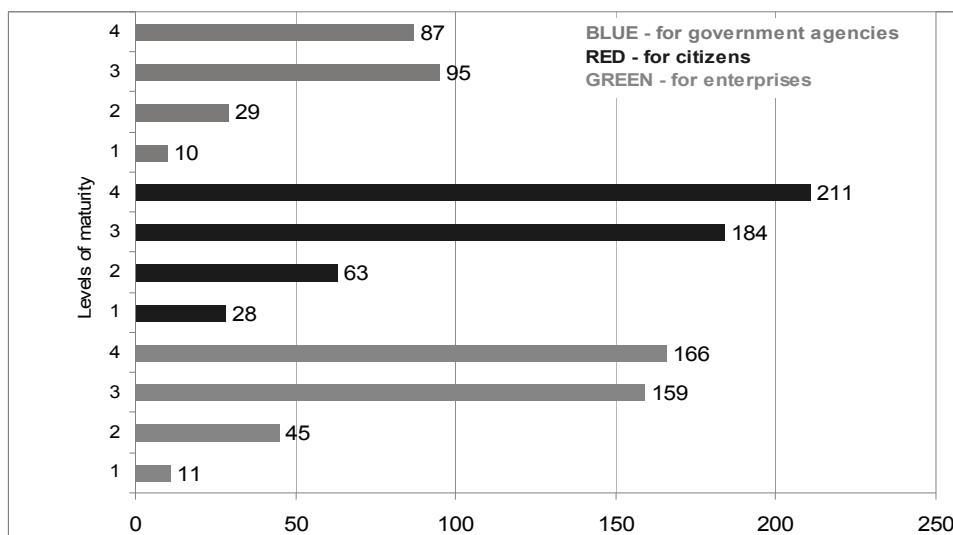
#### **4.2 Maturity of e-Government in SEKAP**

Currently, SEKAP includes 558 various e-Government services, in particular all 20 services recommended by the European Commission. They are rendered to citizens, enterprises, and government agencies, but some of them regard citizens, enterprises, as well as government agencies.

Unfortunately not all government agencies make all 558 e-Government services available. This results from the fact that not every government agency is competent to offer every service. But first of all the reason for such a state of affairs is the fact that government agencies have not implemented appropriate processes and procedures, which make e-Government services available.

The e-Government services are classified into 19 catalogs (groups): (1) construction, architecture, urban planning, (2) identity cards, registration of residence, elections, (3) business activity, (4) geodesy, cartography, (5) public utilities, (6) communications, road engineering, transport, (7) culture, sports, tourism, education, (8) real estate, residential and commercial premises, (9) protection of consumer rights, (10) environmental protection, (12) taxes and charges, (12) agriculture, forestry, hunting, angling, (13) citizenship issues, (14) births, marriages, deaths, (15) health and social issues, (16) regional development, (17) promotion and information about the region, (18) technical services, and (19) other ([www.sekap.pl](http://www.sekap.pl)). Some of these groups are divided into subgroups, i.e. (2) identity cards, registration of residence, elections are divided into: identity cards, registration of residence, and elections. Moreover, those services reach different levels of maturity according to the European Union statement, i.e. level 1 – information, level 2 – one-way interaction, level 3 – two-way interaction, and level 4 – transaction. There are no e-Government services at the 5<sup>th</sup> level, called personalization in SEKAP.

The list of e-Government services in SEKAP contains 247 (44%) services which reached the transaction level. There are 381 services for enterprises, including 166 (44%) services obtained at the transaction level (Figure 1). SEKAP provides 486 services for citizens, including 211 (44%) services which reached the transaction level. In case of G2G relations there are available 87 e-Government services at the transactional level, which is 39% of all e-Government services for government agencies (221). There are a lot of e-Government services at the 2<sup>nd</sup> and 3<sup>rd</sup> maturity levels. There are also some services at the lowest level of maturity (information).



**Figure 1:** Number of e-Government services for enterprises, citizens and government agencies, reached the different levels of maturity

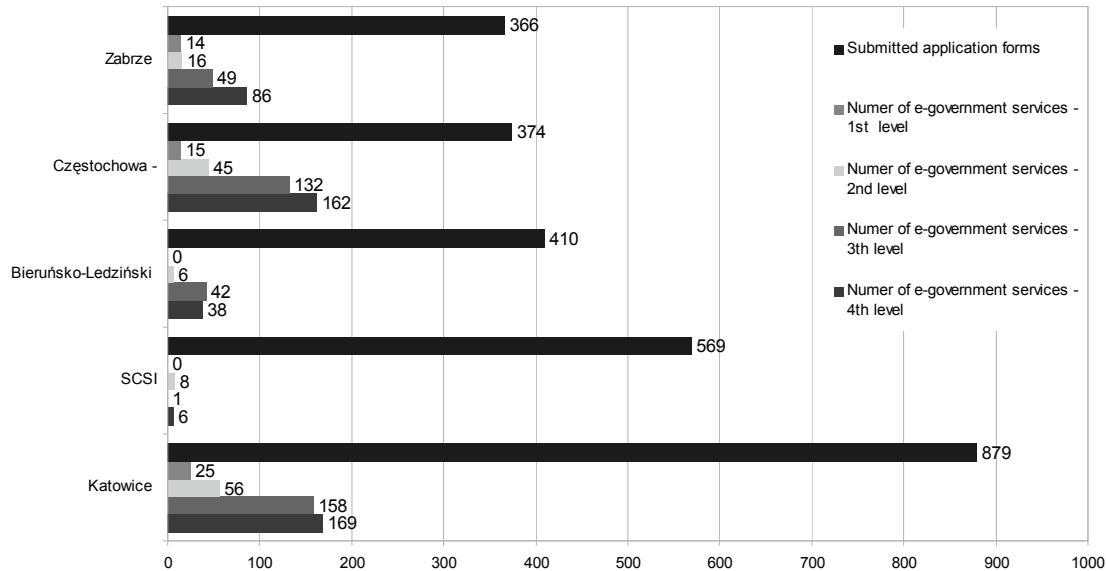
#### 4.3 The use of SEKAP in the context of e-Government maturity

The study revealed that the number e-Government services delivered by individual government agencies (15,755) exceeded considerably the number of e-Government services used by the stakeholders of government agencies (6,179). Except for such government agencies that can be called leaders of e-Government as Katowice, Częstochowa, Zabrze (cities with county rights), Bieruńsko-Lędziński rural county and SCSI, the number of delivered e-Government services was larger than the number of submitted application forms in the other government agencies.

Figure 2 presents number of e-Government services delivered by the prominent government agencies in the context of e-Government services maturity and the number of submitted application forms.

**From the SEKAP launch on 25 April 2008 until 30 September 2012 all government stakeholders submitted 6,179 application forms to obtain appropriate government services.** The biggest number of application forms was submitted in group (19) other – 3,201 application forms, which makes up 51.80% of all submitted application forms. Another group of the most frequently used e-Government services are related to: business activities (552, 8.93%), geodesy, cartography services (464, 7.51%), registrations of residence (408, 6.60%),

taxes and charges (385, 6.23%) and as well as driving licenses (290, 4.69%) and vehicle registrations (161, 2.61%).



**Figure 2:** Number of e-Government services and their maturity levels delivered by prominent government agencies

In order to assess the use of e-Government services in the context of their maturity, the services, which were the most frequently used by the stakeholders, were the subject to a detailed analysis. These were the services from the following groups: (3) business activity, (4) geodesy, cartography, (2) identity cards, registration of residence, elections, and (19) other.

The benchmarking indicators of the e-Government services concerning business activities are measured in the European Union. There are different e-Government services of business activities at various levels of maturity on SEKAP. They are reached at the 2<sup>nd</sup> or 4<sup>th</sup> levels of maturity. Table 1 shows e-Government services the most frequently used, their maturity levels and the number of application forms to obtain them.

**Table 1:** E-Government services concerning business activities – their maturity levels and application forms

E-Government services concerning business activities	Number of application forms	Levels of maturity
Change of the entry in the central register of business activity	272	2
Application for the entry to the central register of business activity	108	2
Granting a license to sell alcoholic beverages	37	4
Application for suspension of business activity	31	2
Notification of cessation of business activity	26	2
Application for renewal of business activity	13	2
Issuing a copy of the decision to withdraw from the business register	13	4
Paying charges for licenses to sell alcoholic beverages	7	4
Issuing a single authorization for the sale of alcoholic beverages	4	4

Table 2 presents e-Government services of the catalogue (4) geodesy, cartography which were the most frequently used by government agencies stakeholders. Those e-Government services are provided at the 4<sup>th</sup> or 3<sup>rd</sup> levels of maturity.

Another analyzed e-Government services catalogue was the catalogue (2) identity cards, registration of residence, elections. E-Government services connected with the registration of residence are most often used in this catalogue. They are supplied at the 4<sup>th</sup> maturity level, with the exception for one which reaches 2<sup>nd</sup>

maturity level. Table 3 illustrates their maturity levels and the number of application forms submitted to obtain them.

**Table 2:** E-Government services concerning geodesy and cartography – their maturity levels and application forms

E-Government services concerned geodesy and cartography	Number of application forms	Levels of maturity
Accepting for a measurement documentation record	362	4
Notification of geodetic and cartographic work	38	3
Issue of an extract from the register of land, buildings and premises, and the excerpt and outline from the land register	27	4
Providing materials and information constituting the state geodetic and cartographic record	23	3
Updating the register of land and buildings	4	4

**Table 3:** E-Government services concerning registration of residence – their maturity levels and application forms

E-Government services concerning registration of residence	Number of application forms	Levels of maturity
Providing the data from residence registration records	230	4
Registration of permanent or temporary residence of over 3 months	70	4
Registration of permanent or temporary residence move-out of over 3 months	37	4
Registration for temporary stay of up to three months	20	2
Residence registration on the basis of an administrative decision	14	4
Residence move-out registration on the basis of administrative decision	14	4
Issuing a certificate of residence registration records	12	4

The biggest number of application forms was submitted in group (19) other – 3,201 application forms. It includes e-Government services such as: making public information available (1,163 application forms, 3<sup>rd</sup> level), complaints and requests (569 application forms, 3<sup>rd</sup> level), application forms for government services not classified in the catalogue of services (530 application forms, 3<sup>rd</sup> level), and correspondences between government agencies (227 application forms, 2<sup>nd</sup> level).

#### **4.4 Discussion of e-Government maturity in SEKAP**

Research indicates, however, that the use of e-Government services is not satisfactory and needs some improvement. Some conclusions can be derived at this stage of our research.

First, the number of e-Government services made available in SEKAP by the government agencies are higher than the number of submitted application forms. This proves of a very low level of utilizing SEKAP capabilities and due to this fact unsatisfactory use of e-Government services in the Silesian voivodship.

Second, the most frequently used e-Government services are of general nature, and are included in groups (19) called “other” and mostly refer to making public information available, complaints and requests, submitting application forms for government agencies, which are not made available as well as correspondence between government agencies. All those e-Government services reached the 4<sup>th</sup> level of maturity (transaction) and they can be obtained completely electronically.

Third, next as far as their frequency of use is concerned are government services referring to business activity, geodesy and cartography, as well as registration of residence. Also in case of these services most of them are delivered at the highest level of maturity (transaction).

Fourth, government agencies making e-Government services available at the 3<sup>rd</sup> and 4<sup>th</sup> levels of maturity receive the biggest number of application forms. Generally, the biggest number of submitted application forms

refers to these two levels. Hence the conclusion can be drawn that making e-Government services available at the 4<sup>th</sup> maturity level enhances their use.

Fifth, currently government agencies do not make e-Government services available at 5<sup>th</sup> maturity level.

## **5. Conclusion**

At the end of the discussion about the use of e-Government at the local level in Poland we make a few reflections.

SEKAP is an innovative technological and organizational solution. It includes e-Government services at the different levels of maturity for citizens, enterprises and government agencies. Many concepts and solutions that arose in the course of its design, implementation and use are universal, and certainly can be an example of "good practice" for other regions. Unfortunately, its usage is not satisfactory and needs some improvement. Therefore, the implementation of innovative solutions in government agencies does not mean a strong interest in them from potential stakeholders at the same time. There are many barriers that hinder or even prevent effective and efficient e-Government development. All the barriers to the usage of e-Government must be identified and removed.

In our opinion in order to achieve success in usage of e-Government we should concentrate on four main elements: e-Government strategy, people, processes and technology. E-Government strategy requires identification of its goals as well as activities and projects to be taken. Citizens, government agencies' officials and employees should improve their skills and knowledge about e-Government. Moreover, an appropriate culture and high self-awareness of enterprises, citizens and government agencies are required. Besides the process approach to the implementation of e-Government services and ICT supporting government processes are necessary as well as the delivery of e-Government services.

Generally speaking, it is very important to indicate the critical success factors for successful usage and development of e-Government. Hence, the critical success factors for e-Government will undergo further research.

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# PhD Research Papers



# Citizen Centered e-Government Services Assessment Framework

Ibrahim Alfadli and Malcolm Munro

School of Engineering and Computing Sciences, Durham University, Durham, UK

[ibrahim.alfadli@durham.ac.uk](mailto:ibrahim.alfadli@durham.ac.uk)

[malcolm.munro@durham.ac.uk](mailto:malcolm.munro@durham.ac.uk)

**Abstract:** Introduction: Electronic Government (e-Government) is attracting the interest of governments around the globe due to its great importance in facilitating and providing services to its citizens. Although most of the countries place massive budgets and provide latest technologies, they face many obstacles, including the notable absence in the assessment of e-Government services. Therefore it becomes important to find ways of assessing e-Government services to determine if it reaches desired goals of their citizens. Aim: This research concentrates on assessment of e-Government services provided to citizens through the development, evaluation and analysis of a new framework. This framework is citizen centric and will help e-Government organizations to assess the strengths and weaknesses of their services. One of the main aspects of developing an assessment framework is to consider the citizens. The citizen is one of the reasons that drive such governments to put their services online as they are the targeted consumers. Therefore, finding ways of assessing their services is very crucial to achieve better results and citizens satisfaction. The IMGov Model is based around the concepts of four attributes (Input, Processing, Quality Control and Output). Each of those consists of set of factors that will be evaluated using a set of evaluation questions. As an example the quality control attribute includes factor that an organization has website content and a system that provide the services to the citizens. The new framework will be compared with existing frameworks. As this research concentrates on services assessment this comparison may be difficult because existing frameworks focus more on the process of how government achieve better e-Government from other perspectives such as technological, political, social and cultural. Method: Different methods will be adopted such as interviews, surveys (Quantitative, Qualitative) for garnering appropriate information and data by reviewing existing e-Government initiatives in different countries, reviewing wide collections on the existing research on the field and reviewing international standards and categorize them based on citizen centered approach. The actual evaluation can be through a carefully weighted average scheme or alternatively the results can be presented in term of Parallel Coordinates or Star Plots to allow as more in depth examination of the results. Result: This research will develop a conceptual framework to enable assessment of e-Government initiatives by evaluating services provided to citizens. This framework will then be evaluated using case study in Saudi Arabia. Conclusion: This research will produce adequate e-Government assessment measures for the services provided to citizens.

**Keywords:** e-government, citizens, e-government services, assessment, citizen centered

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## 1. Introduction

The general definition of e-Government according to (Sakowicz 2003) is: "The use of information and communication technologies (ICT) to transform government by making it more accessible, effective and accountable". According to The World Bank organization e-Government "refers to the use by government agencies of information technologies that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions" (WorldBank 2011). e-Government becomes a necessity in this era because of its great impact to citizens by providing services. In order to achieve better services, governments should address citizen's satisfaction by using citizen-centered approaches (Bertot, Jaeger and McClure 2008). A number of frameworks have been proposed for the assessment of e-Government and the changes needed in the field of information systems for better e-Government adoption. However, there is a lack of models concerning the assessment of e-Government adoption (Gupta and Jana 2003). Where models do exist they have combined the evaluation of process and service. This research highlights the importance of e-Government services assessment by assessing them as a citizen centered e-Government services approach.

## 2. Related work

The purpose of the literature review is to consider prior investigations concerning e-Government and ways of assessing it and its effect on delivering a service to citizens. (Sakowicz 2003) identified different approaches to measure the development of e-Government by looking at it from three areas: how e-Government should be understood, what are the e-Government evaluation methods in leading countries, and whether some criteria can be applied in different countries. The paper defines the four stages of the e-Government development as:

information available on-line, one way interaction, two way interaction, and full online transaction including delivery and payment. It distinguishes different kinds of e-Government approaches that can be used to assess the development of e-Government from different perspectives. In addition; it claims that the correct assessment of e-Government should concentrate on four domains of e-Government: e-Services, e-Management, e-Democracy and e-Commerce. Therefore; it could be argued that none of these approaches can stand alone as an assessment method to assess specific e-Government because each assessment method is subjective and can lead to different results. As a result, combination of different frameworks will lead to more accurate assessment results. Studies by (Gupta and Jana 2003) have shown the importance of e-Government and how it will lead to better governance. It also describes e-Government stakeholders and how they interact with each other. Furthermore, the research indicates there are some factors that play a major role in the success of e-Government such as Government, People, Policies, and Technology. However, to make all of these factors work toward successful e-Government the importance of evaluating the efficiency of e-Government should not be forgotten. The proposed evaluation framework made by Gupta and Jana categorized the following types of measures:

- Hard measures: includes Cost benefit, Benchmarks
- Soft measures: includes Scoring methods, Stages of e-Government
- Hierarchy of measures: includes Return on investment, Total cost and revenues, Improvement in quality of planning and control, Quality of decision, Value of information and System characteristics. As a result, it could be argued that the case study used the proposed evaluation framework in India and therefore some of the measures might not be suitable if applied in other countries. On the other hand, the qualitative analysis is a subjective analysis and this might lead to different results from one person to another.

Previous studies have reported that the US government is using different methods to find out whether or not citizens are getting what they need from e-Government (Cook 2000). In our opinion, changes can be made to the framework in order to adopt this evaluation in other countries, as well as mixing different kind of measures to get more accurate results. In addition, a closer look at the framework from a different perspective by re-grouping of measures might be needed; as some of the measures are hard to actually measure. Some researchers classified e-Government evaluation indicators in different forms such as social, economic and technical issues. (Alshawi and Alalwany 2009) defines the following types of challenges in e-Government evaluation:

- General needs of target group of people
- Identifying and quantifying benefits
- Considering social and technical use

Alshawi and Alalwany proposed framework is based on three factors (Technical issues, Economic issues and Social) issues, where Technical issues are measured by performance and accessibility, Economic issues are measured by cost saving, and Social issues are measured by openness, trust and ease of use. Perhaps the most serious disadvantage of this framework, despite the fact that it is clear and straight forward, is that it is hard to evaluate in a real environment due to the differences that might happen if different people used the same framework against a specific organization or services. Several attempts have been made to evaluate an e-Government by using the EGOVSAT model (Structural Equation Model) to evaluate user's satisfaction. This model focus on eleven measures which have three constructs (utility, efficiency, and customization) and affect four emotional dimensions (confidence, pleasantness, frustration, satisfaction) (Horan and Abhichandani 2006). A web survey has been conducted using the EGOVSAT model to gather data from users as a first stage from two states in the USA. The second stage, after gathering all the data is to conduct several focus groups meeting. Several studies investigating e-Government evaluation have been carried out. An example of these studies is reported by the Dubai School of Government in which they used OECD countries as best practice examples to develop an evaluation model. (DOC N3 2007) The study is based on different members of OECD countries such as Italy, The Netherlands, Australia, United Kingdom and Canada. Moreover, the emphasis is on e-Government evaluation obstacles in these countries and how to overcome them. Some examples of these obstacles are:

- Lack of clarity of objectives
- Hard to define success
- Private sector tools may not work for governments

- Challenge of sharing results

One major criticism of this work is that customization to the Arab countries may be difficult because of the culture surrounding of the area. A relationship exists between an e-Government evaluation from one side, and challenges and issues it might face during the process of evaluation from the other side. According to (Gupta 2007) there are three areas to be considered and assessed. First is the environment, second is the performance of an e-Government project, and third is the impact of e-Government on the government itself. The overall impact will be assessed against e-Government functions, economic and citizen servicing. In order for e-Government evaluation to be a success challenges and issues need to be understood. Gupta focused on stakeholders of an e-Government from different dimensions and points of view such as customers, government and agency. Gupta describes the constraints on the e-Government evaluation process. The study would have been much more convincing if the author had adopted a case study to examine the proposed model to evaluate an e-Government organization.

The e-Government for Development Information Exchange project is coordinated by the University of Manchester and addresses a series of topics of potential interest to e-Government and suggests solutions to issues in relation to e-Government (egov4dev 2008). Egov4dev uses the Design-Reality Gap Model which defines where the e-Government is now and where it will be in the future. It focuses on the following dimensions: information, technology, processes, objectives and values, staffing and skills, management systems and structures and other resources such as time and money. One major criticism of the egov4dev project is that it is only concerned about e-Government in developing and transitional countries. In our opinion, an elaboration could be added on top of this project to include the developed countries as well. (Bertot, Jaeger and McClure 2008) identified the issues related to citizen-centered e-Government research areas such as needs, abilities, expectations, literacy, community engagement, partnerships usability, functionality and accessibility. The research also suggested strategies in order to achieve successful citizen centered e-Government. However, the research effort was exploratory and limited and does not include further details of these areas. (Bartels 2002) suggested that governments should prioritizing which services to put online, improve internal government efficiencies, acquiring citizens interest and satisfaction. One of the limitations of this paper it does not explain why and how to undertake these issues as the research only point to e-Government as a whole transformation. In conclusion, the literature review has shown that there are existing frameworks for assessment of e-Government but they have combined process and service. This research is concerned with the assessment of an e-Government service provided to citizens.

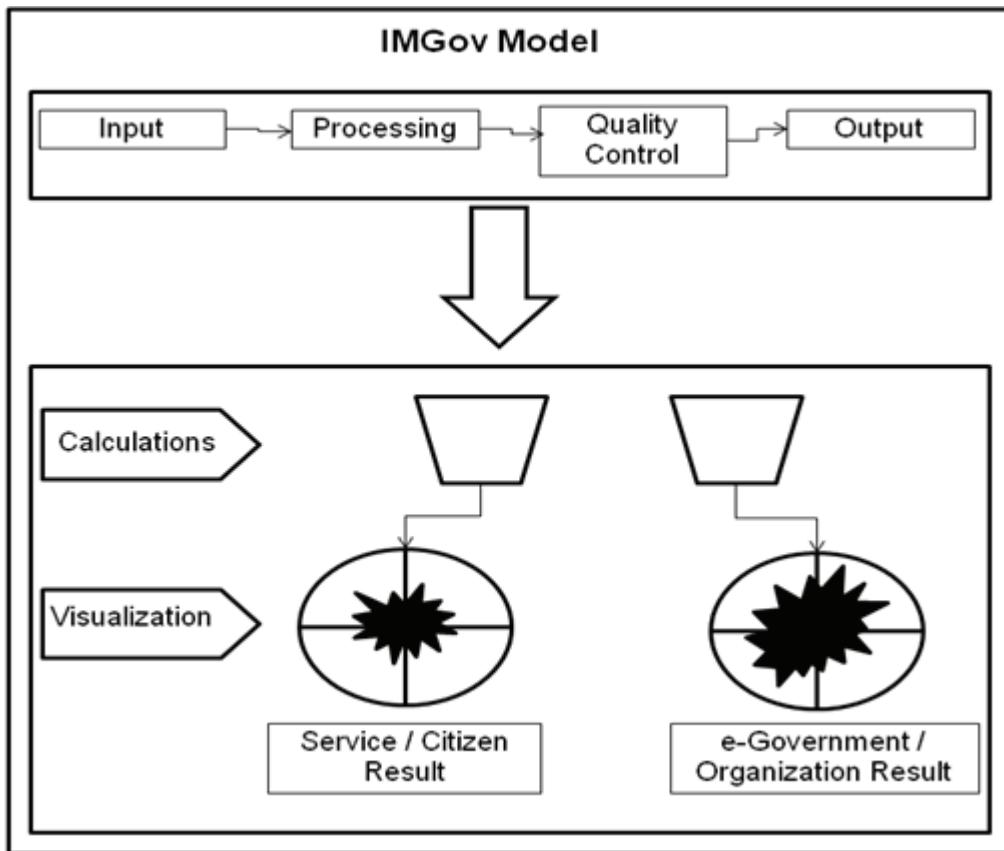
### **3. IMGov model**

The related work showed that there were existing evaluation models but each had its drawbacks. As a result a new model was developed (IMGov) to address the identified short comings. The IMGov model consists of four attributes (Input, Processing, Quality Control and Output) each attribute consists of set of factors contributes to the assessment from a citizen perspective and/or government perspective. A high level view of this model is shown in Figure 1.

In the model each attribute is expanded into a set of factors, each of which comes into a set of evaluation questions. For example, the input attribute has the following factors:

- Information
- Order experience
- Flexibility
- Accessibility
- Security
- Cost
- Usability

All the above aspects will be examined and evaluated and the result will be related and classified to the Citizen/ Service point of view.



**Figure 1:** IMGov model

#### 4. Method

Different methods will be adopted such as interviews, surveys (Quantitative, Qualitative) for garnering appropriate information and data by reviewing existing e-Government initiatives in different countries from many perspectives such as organizational structure, strategy, action plans, services, initiatives, methodologies and practices. Furthermore, reviewing wide collections on the existing research on the field and reviewing international standards and categorize them based on citizen centered approach. The research process consists of four stages (Setup, Define, Result and Evaluation) and each stage consists of phases as follow:

**Set up Stage:** This stage consists of the following phases:

- Gather data on e-Government services
- Categorization in regard of citizen centered approach

The assessment will be built using a number of influences obtained from surveying the literature. The reason behind this categorization is to make a balanced result between subjective aspects and objective aspects which lead to more accurate result. In addition, an online survey to gather and obtain feedback from the citizens themselves will be another essential factor for assessing e-Government.

**Define Stage:** This stage consists of the following phases:

- Define the assessment Framework: This phase will use the actual results from the set up stage
- Pilot study: To enrich the research a pilot study will be used to test the assessment of the framework.
- Re adjust the assessment Framework if needed

**Result Stage:** The scoring method consist of the following phases:

- Identify evaluation questions
- Assign weight to each evaluation question
- Weighted average is calculated

The results can be presented in term of Parallel Coordinates or Star Plots to allow a more in depth examination of the results.

For the purpose of measurement, a mixture of qualitative and quantitative indicators will be used as well as different well known scales such as Summative, 1-10 Rating, Reality Gap and Comparative.

**Evaluation Stage:** This framework will then be evaluated using case study in Saudi Arabia to illustrate the evaluation of specific service or group of services.

## **5. Conclusions**

This research will assess specific service of an e-Government concerning its citizens. Focusing on assessing and evaluating services is a key factor for an e-Government to be successful from citizens' point of views. In this research, the first area taken into consideration is an exhaustive classification of e-Government G2C (Government to Citizen) to be put forward in order to narrow down the criteria related to citizens. In other words a citizen centered approach. The second area of examination focuses on existing models or framework of e-Government assessment methods adopted in information technology in different countries from different perspectives. The third area will be examining different assessment frameworks such as international standards as well as previous studied in the area related to citizen. This will then be built on in order to arrive at a new model (IMGov) for a citizen centered e-Government service assessment framework that enables the assessment of each e-Government service and to better understand the need of citizens from a government perspective. It will also inform citizens about a particular service from their own perspectives. The new model is based on four attributes (Input, Processing, Quality Control and Output) each of which will have a number of factors and evaluation questions associated with them. This will result in helping governments to find their strengths, weaknesses and therefore satisfying their citizens.

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# Factors Affecting Citizens' Adoption of e-Government Moderated by Socio-Cultural Values in Saudi Arabia

Mohammed Alsaif

University of Birmingham, Birmingham, UK

[MOA015@adf.bham.ac.uk](mailto:MOA015@adf.bham.ac.uk)

**Abstract:** This study aims to consider the problems associated with the low response of citizens to the adoption of e-Government in developing Arab countries, with a predominant focus on the Kingdom of Saudi Arabia. The study has validated the Unified Theory of Acceptance and Use of Technology (UTAUT) in Saudi Arabia and has extend the theory by including further variable such as the trust, compatibility, awareness and the service quality which proposed to influence citizens adoption of e-Government in Saudi Arabia. As the adoption consider as an efficient method to evaluate the success of the implementation. It is necessary for this new innovation to be tailored to citizens' wishes, and taking into account the religious, cultural, traditional and other beliefs to ensure the widespread adoption of this innovation. The finding reveals that performance expectancy is the strong predictor of the intention to use e-Government followed by the trust of the internet. On the other hand, intention to use behaviour, computer self-efficacy and availability of resources found to be significant predictors of the usage behaviour.

**Keywords:** e-government, citizens, adoption, culture, UTAUT, Saudi Arabia

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## 1. Introduction

According to Abramson and Means (2001; P2) who consider the life cycle and the beneficial of the system, e-Government can be defined as "*the electronic interaction (transaction and information exchange) between the government, the public (citizens and businesses) and employees*".

Many governments around the world have accelerated their implementation of e-Government, in order to enhance the efficiency, effectiveness, quality, speed and accessibility of their services (Carter and Belanger, 2005). However, there is no universal model that may be applied to governments worldwide. Each government implements its own individual programme, whilst taking into account the characteristics of the country that involve social, cultural, economic and political factors. Characteristics such as these may assist or hinder the implementation and adoption of e-Government. However, the implementation of e-Government is not an easy task and the governments are faced by technical, political, organisational and social challenges which hinder the implementation process. According to Heeks (2006) 35% of the e-Government project in the developing countries had completely failed while half of these projects had partly failed and only 15% consider as successful projects.

The global index reveals that Saudi Arabia is above average in terms of e-services, infrastructure, human resource, yet is below average in e-participation (UN, 2010). Yesser (2011) conducted a survey to measure customer preparedness for the use of e-Government services, which revealed a high level of awareness of the programme at 82%, and a high score of trust level of 92%. However, both usage and satisfaction were at low levels, with scores of 58% and 55% respectively (*ibid*). Therefore it is clear that e-Government should consider the perspectives of users as a means to achieving high adoption levels, and to achieve successful implementation.

E-Government adoption had been studied widely from the perspectives of technical and management factors. There is a need for further research to examine the human factors involved, and particularly the cultural, social and psychological elements of users in developing countries. This is seen as particularly relevant by the researcher, because the lives of citizens in developing countries may be influenced more by social and cultural issues than in developed countries.

The adoption by citizens of e-Government, as well as of information technology systems across society generally, is strongly influenced by differences of national culture (Carter and Weerakkody, 2008; Al-Gahtani et al., 2007). When the design and reality of e-Government implementation are revealed to be mismatched in developing countries, Heeks (2006) explains that this often leads to its failure. E-Government adoption can also be weakened when the unique social context and national culture of a developing country are ignored by

foreign experts employed to introduce this technology, and so this reliance on external expertise results in a gap in practice (Ali et al., 2009).

The review of literature of technology adoption and culture values suggests that low levels of adoption of e-Government in developing countries should not be blamed on the culture or individual citizens, but that new technology needs to be adapted to suit the culture of Arab societies to achieve high diffusion of technology.

This study aims to consider the problems associated with the low response of citizens to the adoption of e-Government in developing Arab countries, with a predominant focus on the Kingdom of Saudi Arabia. As the adoption consider as an efficient method to evaluate the success of the implementation. It is necessary for this new innovation to be tailored to citizens' wishes, and taking into account the religious, cultural, traditional and other beliefs to ensure the widespread adoption of this innovation. This research will enhance understanding of how technology can assist the adoption of e-Government, by examining citizens' characteristics and socio-cultural aspects, which influence the adoption decision.

## **2. Literature review**

The process of the adoption of e-Government is defined by Warkentin et al. (2002) as the intention of citizens to engage with government, to ask for services or to find information. However, unless the needs and expectations of citizens are effectively targeted towards encouraging them to use government websites, this engagement is unlikely to be successful.

The previous works in e-Government adoption have utilized various theories and individual factors affect the citizen's adoption of e-Government in different countries. The literature emerges various factors influence the adoption of e-Government depend on the local context of single country or deployed among single system such as taxpaying or other government electronic services. Based on Rogers' (1995) Diffusion of Innovations Theory (DOI); Carter and Belanger (2004) studied student's adoption of e-Government and trust issues in the USA and emerge relative advantages, compatibility, image and trustworthiness significantly affect the user's intention to use e-Government services. In another study, Carter and Belanger (2005) combined the Technology Acceptance Model (TAM), Web Trust Model and (DOI) to develop a comprehensive model that contains relevant factors affecting citizen's adoption of e-Government and revealed that compatibility, relative advantage and perceived usefulness are significant indicators of user's intention to use e-Government services provided by the state. Furthermore, based on Davis' (1989) (TAM); Dimitrova and Chen (2006) examined socio-psychological factors affect e-Government adoption and identified Perceived Uncertainty and Civic Mindedness as salient factors. Moreover, utilizing Ajzen's (1991) Theory of Planned Behavior (TPB) and (TAM); Horst et al. (2007) examined Perceived usefulness, personal experiences, risk perception and trust as the main determinants of adoption of e-Government services in The Netherlands. Unified Theory of Acceptance and Use of Technology (UTAUT) was utilised among university students developing country, Kuwait, and Qatar which are ones of the GCC countries (AlAwadhi and Morris, 2008; Al-Shafi and Weerakkody 2009) to examine the citizens' adoption of e-Government. Both studies findings concluded that performance and effort expectancy, together with social influence have a significant impact among the decision of citizens to adopt e-Government. The previous literature concerning the adoption of E-Government from citizens prospective mainly utilised TAM and DOI models to identify the catalyst factors. The prior researches suggested that the core variables of the TAM were significant predictors of the adoption as well as compatibility variables in DOI and social influence in the TPB and UTAUT.

However, the review of literature reveals insufficient findings relating to cultural factors influencing the adoption of e-Government, although two studies compared two different cultures, and revealed the potential influence of cultural differences between the UK and Sri Lanka (Ali et al., 2009) and between the USA and the UK (Carter and Weerakkody, 2008). In a study of European countries, cross-cultural adoption of e-Government was evaluated by Arslan (2009). Another study by Zhao (2011) undertook a comparison of Hofstede's five cultural dimensions across the world with e-Government development. However, these studies gives little attention to the influence of Arab culture upon citizen's adoption of e-Government by emphasis on single socio-culture case, and this current research will attempt to fill this gap in the literature by studying how the culture of Saudi Arabia could affect the adoption of e-Government in the country, and to propose a comprehensive model that would take account of relevant socio-cultural constructs.

## **2.1 E-Government in Saudi Arabia**

Saudi Arabia is one of the developing countries which attempt to respond to these innovative technological advances by the implementing of e-Government program in 2005. This milestone was supported by a clear vision and a strategic plan, top management support and the highest investment on the ICT field among the region. The country has spent about 7.2 billion dollars in 2010 and it forecasts to reach 46.3 billion SR (12.3 billion dollars) in 2015 as the fastest growing country in the region concerning ICT spending (CITC, 2010). Moreover, the demographic characteristics of the youth population and advance level of education are more likely to foster the adoption of e-Government in Saudi Arabia. In addition, the compatibility of e-Government with gender segregation in Saudi Arabia and drive banding for female as well as hot climate may consider as a catalyst to e-Government's adoption among Saudi citizens. Despite the economic prosperity of Saudi Arabia and the greatest growth of the ICT market in the region, the country is suffering from a low level of e-Government's citizen's adoption (Al-Shehry, 2006).

In contrast, other factors may impede the adoption of e-Government in Saudi Arabia which are insecure infrastructure, lack of awareness and insufficient IT skills among the users, lack of policy and judiciary requirements and finally the soft social and cultural barriers (Al-Shehry, 2006). Any technology innovation needs special consideration when it applies to religious and conservative society such as Saudi Arabia committee where religion reflects in every aspect of life and resists any alien which might affect religion adherence. The culture of the society is religious in nature and Islam play a vital role in determine the social norm, traditions, pattern, obligations, privilege and practice of the community. This is because Islam is not just religious ideology but a comprehensive system which embraces all aspects of Muslims life as theology, law and way of life (ALSaggaf, 2004). Furthermore, Hofstede (2001, p. 24) argues that "culture is the collective programming of the human mind that distinguishes the members of one human group from those of another, culture in this sense, is a system of collectively held values". Hofstede suggested that there were five dimensions that could be used to define the concept of national culture: Masculinity/Femininity, Collectivism/Individualism, Power distance, Long-term orientation, and Uncertainty avoidance.

The unequal distribution of power or hierarchy is defined as power distance index (PDI), so that when countries are described as high power distance, they are often highly dependent on their leaders, have lower openness for new ideas, demonstrate individual decision making and use a centralised management style, which prevents the adoption of new innovations (Erumban and Jong, 2007). Saudi Arabia has a considerably high power distance value (80) (Hofstede, 2001), but this high PDI value could encourage these individual citizens to use new technology by proving its value to others.

Uncertainty avoidance index (UAI) is defined by Hofstede (2001, p. 83) as "the degree to which members of a society feel uncomfortable with uncertainty and ambiguity." According to Arslan (2009), uncertainty avoidance is demonstrated when e-Government requires trust for virtual transactions or when users are uncertain about applications, so that new or unstructured situations cause people to feel uncomfortable, which affects their adoption of new technology. The UAI score for Saudi Arabia was high in comparison with other countries (68) (Hofstede, 2001). The literature explains that within Arab society, face-to-face interaction is preferred, which supports this UAI score.

The degree to which individuals relate to other groups and how they integrate within society is measured by the individualism (IDV) index. Therefore, societies described as collectivist are strongly influenced by the ideas and norms of their society, which contrasts with societies described as individualist, where individual citizens are more likely to make their own decisions and choices (Erumban and Jong, 2007). This is demonstrated in societies with high IDV scores, where citizens adopt new technology more readily and express their views more easily, but in collectivist societies, new technology often conflicts with the norms and values of society. The individualism index score for Saudi Arabia is relatively low when compared with other countries across the world (38) (Hofstede, 2001), and Saudi society demonstrates interdependence and a cohesive network.

Hofstede (2001) defined masculine values as including competition, success, performance and assertiveness, and feminine values as including solidarity, caring, service, maintenance of warm personal relationships and quality of life. This index attempted to separate emotional roles of the two genders, so that masculinity would encourage rewards for individuals that give them recognition and enhance personal development and training, and suggests that innovation adoption would be emphasised (Erumban and Jong, 2007; Arslan, 2009). Saudi

Arabia has an average score for masculinity (52) compared to other countries, which could be linked to factors associated with religion, as women have a high dependency on men and have a lower level of involvement in society (Hofstede, 2001).

Short-term orientation describes a society that adheres to past and present traditions and presents a static orientation, which contrasts with long-term orientation that focuses on perseverance and thrift to achieve dynamic progression and future rewards (Hofstede, 2001). Therefore, it could be argued that societies who strongly value the need to fulfil social obligations and are conservative and traditional are unlikely to accept and use new innovations (Erumban and Jong, 2007; Arslan, 2009). Saudi Arabia is described as a religious and traditions adherence society but the long-term orientation value was not measured for Saudi Arabia.

According to Hall (1966) Arab countries have a critical cultural factor influencing these societies which is sense of time, as this is regarded as a static phenomenon, so that events generally happen without planning. As e-Government services are available online at all times and from any location, this flexibility could be supported by this cultural characteristic to adopt this new technology, as users do not need to use this at specific times.

The adoption levels in Saudi Arabia have not fulfilled expectations. Religious adherence, collectivism and tribal systems influence the culture of Saudi people, which often make them reluctant to change, but e-Government could be compatible with this culture if cultural issues are considered when promoting the adoption of e-Government.

### **3. Research model and hypotheses**

The adoption of technology by users has revealed salient constructs from the review of literature that have been based on UTAUT, TAM, DOI or TPB, but researchers have also attempted to include more salient variables to explain their findings better by integrating two or more theories. This study will consider the aforementioned socio-cultural value of Saudi Arabia to identify the catalyst factors affect the adoption of e-Government in Saudi Arabia and justify the proper based model for the study.

Although UTAUT was developed relatively recently, when applied to studies of technology adoption within different contexts, its reliability, validity and suitability have been proven (Al Awadhi and Morris, 2008). Eight models of psychological theories, diffusion of innovation and technology acceptance were compared to formulate the UTAUT model. Over a six-month period, this model was validated by four different organisations, so that account could be taken of high levels of variance of usage intentions regarding adoption of technology (Venkatesh et al., 2003). Social influence, effort expectancy and performance expectancy are the three determinants of intention to use technology within UTAUT, so that voluntariness of use, experience, gender and age form four moderate variables, and actual use is determined by the facilitating condition.

Technology adoption is affected by personal or attitudinal characteristics that are included within UTAUT, but are also involved in TPB, DOI and TAM. As Saudi culture demonstrates low individuality and high collectivism, the social influence factor of UTAUT makes this suitable. As technology adoption is fostered by the importance of computer knowledge and availability of money and time (resources), UTAUT includes facilitating factors that are not identified in DOI and TAM models. Therefore, this study has developed a research model based on UTAUT that has been modified so that it is suitable for the case study and the research area. The aim of this study is to explain e-Government adoption in Saudi Arabia better by investigating more variables from the perspective of citizens. Therefore, the study has selected the UTAUT model as a base model for this research due to its reliability, validity and suitability for the study.

Voluntariness of use, experience, gender and age determine how the main factors are affected by these four-moderated variables of UTAUT. This study has adapted these moderated variables to make the context more suitable by taking out voluntariness of use variable, as e-Government in Saudi Arabia already operates on a voluntary basis and is at an early stage of development, so the moderated variable of level of education has been added to the model, which will moderate the adoption behaviour.

E-Government adoption or actual use of the system by citizens can be predicted by the intention to use the system variable (Ajzen, 1991), but actual use of the system in the UTAUT model is related directly to facilitating conditions factors (Venkatesh et al., 2003).

*H1: Positive Usage behaviour will be significantly influenced by behavioural intention.*

Knowledge, persuasion, decision and confirmation form the four stages of the adoption process described by van Dijk et al. (2008). Perception of the system or knowledge is the starting point for adoption, but an important factor for adopting a new system is based on beliefs about the system (Shareef et al., 2011). Therefore, this study has included awareness of the system to the original model to help predict e-Government adoption better.

*H2: Behavioural intentions to adopt e-Government services in Saudi Arabia are affected significantly by awareness of the system.*

The factors influencing adoption of e-Government from the perspective of citizens of Saudi Arabia are identified within this amended UTAUT model. Effort, cost and time saving were benefits of using e-Government systems that could measure performance expectancy, and complexity or ease of use of adopting e-Government systems could measure effort expectancy. The Arab culture suffers from both planning constraints and sense of time, as this system offers greater flexibility that citizens are encouraged to adopt. One important predictor that determines the intention to use technology is performance expectancy (Alawadhi and Morris, 2008; Venkatesh et al., 2003; Al-Shafi and Weerakkody, 2010). In Saudi Arabia especially, the dominance of men in social roles has also resulted in men being more interested in accomplishment than women. Moreover, Venkatesh and Zhang (2010) consider that effort expectancy is a stronger variable, which has an impact upon women's adoption of technology during the early experience stages. Therefore the following hypotheses are proposed:

*H3: Behavioural intentions to use e-Government services in Saudi Arabia will be significantly affected by performance expectancy and this relationship would be moderated by gender.*

*H4: The intention to use e-Government services in Saudi Arabia will be significantly affected by effort expectancy and this relationship would be moderated by gender and internet experience.*

Research findings suggest that the adoption of new technology is affected by compatibility, effort expectancy and performance expectancy as significant factors (Venkatesh et al., 2003; Carter and Belanger, 2005). A further factor that could be significant for e-Government adoption in Saudi Arabia, as it has a culture of segregation of genders, would be compatibility, as women can access government services online. Although e-Government adoption cannot overcome the cultural preference for face-to-face interaction, the hot climate of the country could be another factor that would encourage compatibility of e-Government in Saudi Arabia. Therefore, personal attitude factor was added to the original model to include a compatibility variable.

*H5: Behavioural intentions to adopt e-Government services in Saudi Arabia are affected significantly by compatibility and this relationship would be moderated by gender.*

As Saudi society demonstrates high power distance and collectivist dimensions, social influence on the behaviour of individuals to adopt e-Government services was determined by evaluating the influence of friends, family and other significant people known to individuals. Social influence could also be moderated by gender, as females demonstrate more sensitivity to other opinions, as well as the factor of age, as younger citizens would be more likely to copy the behaviour of others. This contrast with individuals with lower levels of education or those with less experience of using the Internet who tends to follow the norm at an early stage (Al-Gahtani et al., 2007; Venkatesh and Zhang, 2010).

*H6: Intention to use e-Government systems in Saudi Arabia is affected significantly by social influence and this relationship would be moderated by gender, age, level of education and internet experience.*

Factors of face-to-face interaction preference and uncertainty avoidance cultural values in Saudi Arabia reveal the country has a high score, so the model of trust in government (Belanger and Carter, 2008) has been included in this study to the original model to measure how citizens' initial trust influences their intention to adopt and use e-Government services, so trust of government agencies and trust of the Internet were used to measure disposition of trust.

*H7: Intention to use e-Government services in Saudi Arabia will be significantly influenced by trust in the Internet and this relationship would be moderated by internet experience.*

*H8: Intention to use e-Government services in Saudi Arabia will be significantly influenced by trust of the Government.*

Facilitating conditions and perceived behavioural control are constructs that overlap when measuring the factors of technology, knowledge and resources required for technology adoption. Facilitating conditions variables revealed in previous findings suggest that government support and technology support are significant factors (Taylor and Tood, 2005).

*H9: A significant influence on e-Government usage behaviour will be predicted by computer self-efficacy and this relationship would be moderated by internet experience.*

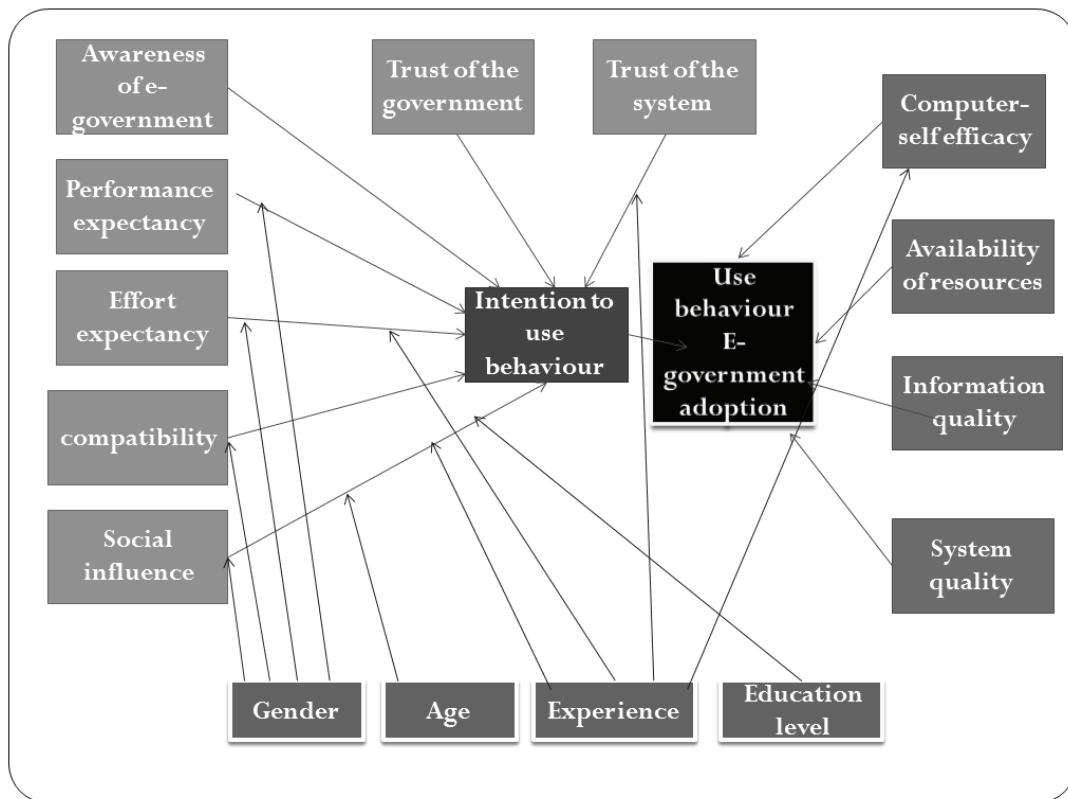
*H10: E-Government adoption will be significantly influenced by the availability of resources.*

Other findings have suggested that e-Government adoption and usage can be determined by the quality of information the system provides and the quality of the system (Shareef et al., 2011). Therefore, this study has included information quality and system quality as facilitators of e-Government adoption to the original model.

*H11: E-Government usage behaviour will be significantly influenced by the quality of information presented.*

*H12: E-Government usage behaviour is influenced significantly by system quality.*

Based upon on the model and theories of technology acceptance discussed previously, as well as relying upon the core model of UTAUT, the following conceptual model is developed.



**Figure 1:** Proposed model of the adoption of e-Government in Saudi Arabia

#### **4. Methodology**

This study used an amended unified theory of acceptance and use of technology (UTAUT) to determine the factors that affect the adoption of e-Government from the perspective of citizens by investigating the psychological, technical and social factors, moderated by cultural values, which influence the adoption of e-Government. The study used an online quantitative questionnaire to survey citizens from heterogeneous groups within a diverse area of Saudi Arabia as a case study, which will be representative of Arab developing countries. The study employed online convenience sampling method and unrestricted self-selected surveys by posting the survey online in various public social networks, such as Facebook and national forums which are related to different cities of Saudi Arabia. The use of the quantitative method is preferred in this study, due to the necessity for consistency and objective judgment of the results that could be generalised to larger

populations (Bryman, 2008). Quantitative research is also useful when attempting to quantify personal belief, behaviour and opinion in order to discover the attitudes and perceptions of populations towards certain phenomenon (Carter and Belanger, 2005). The society of Saudi is conservative by nature, which emphasis segregation by gender. This will influence the strategy of this research by avoiding direct contact in the method of data collection; otherwise the research will be biased towards one gender only. As this approach attempted to cover a wide geographical area and survey a large population to gain information from a diverse range of respondents' characteristics and heterogeneous groups, this method was determined to be the most appropriate. The survey was posted on various social public networks for a period of six weeks and a total of 723 responses completed the survey.

## **5. Research finding**

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances and the data was checked for inconsistent and missing data which affect the analysing process using SPSS. Finally, a total of 692 usable completed questioners were selected for further analysing which consider as a reasonable response number. The reliability and validity tests are ones of the crucial tests which measure the property of the instrument especially in quantitative research. Cronback's alpha test was conducted in this research in order to measure the internal reliability and emerges an overall cronbach alpha value more than 0.872 which considered as a high internal reliability coefficient. In this study factor analysis and correlation matrix test was performed in order to evaluate the construct validity of the research. Moreover, the factor analysis will examine the difference between some new factors which have been added to the UTAUT such as information quality and system quality, trust of system and trust of the government.

The factor analysis found six components which influence the intension to use e-Government behaviour. Most items were loaded perfectly under their proposed factor except three items which have cross loaded and discarded for further analysis. The first group of items are involved under effort expectancy (EE) factor and the second group are comprised under Trust of the government (TG) factor. Furthermore, the third group of components is regarding Performance expectancy (PE) factor while the forth group is referring to compatibility (CM) factor. The fifth group is referring to social influence (SI) factor and finally the sixth group is considering trust of the internet (TI) factor.

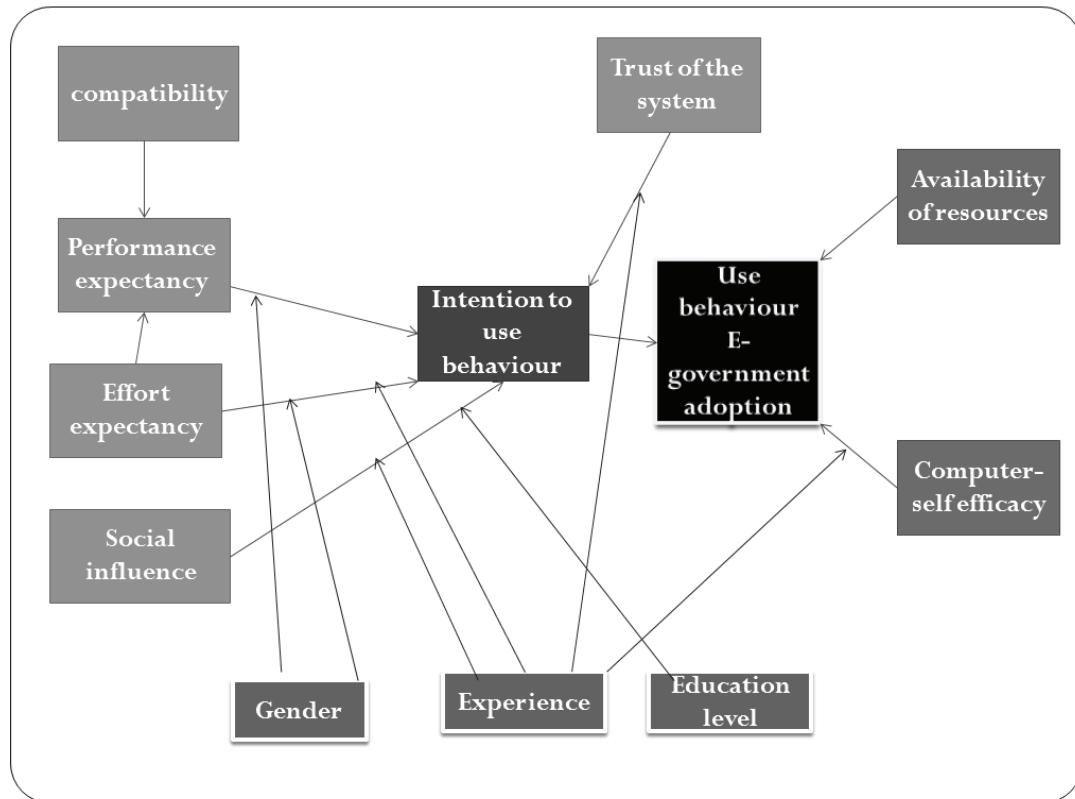
The second group of components which regards usage behaviour are loaded under three groups with some components were deleted because of cross or low loaded. The first group loaded both information quality (IQ) factor and the system quality (SQ) under one component. Therefore, these two factors were merged together under one components and called service quality (SQ). The second group is loaded under availability of resource (AR) factor. The third group of components is considering computer self-efficacy (CS) factor.

A general linear module (GLM) contains three procedures which are regression, the analysis of variance (ANOVA), and the analysis of covariance (ANCOVA) was utilised in this section to predict the effect of the dependent variable in one side with an interaction between two independent variables on the other side which also called factorial ANOVA (Field, 2009). The Levine's test of equality was performed to assess the homogeneity of the variance (Field, 2009). The outcome reveal insignificant of the Levine's test among the intention to use e-Government ( $F= .861$  and  $p>.05$ ) which affirmed that the error variance of the dependent variable is equal across the groups.

The finding reveals that performance expectancy is the strong predictor of the intention to use e-Government followed by the trust of the internet. This result was expected as the Saudi culture has uncertainty avoidance value and lack of sense of time which could be overcome by using e-Government system. The compatibility factor has indirect relation with the intention to use e-Government throughout the performance expectancy. In addition, social influence predicts the intention to use behaviour via the moderated variables which are internet experience and level of education. People with more experience and high level of education moderate negatively the influence of social influence towards the intention. Additionally, effort expectancy determines the intention negatively with more experience of the internet. On the other hand, the finding shows no significant correlation between awareness of the system and trust of the government with the intention to use e-Government where ( $p>.05$ ).

The Levine's test of equality was performed to assess the homogeneity of the variance and reveal insignificant of the Levine's test among the usage behaviour of e-Government ( $F=.514$  and  $p>.05$ ) which affirmed that the error variance of the dependent variable is equal across the groups.

On the other hand, intention to use behaviour, computer self-efficacy and availability of resources found to be significant predictors of the usage behaviour. The usage of e-Government system behaviour increased as the intention behaviour, computer self-efficacy and availability of resources increased. Figure 2 below illustrate the final empirical research model.



**Figure 2:** Research adoption model

## 6. Discussion and conclusion

The culture characteristics of the country have an impact on the result which reflects on few females participants due to the conservative society and lack of interesting of this subject for the females as they fully depend on theirs men relatives to deals with government transactions. On the other hand males account for 74 per cent of those who never used the system before which explained by the separated gender and driving ban motivate females to conduct e-Government transactions from home. Moreover, the significant correlation between performance expectancy and trust with the intention to use was expected as the Saudi culture has uncertainty avoidance value (face to face preference) and lack of sense of time which could be overcome by using e-Government system. Finally, the youth population of the country neglect the influence of age as a moderated variable. Religious adherence, collectivism and tribal systems influence the culture of Saudi people, which often make them reluctant to change, but e-Government could be compatible with this culture if cultural issues are considered when promoting the adoption of e-Government.

The findings from the research are anticipated to support policy makers and governments in tailoring e-Government services to the requirements and choices of citizens, and to reflect users' traits and to encourage a high level of adoption.

The current study used a statistics quantitative approach to investigate the adoption factors from the citizens' viewpoint and the future works could investigate in depth the research finding using the qualitative approach to expand our understanding of the new area of citizens' adoption of e-Government.

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# Balancing Rights and Utility in Determining Power Relationship Ratios in e-Health Systems

Stephen Darlington

The Australian National University, Canberra, Australia

[stephen.darlington@anu.edu.au](mailto:stephen.darlington@anu.edu.au)

**Abstract:** Governments and private health organizations are adopting e-health systems as a means to improve medical service delivery and reduce costs. While some e-health systems show indications of success there have been some expensive failures, most notably in the UK. Power-relationship ratios determined by a chosen balance of rights versus utility could explain e-health system success or failure. Rights over the portability of medical information have become a contentious e-health issue which could limit desired effectiveness and efficiency. There are conflicts over information governance issues such as consent, privacy, choice, fairness, balancing the rights of the individual versus the common good, questions about who owns health information and what can be done with it. This paper uses a historical institutional framework to compare the path dependencies inherent in adopting *opt-in*, *opt-out* or *mandatory* e-health systems which may result in different outcomes. Each approach makes assumptions about a balance of rights versus utility that may directly impact medical service delivery and costs. These decisions institutionalize e-health power-relationship ratios between e-health actors. The concepts of capacity, competence and ableness are used in an effort to determine power-relationship ratios and what rights e-health stakeholders should have. Striking an optimal balance between rights and utility may well be one of the key choices governments make in order to successfully institutionalize e-health systems, transform service delivery, increase the efficiency and effectiveness of public sector service provider and citizen interaction, and, through the lens of citizen satisfaction, enhance the legitimacy of e-government systems in general.

**Keywords:** e-health, rights, utility, power relationship ratios, citizen interaction

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## 1. Introduction

This paper focuses on the portability of a patient's medical records and the information governance issues that may cause conflict between key stakeholders in e-health systems.

E-health systems that create portable health information in a digital format are being widely adopted by governments and private health organisations as a means to reduce costs while improving medical service delivery. For instance, economic modeling by Deloitte for Australia (DoHaA 2012) estimated a cost saving to the health system of approximately \$11.5 billion over 15 years. Cost reductions were expected to be achieved through more effective medication management leading to reduced hospital admissions and GP visits as well as from improved continuity of care – efficiencies gained from better clinician access to patient information (DoHaA 2012, Turner 2012). By mid-2012 the Australian Government had funded the Personally Controlled Electronic Health Record (PCEHR) to the tune of \$700 million (Turner 2012). The anticipated reduction in healthcare costs compared to expenditure to institutionalize an e-health system is therefore significant.

However, expected benefits have not always materialized. The UK abandoned its electronic medical record (EMR) system after £12.7 billion (Campbell 2011) had been spent on the program. The Australian state of Victoria did likewise after spending over \$400 million (LeMay 2012).

Another reason sometimes given for the adoption of e-health systems is the expansion of citizen rights as a means of improving efficiency and effectiveness (Huijboom 2009: 21-28). Australia's PCEHR institutionalizes this concept and makes patient rights a central component of the e-health system. The PCEHR is an attempt to strike a balance between respecting some stakeholder rights and affecting others. Stakeholder rights, as part of the broader issue of information governance, are now key issues of contention that may define system success or failure. Policy decisions about whether to adopt opt-in, opt-out or mandatory e-health systems raise issues of consent, privacy, choice, fairness, balancing the rights of the individual versus the common good, and questions about who owns health information and what can be done with it.

These contrasting e-health systems will produce different outcomes. Each systems approach makes assumptions about a balance of rights versus utility that may directly impact medical service delivery and costs. These decisions institutionalize e-health power-relationship ratios between e-health actors. I argue that striking an optimal balance between rights and utility may well be one of the key choices governments make in

order to successfully institutionalize e-health systems, transform service delivery, increase the efficiency and effectiveness of public sector service provider and citizen interaction, and, through the lens of citizen satisfaction, enhance the legitimacy of e-government systems in general.

## **2. Concepts and definitions**

E-health information governance rights are rights that affect stakeholder participation in the functioning of a portable medical record system. Stakeholders include: patients, healthcare providers and the state. I will focus on seven stakeholder rights, namely: consent, privacy, choice, fairness, utility, balancing the rights of the individual versus the common good, and the ownership and use of health information. The analysis used to assess an appropriate balance of rights across the three contrasting e-health systems will be historical institutionalism and path dependency. Stakeholder's capacities, competencies, and capabilities, along with system ableness, will be used to explore power-relationship ratios and an appropriate balance of rights in each of the three systems.

A brief explanation of the terms to be used is warranted in order to improve the clarity of the argument. Consent refers to two things: informed and capable patient agreement to the transfer of their medical record, and healthcare provider and state agreement (sometimes through rules and procedures) to the transfer of medical records. Privacy rights deal with who has access to, and control over the distribution of, medical records. Australia's PCEHR e-health system gives patients the right to decide what information is included in their portable medical record and who gets to access it and who does not. Choice refers to having more than one option when making decisions and will be linked closely with the concept of capability. Choice will be expressed in Dowding and John's (2012) expansion of Hirschman's (1970) exit, voice and loyalty terms into citizen satisfaction with the quality of government services. The issue of fairness will be dealt with in Rawlsian (Lehning 2009) terms of equal liberty, equality of opportunity, reciprocity and the difference principle. Utility will be discussed in economic terms of the greatest good for the most people expressly in the interest of the state.

Stakeholders in e-health systems have varying capacities, competencies and capabilities. Here I will use Cowden and Lau's (2012) terminology and Cowden's (2012) linkage with Hohfeldian concepts of the internal structure of a right with one difference. Ableness will be defined as an institutional process that enables capacities to develop into competencies and extended into the capability for competencies to be expressed or used. Ableness will still, according to Dowding (cited in Cowden 2011: 4-5) "encompass the external resources and opportunities on needs to complete an act". Stakeholder competency can be measured on an ordinal scale in two ways. Zero to highly competent, and also in comparison to other stakeholders as more or less competent. This allows meaningful choices about rights allocations to be made.

I use the term rights as an Hohfeldian concept of duty bound obligations comprising action and inaction (Radin 1938). Rights respected or affected will be used as a framework for assessing stakeholder satisfaction with e-health systems clearly linking rights in practical terms to the stated goals of e-health systems – improved service delivery and reduced cost. Stated in these terms, rights systematize the institutionalization of public system service provider and citizen interaction and enhance the potential for service delivery transformation.

Power-relationship ratios have three essential components: *who* – the individual, institution, group and state; *what* – action or inaction is taken; and *outcome* – resulting in a relative position on an ordinal power scale of more or less power. For example, Australia's opt-in PCEHR could be said to give patients *more power over their own choices* and the e-health institution and the state less coercive power over individual choices. In contrast, an e-health institution that mandates the transfer of medical records to whichever healthcare provider requests them could be said to give *less power to the patient and more power to healthcare providers*. Hart's (2009: 289) argument that the most useful approach to the observation and measurement of power is one that focuses on control of events and outcomes will be used in this paper.

Historical institutionalism is typically used to redesign existing institutional frameworks rather than create an initial institutional design (Peters, 2012: 85). However, given future path dependencies of e-health institutions will depend heavily on "initial choices of policies and structures" (Peters 2012: 84) it should not be surprising that looking forward creates an interest in the initial institutional design. This is especially true as e-health is an emerging system and its policies and structures are still largely in the design phase. The extant stakeholders

continue to negotiate policy and structure and a dominant framework of stakeholder rights has yet to emerge from those negotiations. However, what does seem clear is that the rapid development of information communication technology (ICT) is a critical juncture for the old healthcare systems resulting in punctuated equilibrium enabling a move from provider-driven to patient driven healthcare systems with path dependencies very different from the old system.

### **3. Stakeholder interests in e-health systems**

Patient rights can include consent, choice, privacy and service delivery outcomes, although individuals will value these differently. Their satisfaction collectively with each may influence the perceived success or failure of the e-health system. For example, Jolly (2011) has identified patient rights with e-health systems as an area of particular importance requiring significantly more rigorous research and has “argued that privacy concerns have been central to delays in the uptake of e health [sic] in the United States”. Townsend (2012) highlighted three areas of key patient concern in Australia: the limitation of privacy control settings to actually meet patient privacy expectations; the need to fully educate both patients and healthcare providers and their staff on how to effectively use the PCEHR system; and the likelihood that patients will keep information to themselves fearing that it may be used against them by health insurers, life insurers and other doctors.

The major benefits patients may expect from e-health systems include: “increased communication with healthcare providers, timely transfer of accurate medical records, better decision making by healthcare providers and the individual patient themselves” (NEHTA 2013), faster service or less waiting, all leading to improved quality of care.

Healthcare providers are concerned about firstly, the completeness of patient records – patients may not choose to fully divulge all pertinent medical information, and medical records may not be kept up to date. The practical impact of this concern has led healthcare provider organisations in Australia to advise doctors to “examine and assess the patient as they’ve always done noting this information in their own records” which may limit expected efficiencies (Townsend 2012). Secondly, they are concerned about liability for incomplete records and privacy breaches. And thirdly, they are concerned with property rights. Ownership of medical records, rights of access and transfer and their associated costs affect healthcare provider commercial interests.

Potential benefits for healthcare providers include: reducing hospital readmission rates, faster clinical assessments, more accurate diagnoses and referrals, and more effective treatment and prescribing of medicine (NEHTA 2013). There is also the potential of e-health systems to positively transform service delivery. For example, a patient’s right to life may well be enhanced by efficient and effective e-health systems that enable healthcare providers to improve their duty of care and thus improve patient outcomes while at the same time lowering the cost of doing so.

The state’s main concerns may be indicated by the type of e-health system selected for the public health system adopted when legislating healthcare policy. Opt-in systems are likely to reflect a state’s desire to improve citizen interaction with service providers by shifting power-relationship ratios towards the patient, increasing patient satisfaction with service delivery outcomes and therefore enhancing the legitimacy of e-government systems in general. However, opt-in e-health systems run the risk of low stakeholder uptake which may reduce the expected benefits of lower cost and widespread improvements in patient outcomes. Opt-out and mandatory e-health systems are likely to reflect the state prioritizing utility over stakeholder rights in order to achieve perceived benefits. Both lessen choice and increase state coercion therefore shifting power-relationship ratios away from patients towards healthcare providers and the state.

Regardless of which system is chosen reducing costs and improving service delivery are likely to be key state goals driving the implementation of e-health institutions and affecting the rules and procedures of the initial system design. Given governments are the major source of funding in most health systems (WHO 2011) they are likely to see e-health systems as a way to monitor health expenditures, improve the use of scarce resources and enable “better policy development as a result of the high quality data potentially available for use in research and planning” (NEHTA 2013) in order to achieve their goals. The choice of system will directly impact stakeholder rights that are *respected* and those that are *affected*. Rights respected and affected by system choice will be discussed in terms of institutional choice and path dependency.

#### **4. Institutional choice and path dependency**

E-health systems have the potential both for social control (Zola 1972; Hodgson 2006) and service transformation. Social control is where power-relationship ratios heavily favour the state/government and to some extent healthcare providers. Service transformation is important as public sector providers improve their efficiency and effectiveness. Combined with increased citizen interaction and desire the latter can shift power relationship ratios towards patients and healthcare providers and away from the state. This may lead to an increase in satisfaction with e-health systems for most stakeholders most of the time. The choice of e-health system may therefore be crucial in determining rights respected and affected, service delivery outcomes and stakeholder satisfaction.

Stakeholder rights that are respected in an opt-in e-health system include: initial consent, initial choice to join, assurances of privacy, and fairness. Opt-in e-health systems, such as Australia's PCEHR, give both patients and healthcare providers the most choice. Both parties must choose to join for the meaningful transfer of medical information to take place. The path dependencies of patients being able to choose what information goes into their PCEHR, and which healthcare providers may access what information, clearly shifts power relationship ratios towards the patient. Patients have more control over both events and outcomes than they had previously and their privacy rights are strengthened. They are also able to make different decisions from one another yet still be satisfied with the e-health system and thus see it as fair.

However, rights that are affected, such as the portability of medical records and the ownership and use of medical information, may reduce the utility of the system. In systems where healthcare providers are not salaried employees, but operate as a business, commercial issues arise of ownership, access, and cost. For example, a patient requesting their records be transferred to a competing healthcare provider might find that their current healthcare provider considers those records the property of the medical practice and may refuse the transfer request or charge for it. The question then becomes one of transactions within a commercial exchange. When a patient pays for a diagnosis who owns the professional opinion of the healthcare provider and the medical test results that provider ordered? Are those records transferrable? Who decides and who pays? Resolving these issues is critical for both effective patient and healthcare provider participation and positive system utility. Expected cost reductions and improved service delivery will be less likely to occur if some stakeholders refuse to participate because they see their rights being negatively affected.

Opt-out e-health systems have the practical effect of reducing real choice to those who know they have such a choice and have the inclination and ability to navigate the system in order to realize their choice. Patients are automatically enrolled in the e-health system and must follow its rules and procedures unless they choose to opt-out. This was the case with the UK's National Health System Summary Care Record (SCR). Patient concerns included the difficulty of opting out, privacy and accuracy of their records, and a lack of government consultation about the whole process (Porter 2010). Lack of choice reduces stakeholder control of events and outcomes shifting power relationship ratios towards the state. Power-relationship ratios can also favour healthcare providers if they institute systems that automatically enroll patients. For example, this may happen on hospital admission with the expectation that patients will follow the rules and procedures as they are treated within the hospital's system. It may be very difficult for patients to opt-out of such systems with the practical result being the imposition of a mandatory system in all but name unless patients have the resources and capability to voice dissatisfaction or exit the system. Therefore, rights both respected and affected in opt-in systems are likely to be more contested in opt-out systems unless stakeholders habitually engage with, and display satisfaction for, the institutional system of rules and norms.

Mandatory e-health systems imply imposition, universal coverage and an absence of patient choice and privacy rights. While initial system structure may be a result of stakeholder negotiation, once institutionalized e-health system rules, procedures and norms dictate the role of rights and establish power-relationship ratios. Therefore power, and control over events and outcomes, is likely to aggregate in the hands of the major healthcare providers and the state. Utility is likely to be prioritized as the path most likely to achieve goals of improved service delivery and lower cost. The rationale for universality and utility is advances in technology have produced the opportunity for e-health systems to efficiently and effectively deliver outcomes that support key state goals in a way that was not possible in the past. The opportunity cost of not doing so is seen as high especially in an era of aging populations and rapidly rising healthcare costs. For example, identifying a target group susceptible to a certain disease within the system makes it much easier to notify, monitor and

treat that group than if they have opt-in or opt-out rights. Effectively dealing with epidemics such as SARS is a case in point.

## **5. Satisfaction with e-health systems seen as success or failure**

The factors that may impinge on satisfaction measures would include: improved information management leading to better medical service delivery, cost efficiencies, positive service delivery transformation, whether overall expectations are met and participation fully realized (loyalty as opposed to exit). Satisfaction may involve patients fully disclosing relevant medical information (responsibility) to healthcare providers in the expectation that by doing so they will receive the most appropriate care. Addressing patient privacy concerns is key to reducing the likelihood that “patients will continue to keep information to themselves” (Townsend 2012). E-health also has the potential to transform service delivery with the result that service delivery will be improved. Indicators that the transformation of service delivery has been successful are changed stakeholder expectations of increased institutional efficiency and effectiveness and a measureable improvement in both. Achieving these outcomes is the theoretical basis for ascertaining e-health system success and an indicator of the legitimacy of e-government systems in general.

Dissatisfaction with e-health systems may be indicated by: service delivery staying the same or deteriorating, unresolved rights issues that negatively impact stakeholders loyalty, negative stakeholder expectations regarding the efficiency and effectiveness of the e-health institutional system, and dissatisfaction expressed through voice (complaints, arguments and litigation) and exit. Therefore, incentives and disincentives, how they are interpreted and valued, need to be explained (Hodgson 2006: 6) in order to more fully identify the components of success or failure. Power-relationship ratios may also be determined in part by the rights incentives and disincentives inherent within the institutional e-health system. This is an area requiring further research.

Satisfaction may be enhanced by the widespread adoption of e-health institutional norms and values that appropriately balance stakeholder rights and system utility. E-health legislation creates legal rights that result in healthcare provider obligations. E-health institutional rules then develop as an interpretation, often explicit, of legislative intent. Once these rules are followed by most stakeholders most of the time they become customary (Hodgson 2006: 3,6,7,18,21). If combined with complimentary social norms then rules and norms combine to reinforce institutional legitimacy. People thus obey laws not simply because of the sanctions involved but also because legal systems can acquire the force of moral legitimacy and the moral support of others (Hodgson 2006: 5). When citizens habitually obey laws, follow rules and procedures, and show satisfaction with an institutional system then it could be argued that the institutional power relationship ratio favours the citizen while broadly supporting government policy.

## **6. Determining stakeholder rights**

My main argument is that power-relationship ratios determined by a chosen balance of rights versus utility could explain e-health system success or failure. The theoretical basis for e-health system success is the Rawlsian concept of the role of institutions being to “secure fair background conditions against which the actions of individuals and associations – that are all part of society as a whole – take place” (Rawls, cited in Lehning 2009: 95). By doing so e-health systems can enhance service provider and citizen interaction by effectively balancing citizen concerns over choice and service quality (Huijboom et al. 2009: 21) with the demand for, and cost of, health services. In part, this operationalizes “key factual and visionary trends” identified by Huijboom et al. (2009) including the “simplification of processes and organisation” that reduce the administrative burden for citizens and businesses, and good governance concepts including responsiveness, consensus, equity and inclusion through democratic participation. To do so requires e-health systems that enable citizen’s capacity and competence to be capably expressed or used. This is both an institutional process of ableness and a societal process of norm building that reflects stakeholder values leading to appropriate power relationship ratios that balance stakeholder rights and e-health system utility.

A successful balance between rights and utility will be identifiable in part when e-health institutional rules and procedures become conventional and are widely seen as legitimate. Hodgson’s (2006) concept of the social nature of citizen interaction with institutions such as e-health is valuable in that it allows public sector service provider efficiency and effectiveness to be measured through the rights lens of stakeholder engagement and satisfaction with the institutional system of rules and norms. Thus, Australia’s PCEHR allows patients to make

choices that effectively control the portability of their medical records. If participation and satisfaction with the system is high then it could be seen as successful.

What is the ideal power-relationship ratio in an optimal e-health system? Where stakeholder competence and capability is high and enhanced by system ableness then optimal e-health system utility and stakeholder satisfaction may be best served by adopting an expansive opt-in system that has opt-out and mandatory components that best serve. Here, power-relationship ratios favour the citizen and support key values the European Council identified as central to health policy that sustains the “growing expectations and empowerment of patients” (Huijboom 2009: 26). Those key values are “universality, access to good-quality care, equity and solidarity” (Huijboom 2009: 26). This approach has the most potential to transform service delivery but requires significant stakeholder participation, consultation and input. McGee (2011) has argued that the US has made enormous efforts to obtain input from relevant e-health stakeholders before creating the e-health institutional rules, procedures and financial incentives, effectively creating a hybrid top-down and bottom-up system that is far more likely to be successful than the failed British top-down “one size fits all ... you’re using this and will like it” model.

Where stakeholder competence and capability is low and unsupported by system ableness then it may be more prudent to focus first on utility by establishing opt-out and mandatory systems that are designed to transform into the opt-in system described above as system ableness increases stakeholder competence and capability. Here, power-relationship ratios favour the state. If the state’s initial goal in establishing an e-health system is to enhance stakeholder competence and capability power-relationship ratios should eventually shift towards the citizen while still maintaining system utility.

## **7. Theoretical implications**

This analysis is a work of practical political philosophy in that it provides bases for public justification and political agreement about e-health systems by creatively constructing a valuation frame of reference whose rules and procedures are both normative and evidential (see Lehning 2009: 12,100). Normative in the sense that they ‘should’ be adopted. ‘Should’ is justified by reason. Evidential in that the ‘should be’ is in some way better than the ‘is now’. Reason presupposes an outcome ‘better than is now’ that must in some way be measurable or otherwise the premise does not lead logically to the conclusion - the outcome would be meaningless and ‘should’ an emotion without substance to shift the reality of ‘is now’. Therefore, the scientific method can support or deny normative claims.

Lehning (2009: 12) notes that since the 1950s, and particularly the 1960s, “making the step from observable facts to norms is [when applying the scientific method] in principle impossible”. I would argue it is both possible and natural. Observable facts establish what ‘is’, which naturally leads to what ‘ought to be’. Something ‘ought to be’ because reason X and its predicted outcome  $Z_1$  is better than reason Y and its current ‘is’ outcome  $Z_2$  or competing predicted outcomes  $Z_3, Z_4, Z_5$ . In an institutional setting such as e-health the path dependencies of X and Y could be used to measure predicted outcomes of ‘is’ and ‘ought’. When applied to Rawls’ concepts of justice as fairness and the difference principle, a measured value can be given to normative values.

Why? Because outcomes have stakeholder values. While these values can be normatively expressed they can also be measured. For example, satisfaction is a normative term that can be measured as more or less satisfied on a scale. This scale can be numbered giving more precise measurements of 1, very unsatisfied, through to say 5, very satisfied. Measurement, and for that matter subject response, may be subjective and therefore value relative but this is a notion of change over time. For example, when suffering from influenza in 1920 citizen A may well be satisfied with a hospital bed and comforting care but no cure. However, were they living in 2013 they may well be unsatisfied with that medical response and be expecting a cure that enables them to leave hospital in the near future healthy and full of vigor. The outcome in 1920 may well have been death whereas the outcome in 2013 may well be life – a significant difference. Therefore, some aspects of particular values may be objectively measured if linked to outcomes.

## **8. Conclusion**

I have argued that in choosing a balance of rights versus utility, e-health systems determine power-relationship ratios. The balance chosen could explain e-health system success or failure. Competent and

capable stakeholders who exercise more control over events and outcomes enable power-relationship ratios that are likely to increase stakeholder satisfaction with e-health systems. This promotes outcomes more closely aligned with stakeholder values. Increased stakeholder satisfaction is likely to increase the efficiency and effectiveness of public sector service provider and citizen interaction, thus enabling e-health system utility goals to be achieved. E-health systems which develop citizen capacities and enable competence to be capably expressed or used, are likely to enhance the legitimacy of e-government systems in general.

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# Conceptualizing Public Service Networks as Complex Adaptive Systems

**Ameneh Deljoo and Marijn Janssen**

**Delft University of Technology, Delft, The Netherlands**

[A.deljoo@tudelft.nl](mailto:A.deljoo@tudelft.nl)

[M.F.W.H.A.Janssen@tudelft.nl](mailto:M.F.W.H.A.Janssen@tudelft.nl)

**Abstract:** Public private service networks (PPSN) and complex adaptive systems (CAS) have gained a lot of research attention recently. Combining these two streams results in conceptualizing organizational networks as complex systems. Such complex network consists of many different actors that make use of a variety of different technologies. This complex network is susceptible to cascades of information, norms, and coordinated actions. Nowadays due to the explosion of digital connectivity, a significant improvement in communication and information technologies is occurred which influence the shape of PPSN. The inherent complexity and unpredictability of the information society demands new kinds of network coordination that focus on rapid joint responses and collective actions instead of centralized predictive planning. In such a network private and public organizations have to adapt these developments through 'nonlinear innovation'. Policy-makers are looking for way to direct the development of these networks. Our aim is to improve the understanding of PPSN by reviewing the contemporary literature in PPSN and complexity systems. Finally we discuss the CAS characteristic in PPSN and illustrate that a complex system lens can help to conceptualize PPSNs. By modeling PPSN as CAS the effect of policy-intervention should be evaluated and the evolution of PPSN should be understood.

**Keywords:** public private service network, coordination, complex systems, complex adaptive system, eGovernment, policy-making

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## 1. Introduction

Researchers and practitioners started to use complexity science to understand better organizations (Dooley et al. 2003). Theoretical models and proposals emerged on organizational and managerial issues. Concerning these theories, Dooley et al. (2003: 62) state that: a basic assumption within these theories is that organizations are conceptualized as complex adaptive systems (Anderson 1999; Axelrod and Cohen 2001). CAS is composed of semi-autonomous agents that seek to maximize fitness. By adjusting interpretative and action-oriented schema that determine how they view and interact with other agents and the environment. Also, (Mathews et al. 1999) argue that the emerging complexity sciences have the potential for extending and enhancing our knowledge of organizational change and transformation processes.

At the same time policy-makers are looking for way to direct public-private service networks (PPSN) to let them better meet societal needs. PPSN are networks of the autonomous the agents they are interacted with each other and environment.

The focus of this paper will be on seeking aspects of CASs that can be used as a generative metaphor in PPSN settings. For that reason, we avoid the more theoretical and philosophical discussions on CASs. Further, the question of whether the literature and research conducted on CASs constitutes a theory is also avoided, not because it is unimportant, but rather from the viewpoint that the discussion is of little value in building a generative metaphor as a starting point for this research.

In this work, first we review literature about CAS and Network organizations. Following that, we will argue that PPSN can be conceptualized as CAS to capture its intricacies. We use the general definition of CAS as a system that emerges over time into a coherent form, and adapts and organizes itself without any singular entity deliberately managing or controlling it (Brown 2004). Through the CAS lens, a PPSN is conceptualized as a network of organizations interacting with each other using technology. In this paper we discuss the relationship between PPSN and the CAS theory and make the argument why CAS is a suitable lens for conceptualizing PPSN. This paper is structured as follows: In section 2, we give an overview on the CAS literature, which is followed by a description of network organization in section 3. In following in section 4, CAS model development and the application of the CAS in PPSN. Finally, in Section 5, the implications of this research are presented and conclusions drawn.

## **2. Theoretical background**

### **2.1 Complex adaptive system**

In this section an overview of complex systems is provided and the multi-disciplinary nature of research on the topic will be explained. The section will firstly address the way of thinking required to grasp complex adaptive systems before moving on to discussing some of the basic concepts of complex systems. Finally, five overlapping concepts of complex adaptive systems will be offered as a starting point, or generative metaphor, (i.e. aggregation, flows, nonlinearity, diversity and evolving). These five concepts can assist in the process of understanding how CAS can assist with organizational understanding. This section will also provide most of the definitions required for understanding complex systems.

Many writers have used a story telling method of explaining CAS as it often requires going back and having a look at what has been said previously before progressing once again (*ibid*). According to several researchers ((Holmdahl 2005), (Levin 1998, 2002)) the concept of complexity science covers many fields of scientific research such as many natural systems (e.g., brains, immune systems, ecologies, societies) and increasingly, many artificial systems (parallel and distributed computing systems, artificial intelligence systems, artificial neural networks, evolutionary programs) are characterized by apparently complex behaviors that emerge as a result of often nonlinear spatio-temporal interactions among a large number of component systems at different levels of organization (Eve Mitleton 2003; Jiang et al. 2011). These systems have recently become known as Complex Adaptive Systems (CAS). The complexity framework is originating from work in the natural sciences studying CAS, e.g., physics, chemistry, biology) (see for example (Dooley 1996; Rounsevell et al. 2012)).

(Holland 1992) defines a CAS as a “collection of autonomous, heterogeneous agents, whose behavior is defined with a limited number of rules. These rules govern the types and number of interactions among agents”(p.18). The power of the system mainly comes from agents’ interactions, not the agents themselves. Each individual interaction generally has only a small or limited direct effect on the outcome of the system. However, the aggregate product of the thousands of these interactions and the accumulated feedbacks among the agents can have a large effect. Systems behavior is made up by the interacting agents.

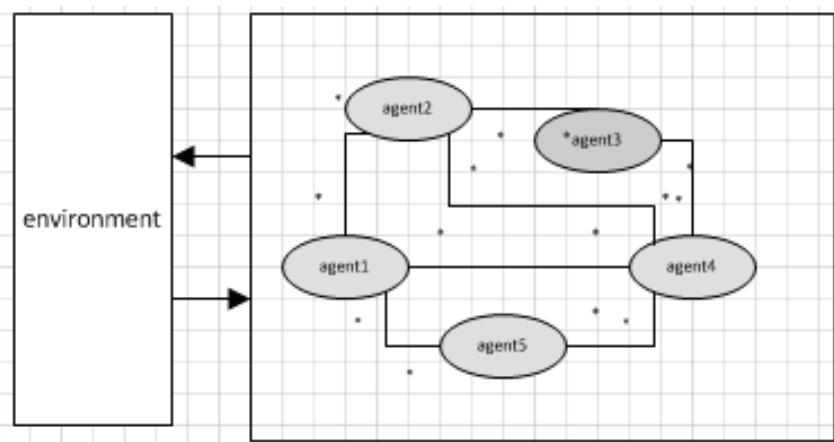
CAS is a method developed in physics, mathematics, and computational sciences (Eidelson 1997) to deal with the issue of complexity and complex systems and has been redefined by a growing number of applications in domains as diverse as biology, political science, economics (Holland 1992). Complex dynamical systems are comprised of parts that interact with each other. They are complex because it is impossible to predict their behavior by simply understanding the function of each part, primarily because the function of the overall system depends on the way these parts interact with each other (Wallis 2008).

The diversity of these parts and the richness of their interactions endow a complex system with its capacity to innovate, adapt, and sustain itself (Brown 2004). At the same time, these global, emergent properties cannot be studied or readily understood by only inspecting the parts in isolation. Complex dynamical systems are nonlinear, such that threshold effects allow a small change in the input value to cause disproportionate change in the output variable. They are also adaptive-the system adjusts to both negative and positive changes caused by external or internal factors. They often exhibit emergent properties, i.e., properties not anticipated by the blueprint of the system (Chan 2001; Damper 2000). One of these properties is the ability of system’s parts to self-organize in some manner that is beneficial to this emerging group. CAS has the ability to exist and operate in a state between pure stability and complete instability in a region contains both.

Many interesting systems are difficult to describe or control using traditional system methods (Stowell and Welch 2012). They include natural ecological system, immune system, economic and other social systems (Levin 1998). One source of difficulty arises from nonlinear interactions among system components. Nonlinearities can lead to unanticipated emergent behaviors, a phenomenon that has been documented and studied in different majors. Nonlinear systems with interesting emergent behavior are often referred to as complex systems. Complex system primitive components of the system can change their specification, or evolve, over time. In this (section 2.1) CASs are dynamic systems able to adapt in and involve with a changing environment. It is important to realize there is no separation between a system and its environment in the idea that a system can always adapt to environment changing. Within such a context, change needs to be seen in terms of co-evolution with all other related systems, rather than as adaptation to a separate and distinct environment

(Chan 2001). Another reason for showing difficulties to describe the underlying is that, the rules of the system are changing over time which means that different agents behave according to different rules at different times.

Researchers have employed different inventions in explicating the theory of CAS. For instant, (Holland 1992) explained the properties and mechanisms of CAS through its seven basics: aggregation, flows, nonlinearity, diversity, tagging, internal models, and building-blocks. Drazin and Sandelands (1992) condensed the inner workings of CAS to three levels of structure: deep structure, elemental structure, and observed structures. In the deep structure looking in the details of system and in another level categorize the element of system. Finally, investigated the environment and how this system has relationship with environment. Although there is no universally agreed upon paradigm describing CAS (Gell-Mann 1995), three components have been consistently recognized as the core of the theory: agents, interactions, and an environment. Janssen and Kuk (2006) identified seven characteristic of CAS: Co-evolution, Emergence, Sub optimal, Requisite Variety, Connectivity, Simple Rules, Self-organizing, Edge of Chaos, Nested Systems. We are looking at the some basic properties common to CAS such as: nonlinearity, aggregation, diversity, flow and evolving. In figure 1 we have shown a simple visualization of agents, interaction between them and environment. In the Table 1 an overview of these Concepts of CAS are presented.



**Figure 1:** Visualize an agent, interaction and environment

In table 1 we are presenting an overview of agent, environment and interaction between them. As we show in table 1 each agent in the system has a specific attribute and behavior rules. In the network there are numerous relationships between the agents which make a flow of information. Finally, we assign this attribute to the PPSN. For example, each agent in the network has special attributes like name, model and organization name. They are connected to each other in the different level of organization environment with rules. CAS aims to facilitate the understanding of the relationships between organizational agents by describing the roles and relationships between agents and environment.

**Table 1:** Basic concepts of the theory of CAS

Table 1 Basic Concepts of the theory of CAS		
Concept	Description	Example
Agent	a collection of properties	People, object, concept, organization, actor
Attribute	characteristic of agents	wealth, age, color, model, capacity
Behavioral rule	The laws of nature	Tit for tat, checkers-playing, send /receive order
Interaction	the recurring regularities of contact among types within a system	Standing ovation, cooperation
Relationship	Relationship between agents	Friendship, food web
Environment	An area for agents to operate on and interact with each other	Landscape, social context, external environment

### **3. Public private service networks**

PPSN are a type organizational network in which organizations can either be public or private organizations. There are some definitions about the network are available, according to Raab and Kenis (2009) networks are “consciously created groups of three or more autonomous but interdependent organizations that strive to achieve a common goal and jointly produce an output” (p. 201). Brass et al. (2004) define a network in a very general way as “a set of nodes and the set of ties representing some relationship, or lack of relationship, between the nodes.” They point out that the content of the relationships between nodes is “limited only by a researcher’s imagination” (p. 795). Brass provide an overarching look at organizational network research at the interpersonal, inter unit, and inter organizational levels of analysis (Brass et al. 2004). Consider networks as a unique organizational form because organizations are already embedded in their broader “network” of economic and social relationships (Podolny and Page 1998). Although great strides have been made, a shared language with definite, concrete meanings in the study of networks has not been developed (Provan et al. 2007).

Networks as coordination mechanism are often discussed on a scale with hierarchies and markets at the ends, which are considered the traditional core model of organizing or coordination (Powell and Grodal 2005; Walter 1990). Networks differ from markets in that the actors in the network pursue “repeated, enduring exchange relations with one another” (Podolny and Page 1998, p.59), instead of relationships that are formed only for specific transactions (e.g. Transfer of goods and resources (Podolny and Page 1998; Powell and Grodal 2005)). In conclusion, PPSN are a particular type of organizational networks in which public and private organizations collaborate. Given the definitions about organizational network in the previous paragraphs help us to define PPSN as a network consisting of (at least three) autonomous public, private and non-profit organizations which aim to provide a service to individual citizens or businesses.

Network organization can be classified as different stakeholders with different goals and interested. Any arrangement in the network has to deal with these differences (Klievink 2011). When it comes to public-private networks, the difference between the goals, interests and values makes it potentially conflicting. There are both vertical and hierarchical relationships (often within organizations). As such there is no central authority and organizations employ a wide variety of technologies.

### **4. PPSN as complex adaptive system**

In this paper we look at the organization as a type of actor and they are connected to each other and are within an environment. In turn an organization is often made up of departments, which consist of many sub-sections with huge interactions among stakeholders, customers, employee and employer by using technology. As we mentioned in section 2, a CAS is composed of many agents or actors which interact with each other and environment. In traditional view the system or network cannot be influenced by the environment but the environment can influence the system (Stowell and Welch 2012). PPSN and environment have an impact on each other, therefore this effect can change the structure of network during time in the rest of this section we describe the evolving in the PPSN.

A complex organization is composed of a large number of individuals, groups, and human subsystems that have nonlinear interaction and the capability to make many local decisions and strive for specific end states or goals. These components build many relationships both within the organization and external to the organization’s boundaries that may become highly complex and dynamic (Jiang et al. 2011). The world adaptive implies that the organization and its subcomponents are capable of studying and analyzing the environment and taking actions that internally adjust the organization and externally influence the environment in a manner that allows the organization to fulfill local and higher-level goals. CAS or complex adaptive organizations, then, are composed of a large number of self-organization components that seek to maximize their own goals but operate according to rules and in the context of relationships with other components and the external world (Dooley 1997). Therefore in our definition of PPSN, the organizations in the network as we shown in figure 1 have relationship with each other and with the environment. In the following, we investigate the PPSN characteristics by using the CAS lens.

*Nonlinearities (Property):* CAS exhibit nonlinear behavior, “so it is difficult to predict their behavior. Aggregate behaviors cannot be easily analyzed into the separate behaviors of component variables via the simple opera-

tions of summing and averaging". In PPSN agents are dynamic and can move in the network freely, therefore predict and analysis this kind of nonlinear system is difficult.

**Aggregation (Property):** This property captures the hierarchical organization that is so striking in CAS. Bodies are made of cells. Economies are made of individuals. In CAS, often the formations of more complex meta-agents are built of simpler agents (Holland 1992), "Aggregation ... is indeed a basic characteristic of all CAS, and the emergent phenomena that result are the most enigmatic aspect of CAS."(p.19). As we shown in figure 2 we divided PPSN in 4 levels (technical level, agent level, department level and organizational level).

**Diversity (Property):** Populations in CAS are diverse and tend to operate far from equilibrium. (Holland 1992): "It should be evident then that we will not find CAS settling to a few highly adapted types that exploit all opportunities. Perpetual novelty is the hallmark of CAS" (p.22)

**Flows of Resources (Property):** Another characteristic of CAS is that resources continually flow through the system — the familiar "open-system" or "matter-energy throughput" of CAS (e.g. flow of information). In the technical layer of the figure 2 we have the flow of information and data between passive agents.

**Evolving (Property):** Gradual changing in a system during the time without changing the fundamental and infrastructure of system is called "Evolving". For this concept, systems (organization) are matured and expand their domain while these developments are occurred during the life of system (organization). System will grow gradually (i.e. develop the scope, more employee, more facilities, more sub-domain, etc.) without changing in the mission of this system.(Stebbins and Braganza 2009). In PPSN the structure of network is changed because of the new agent enter in the market and the old one is disappear.

In Figure 2 we illustrated a PPSN as agents. The top level in figure shows the interacting organizations. Using hierarchical decompositions we can decompose the organization level. Organizations are purposeful entities (March and Smith 1995) that consist of departments populated by self-interested individuals. These individuals use all kind of software and technologies to support their activities. Whereas individuals can be modeled as active agents and can change the structure, the supporting software is passive in the sense that they provide services to the active agents. Passive agents, transfer message and service between active agents or can support active agents by providing support. Passive agents have no action and just play intermediaries roles in the organizational network. Examples of elements of PPSN that can be modeled with passive agents are computers and connections. Active agents are used to conceptualizing and modeling the organizations (Janssen 2001). In the technology level, each modification or changes in the software or technology such as: define new rules or policy, adding new systems, change in the database, have an effect on the user's level; so, active agents and in the top level each department must to adapt themselves to these changes as we shown it by red flash in Figure 1. By using CAS lens, each level in the organizational level learns how to adapt and deal with challenges.

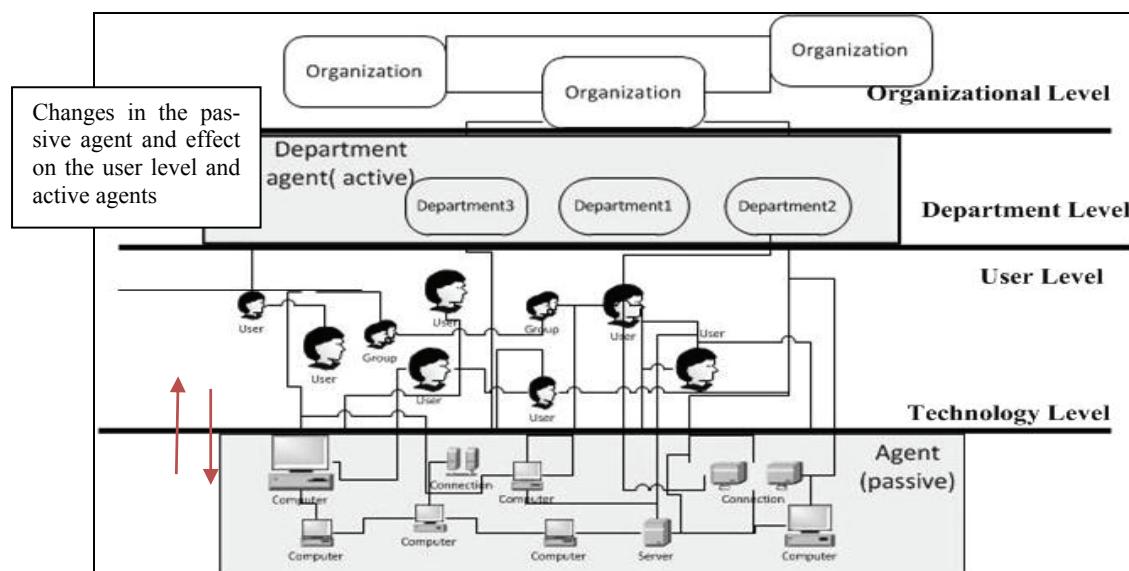


Figure 2: PPSN conceptualized using agents

PPSN are composed of a large number of agents and their relationships such that there's an inability to predict or understand causal relationships among them due to the number of relationships and their nonlinearity. Thus, a complex system can take a large number of states and possess characteristics that we call emergent in that these global characteristics cannot be directly derived from the individual elements and their relationships. PPSN are a relatively new phenomenon, there is little understanding of their evolution. PPSN, because of these interactions between the organizations in the network, may operate in a less stable and more dynamic environment like traffic jam, school of fish and flock and stock market. For instance the new policies for selling product or control the emergency situation in the healthcare system are kind of emergent phenomenon in the PPSN. This makes it difficult for policy-makers to direct its evolvement.

In our definition of the PPSN we illustrate that each organizations in the network (private and public, non-profit organizations) provides services to customers. In addition, organizations change and take new forms; they often do so through the creation and development of emergent aspect. Changing in the demand of the customer and changing in the structure of the network during time make system and relations more complex. In the public and private network when a new rules and system added to the system, all the system accepts the new member of network and adapts them to it. For this adaption, some rules and attributes are changed for instance in stock market when new product added to the system the new policy about how sell this product with the best profit.

## **5. Conclusion**

We analyzed PPSN and CAS and we argued that CAS has the ability to exist and operate in a state between pure stability and complete instability in a region contains both. This paper has highlighted fruitful subjects (e.g. service quality) for further exploitation and exploration for CAS perspective in PPSN and offered a number of research opportunities and challenges such as nonlinearities in the network and adaptive property that may facilitate or hinder ongoing and future PPSN investigation efforts. The lack of understanding of PPSN, or viewing PPSN as mechanic without considering nonlinearities can easily lead to inappropriate hypothesizing and findings that are difficult to interpret in better network outcomes. In this paper we argue 5 properties of CAS (nonlinearity, aggregation, diversity flow and evolving) are use full for conceptualizing PPSN. We figure out that in the network of organization by considering the flow of information and different between goals of organizations (both commercial and non-profit) systems are constantly changing during time so, CAS can help to adapt network to this modification.

We proposed the initial conceptualization of PPSN in which each organization; department or individual is modeled as an agent. Our future work will focus on understanding evolution of PPSN by conceptualizing them as CAS. Also, by using agent based modeling we find the model of CAS for understanding PPSN by using multi-agent simulation. Agents will be used to model the behavior of each individual entity and the aggregate behavior of individuals can show the dynamic and emergent behavior over time. Once an ABM is created, various parameters can be manipulated and rules could be modified in order to study the emergent outcomes and to study the adoption of new developments. In this way the implications of design principles can be evaluated and used to modify the design principles.

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# Citizen-Centric Requirements for Transformational Government

**Kamalia Azma Kamaruddin, Ariza Nordin and Nor Laila Md Noor**

**Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia**

[kamalia@tmsk.uitm.edu.my](mailto:kamalia@tmsk.uitm.edu.my)

[ariza@tmsk.uitm.edu.my](mailto:ariza@tmsk.uitm.edu.my)

[norlaila@tmsk.uitm.edu.my](mailto:norlaila@tmsk.uitm.edu.my)

**Abstract:** Governments in developed and developing countries have implemented electronic government in their effort to improve internal cost and promote efficient governance to the citizens and business communities alike. Though most countries, including the least developed ones, now are having their own websites and providing online services, it has been proven that e-government does not deliver the results as it was expected. From a research done in developing countries, it has been discovered that 35% of e-government projects resulted in total failures, 50% were partial failures and only 15% succeeded. In reaction to these poor outcomes, a new trend in delivering public services using information and communication technology known as Transformational Government (T-Government) has emerged. The shift of perspective in transformational government is about the use of technology to encourage more open and transparent form of government, where the public has a greater role in forming policy and has improved access to government information. In this research, we argue that citizen-centricity is a fundamental principle in t-government implementation, where citizens will no longer play the role of passive recipients of the government services but may take an active role in the t-government service design, implementation and operation as part of democratic processes. Citizen-centric also means that government is more responsive towards citizen's requirements and being transparent in its service. By using literature analysis method, we begin by investigating the characteristics of transformational government and identifying its constructs from the citizens' perspective. Then, a citizen-centric demand model is composed and the relationships between its components are identified. These relationships will become the basis to build research hypotheses in upcoming work. Future works also include integrating the citizen-centric demand model into the research's broader requirements framework that will contain government and technology components. The findings of this research are significant for designing an effective program of citizen-oriented services in government agencies. A guided definition of citizen-centricity concept is expected with the establishment of the model.

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**Keywords:** transformational government, citizen-centric, demand model, citizens requirements, requirements framework

## 1. Introduction

Governments around the world have implemented electronic government in their effort to improve internal cost and promote efficient governance to the citizens and business communities alike. In the era of information technology especially when the Internet and World Wide Web continues to expand, it is not surprising to see all levels of governmental bodies leveraging on these approach to deliver their services. However, even when the least developed countries have had their own websites and provide online services, it has been proven that e-government does not deliver the results as it was expected (Dada 2006). From a research done in developing countries, it has been discovered that 35% of e-government projects resulted in total failures, 50% were partial failures and only 15% succeeded (Heeks 2003). Moreover, Gartner Group (2002) identified the failure rate of e-government projects worldwide is as high as 60%.

In reaction to these poor outcomes, a new trend in delivering public services using information and communication technology (ICT) known as Transformational Government (T-Government) has emerged. Also branded as Government 2.0, it is about the use of technology to encourage more open and transparent form of government, where the public has a greater role in forming policy and has improved access to government information. The shift of perspective to transformational government will enable citizens to gain more efficient and timely access to data, information and services through the sharing and distribution of information within and through the government.

Transformative government application encompasses a virtual business layer within government, which allows a transparent, collaborative and innovative citizen-centric service to be presented to citizens across all channels. To materialize this, a good requirement engineering framework needs to be present to be used as process guidelines in developing transformative government applications. In a research conducted in National University of Singapore, Saha (2010) stressed on the need "to balance the currently dominant service-provider centric viewpoint with the often ignored service-consumer centric viewpoint". Although service-consumer

centric viewpoint does not embrace the whole citizen-centricity concept, it is still worth studying since it can promote better understanding of citizen preferences aimed at increased citizen-centricity (Blakemore 2010). However, the core of public sector ICT framework in many developing countries mainly stress on delivery system on a supply-side perspective (MAMPU 2011; Darwish 2008; Bhuiyan 2010; Shareef 2012). It does not focus on citizen participation to uphold democratic principles where citizens are allowed to contribute ideas through requirement gathering and e-government services design and evaluation. These ICT roadmaps are fundamentally not a citizen-focused one, which will be resulted by low level of take-up for e-services (Borras 2011). Government's attempts at eliciting citizen demands can be seen through requirements studies that were done on project basis based on opinion surveys, consultants' experiences and reflections of previously implemented systems, but at its best, these attempts does not build a cohesive model for future developments. Policy makers and systems developers have no means to conduct empirical research to understand citizen's needs due to limitations of time, resources and environment. Thus, it is the intention of this research to produce a realistic model that can represent the principles of citizen-centric demand requirements to support development of transformational government.

According to Janssen and Shu (2008), models and frameworks are facilitating instruments that enable the realization of t-government, and there is hardly any formal model available that can operate at abstraction level. Although Janssen and Shu's study was done five years ago, still until now we couldn't find any framework to guide requirements modeling for t-government application development, especially in the context of developing countries. Thus, it is the aim of this research to propose a citizen-centric model that can be incorporated in requirements engineering framework for t-government applications, in order to support the implementation of transformational government in developing countries. The research will address and manage demand of citizens that needs to be integrated in t-government system design in order to deliver an effective solution for better services provision. It will address citizen-centricity at operational level where the interface between citizens and government lies. The remainder of the paper is organized as follows: section 2 describes the definitions of transformational government by various authors, as well as presenting a table to show its characteristics and approaches. Section 3 discusses the research findings - a citizen-centric demand model for transformational government and explanation of its components. Concluding remarks and an outlook for future works are provided in section 4.

## **2. What is transformational government?**

When discussing transformational government, various researchers have offered different definition to explain the concept (Ho 2002; Janssen and Shu 2008; Borras 2011; Dwivedi and Janssen 2011). For instance, Ho (2002) explains transformational government in terms of the way such governments operate; Janssen and Shu (2008) define it based on its fundamental characteristics while Borras (2011) and Dwivedi and Janssen (2011) view it with a focus on process of transformation and back office reengineering respectively. Realizing that these definitions are context and focus dependent, lack of clarity of the precise meaning is indeed similar to e-Government where it has been claimed that there is an absence of a universal definition (Filho and dos Santos 2009). Nevertheless it has been found that countries today are experiencing a progression of e-government maturity level towards realizing t-government (Reinwald and Kraemmergaard 2012; Weerakkody and Dhillon 2008). It is the maturity level that distinguishes clearly between e-government and t-government in that the former is a traditional, agency-centric in vertical-silos model while the latter has transformed to a one-stop, citizen-centric model driven at whole-of-government level (Al-Khoury 2011; Borras 2011). Therefore according to Borras (2011), the four major ways t-government evolves from e-government are; it transforms services around citizen and business user, it aims to e-enabled the frontline of public services, it empowers the citizen, and finally, it promotes cross-government efficiency. For another perspective of e-government maturity, the failure of various e-government projects has triggered the necessity of having t-government as a remedial justification in order to improve the level of competency and cost saving of the delivery system in the public sector, which was initially anticipated through electronic service delivery (Dwivedi and Janssen 2011). The emergent of terms such as "e-Government 2.0", "Government 2.0" and "eGov. 2.0" have been stated as another paradigm (Osimo 2010; Silvarajah and Irani 2012) within the practice community, which consequently leads to increasing efforts of transformational government. However there is yet an impending need for research to focus on t-government theory in order to enhance clarity on the definition and principles of transformational government.

In order to get the essence of what transformational government entails, we delved into various literatures using keywords such as ‘transformational government’, ‘connected government’, ‘government 2.0’, ‘open government’ and ‘citizen-centric government’ to find its approach, dimensions, requirements, characteristics or concept. Al-azri et. al. (2010) proposes a classification of paradigms for successful e-government transformation as (a) organizational, (b) technology and (c) user, which is in line with taxonomy of t-government issues presented by Janssen and Shu (2008). Thus, this research will adopt this view in theorizing and classifying the definitions of t-government based on the literatures found.

Dais et. al (2012) explains the requirements of t-government as having citizen-centric delivery and effective management within government, which strikes a balance between user and organizational paradigms. This view is also shared by Saha (2010), in which he describes connected government as having seven dimensions that are mostly in user and organizational views. Another author that seconded this outlook is Al Khouri (2011). He explains the characteristics of citizen-centric e-government as having increased trust and accountability, collaboration among departments and stake holders, avoid duplication and overhead, track effectiveness of initiatives, improved transparency, consistent user interface and convenience channels, increase responsiveness and security, and opportunities for businesses to provide inputs (Al Khouri 2011). In a similar note, Bannister and Connolly (2011) also elaborate on the concept of transformational government by giving emphasize on organizational paradigm, such as networked and entrepreneurial government, decentralization, agility and the elimination of bureaucracy.

On user-centric view, Osimo (2010) in his editorial article in European Journal of ePractice defines transformational government, to go beyond traditional eParticipation, including open government, citizens-driven services, and adoption of social tools. His opinion differs from Dwivedi and Janssen (2011) as the latter focus only on reengineering back office processes and IT systems in the public sectors. A mixture of organizational and technological view was found in the work of Reinwald and Kraemmergaard (2012), where they emphasized important characteristics of transformational government as having integrated databases, process reengineering and cross-agency integration, however, no mentioning of user-centric factors was included in their definition. The most comprehensive concept of t-government have to be said on the work of Borras (2012) and OASIS Technical Committee, where all paradigms are unified to give an emphasis to t-government approach proposed by them. The summary of t-government principles is shown in Table 1.

It can be concluded that there is no universally accepted definition of the transformational government concept. T-government is an ill-defined concept and arises from governments having to become more citizen-focused while recognizing that it would need fundamental changes to governance (Janssen and Shu 2008). From the summary of t-government characteristics, it is clear now that transformational government is multidimensional which involves a combination of organizational, technological and user domains. In this research, elements of citizen-centric t-government will be established, as the transformation process has to deal with user-oriented dimensions of change. We will discuss this further in the following section.

### **3. Discussion**

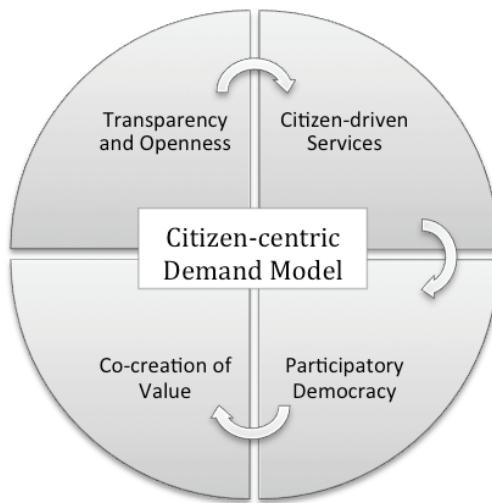
Al-Khoury (2011) in his paper alleged that governments should transform from department-centric model to a citizen-centric model. This concept was also repeated by Luna-Reyes et. al (2011) who said, having a citizen-centric approach increases efficiency and reduces bureaucracy in public offices. Many other authors who presented their work in transformational government research also echoed this idea. However, what is actually coined by the term citizen-centric, and what are its elements, have never been discussed thoroughly in previous literatures. To shed light on this matter, this section explains the citizen-centrality concept for common understanding, comparing and guiding implementation of ICT-mediated transformational government initiatives.

To get the crux of what makes a citizen-centric model, we referred back to the user domain of t-government characteristics in Table 1. Using abductive method, we further analyzed the essence of each characteristic in previous literatures to get a solid understanding of its concept. By grouping the similar characteristics together and finding a statement that best match its meaning, these four constructs stood up to represent the citizen-centric notion, as depicted in Figure 1.

**Table 1:** Classification of T-government characteristics

Domain	No	Characteristics of T-Government	Author
Organizational	1	Effective management within government	(Dais et. al 2012)
	2	Collaborative services and business operations	(Saha 2010)
	3	Public sector governance	(Saha 2010)
	4	Networked organizational model	(Saha 2010)
	5	Government as convener of multiple sources of citizen service	(J. Borras 2012)
	6	Increased trust and accountability	(Al Khouri 2011)
	7	Collaboration among departments and stakeholders	(Al Khouri 2011)
	8	Avoid duplication and overhead	(Al Khouri 2011)
	9	Track effectiveness of initiatives	(Al Khouri 2011)
	10	Networked government	(Bannister and Connolly 2011)
	11	Entrepreneurial government	(Bannister and Connolly 2011)
	12	Decentralization	(Bannister and Connolly 2011)
	13	Agility	(Bannister and Connolly 2011)
	14	The elimination of bureaucracy	(Bannister and Connolly 2011)
	15	New ways of working (process reengineering cross agency integration)	(Reinwald and Kraemmergaard 2012)
	16	Reengineering back office processes and IT systems	(Dwivedi and Janssen 2011)
Technological	1	Common infrastructure and interoperability	(Saha 2010)
	2	A virtual business layer	(J. Borras 2012)
	3	Multi-channel service integration	(J. Borras 2012)
	4	IT as a service	(J. Borras 2012)
	5	A single point of contact (integrated databases)	(Reinwald and Kraemmergaard 2012)
	6	Adoption of social tools	(Osimo 2010)
User	1	Citizen-centric delivery	(Dais et. al 2012)
	2	Citizen-centrality	(Saha 2010)
	3	Social inclusion	(Saha 2010)
	4	Transparent and open government	(Saha 2010)
	5	Citizen-centric	(J. Borras 2012)
	6	Demand pull	(J. Borras 2012)
	7	Identity is owned and managed by citizen	(J. Borras 2012)
	8	Public data available freely for reuse by all	(J. Borras 2012)
	9	Citizen as owner and co-creator of services	(J. Borras 2012)
	10	Brand-led	(J. Borras 2012)
	11	Improved transparency, consistent user interface and convenience channels	(Al Khouri 2011)
	12	Increase responsiveness and security	(Al Khouri 2011)
	13	Opportunities for businesses to provide inputs	(Al Khouri 2011)
	14	Participatory democracy	(Bannister and Connolly 2011)
	15	Greater transparency	(Bannister and Connolly 2011)
	16	eParticipation	(Osimo 2010)
	17	Open Government	(Osimo 2010)
	18	Citizens-driven services	(Osimo 2010)

Our model proposes four constructs that must exist in any citizen-centric transformational government. They are transparency and openness; citizen-driven services; participatory democracy; and co-creation of value. We argue that it is a 'citizen-centric *demand* model' because the characteristics are viewed from demand perspective, which takes the citizen's paradigm, and not from the supply side where government resides. It is also in accordance with suggestion by Millard (2010), who emphasized that transformational government paradigm concentrates much more on the demand side, which address specific societal challenges. The constructs are discussed below:



**Figure 1:** Citizen-centric demand model for transformational government

### **3.1 Transparency and openness**

The essence of transparency is providing information for citizens (Parycek and Sachs 2010). It supports the political doctrine that business of government should be opened at all levels for public to view and examine effectively (Saha 2010). For citizen-centric model, transparency is an important construct because it means government agencies are able to provide information about their operations and decisions to the public. Transparent public services and open government data allow the citizens and businesses to be informed of certain situation and permit them to act accordingly. Open datasets, whether structured and unstructured can also be utilized by third party stakeholders to innovate and add value to it for public usage. ICT is good at delivering transparency (Miller and Williamson 2008) and technology such as web 2.0 has enhanced this. However, issues such as data and privacy protection have to be carefully considered when implementing this initiative (Dais et al. 2012).

### **3.2 Citizen-driven services**

Government needs to recognize its citizens' roles and perspectives in order to serve them effectively. Citizens who are technology adopters have more diverse requirements and expect better user experience with government services while citizens who are consumers of services anticipate effective and relevant amenities provided to them. Thus, government must be more responsive to citizen wants and needs. Citizen-centric means viewing the government from outside in, where requirements and expectations of the citizens becomes the guiding principle for all government policies, programs and services (Saha 2010). Citizen-driven services such as single authentication, consistent user interface, convenience channels and service personalization are critical examples for government's success and reputation. Technology such as web 2.0 is user driven by nature and it can change citizenry from being a final user to active contributor in the process of government transformation (Ferro and Molinari 2010).

### **3.3 Participatory democracy**

Citizen-centrism is a concept that goes well with the notion of democratic principle. One of the basic indications of democracy is citizen participation, as it is not only the citizen's constitutive right to participate in government but it is also their duty. Participation is the fundamental role of citizens in a democratic country and it builds a better democracy. In technology-mediated government, citizen e-participation may take many forms including online voting, online poll, online discussion forum and online petition, where it is ever more easier for people to access government information, provide feedback, and in effect be more involved in the political process of their countries. Another important element in participatory democracy is social inclusion. Ideally, government must provide equal access of its services for all citizens and businesses, including the disabled and socially excluded - those who do not have Internet access of their own (Dwivedi and Janssen 2011). With participatory democracy concept, e-inclusion should be considered as a strategy for t-government planning and development.

### **3.4 Co-creation of value**

In the technological era that we live in today, customers are not just consumers of services but they are fully ready to cooperate with service provider to co-create value (Adeleke and AbdulRahman 2011), which in turn will give benefits to them. According to Vargo and Akaka (2009), co-creation of value suggests "there can be no value without the customer incorporating the firm offering into his or her own life". This represents the service-dominant logic concept (FP6), where value creation is interactional, not optional but always co-created (Vargo and Akaka 2009; Vargo and Lusch 2008). In government services, it means creating and constantly improving and diversifying services together with those who are serviced. There is a growing need to engage citizens directly in the design, implementation and operation of services for public usage as neither government nor citizens have enough resources such as time, knowledge, will and effort to solve problem on their own. Co-creation will empower citizen by helping them to turn 'into active, independent, competent members of society' (Heeks 2006). Allowing citizens to self-create simple ad-hoc services that are tailored on their specific needs, manage their own identity online and tag, assess and rank content according to their own preference are examples of value co-creation that can be inculcated in citizen-centric transformational government.

We argue that the relationships between the constructs are in a linear process where a stage progresses straight to another, and has a starting point and an ending point. By providing *transparent services and open data*, government is encouraging more demand for *citizen-driven services* to be provided by public sector agencies and third party stakeholders, thus this will invite citizen's *participation* in government's operation and decision-making, which in turn will yield *value co-creation*. To prove the dynamism, the author will further test the hypotheses empirically in future work.

## **4. Conclusions and future works**

To help build a foundation for analyzing transformational government requirements, this paper has provided a conceptual model for characterizing citizen-centricity at its basic form so as to bring order to the diffusion of loose terms currently in use in both the popular and academic literature. By presenting a table of transformational government characteristics, a citizen-centric demand model for transformational government is derived and its components are discussed. The intent of this model is to help public administrators and researchers to better understand the concept of citizen-centricity, which will guide implementation of transformational government application. This study is a part of larger research and can be characterized as being in the domain of Information systems, specifically addressing transformational government applications development. Future empirical research will examine the validity and precision of the model, which is collected and constructed based on literature analysis and so subject to further improvement as the research mature. Empirical data will be collected using questionnaire survey to citizens and related non-government organizations, and face-to-face interview with government officers and systems developers to validate the constructs of model. Data collected will be analyzed using an analysis strategy that classifies collected data from both citizens and government perspectives. More work is also needed in aligning and integrating the citizen-centric demand model into the research's broader framework, which includes the organizational and technological components. In the end, a requirements framework for transformational government applications will be proposed as an artifact of the research. The contribution to knowledge in the field of information systems, made by this research, comes from the provision of a model for citizen-centric demand for t-government and a requirements framework for transformational government applications. This framework can be used for designing and delivering an effective program of technology-enabled change in local governments of developing countries. A guided implementation of transformational government applications is expected with the use of the requirements framework.

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# Classification Schemes for Open Government Data Provision

**Wolfgang Palka, Marlen Jurisch, Maximilian Leicht, Petra Wolf and Helmut Krcmar**  
**Chair for Information Systems, Technische Universität München, Germany**

[palka@in.tum.de](mailto:palka@in.tum.de)

[jurisch@in.tum.de](mailto:jurisch@in.tum.de)

[leicht@in.tum.de](mailto:leicht@in.tum.de)

[wolf@in.tum.de](mailto:wolf@in.tum.de)

[krcmar@in.tum.de](mailto:krcmar@in.tum.de)

**Abstract:** Recent studies show that open government data (OGD) initiatives are gaining more and more attention among public administrations worldwide. However, although the attention for OGD provision increases, no guidelines exist that depicts the crucial elements for OGD provision via web portals and enables that in a systematic manner. The purpose of this paper is to classify the crucial elements for OGD implementation and provision. The outcomes are three classification schemes developed by using the creativity technique of morphological boxes: one for the strategic and two for the operational dimension. This classification is grounded in the results of a multiple case study analysis and relevant literature. The classification schemes provide a structured overview of the characteristics which have to be considered when implementing and operating an OGD portal. Thus, the schemes can serve as an aid for making decisions as well as for designing the necessary portal elements. Moreover, they prepare ground for further research in this emerging field.

**Keywords:** classification scheme, open government data, open government, multiple case study analysis, morphological box

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## 1. Introduction

Open government has the potential to address three major objectives of public administration: raising both economic and social benefits, and fostering stronger democracy with citizen participation (Francoli 2011). While early discussions on open government focused on freeing up government information, current discussions focus on increased transparency, participation, and collaboration (Ganapati & Reddick 2012; Scholl & Luna-Reyes 2011).

To enable these values of open government to the stakeholders in public administration, the provision of open government data (OGD) is indispensable. In making these data available for public consumption, public administrations or third parties implement and operate open government data (OGD) portals. These portals provide personal access (single point of access) to the data of the public administrations (Großmann & Koschek 2005). The data on OGD portals provide the basis for the development of innovative value-added services (Ganapati & Reddick 2012). Many public administrations or third parties have implemented OGD portals (McDermott 2010). In addition, recent studies show that OGD initiatives are gaining more and more attention among public administrations worldwide (Ganapati & Reddick 2012). However, although the attention to OGD provision increases, no systematic guidelines exist that specify the critical elements for OGD implementation and provision via web portals. This leads us to the formulation of the following research question: *"What are the critical elements necessary to implement and provide OGD portals?"*

To answer this research question, we classify the critical elements for OGD implementation and provision into three classification schemes: one for the strategic and two for the operational dimension of OGD. This classification is grounded in the results of a multiple case study analysis (Francoli 2011) and relevant literature. We developed these classification schemes by using the creativity technique of morphological boxes as proposed by Zwicky (1966). The classification schemes provide a structured overview of the characteristics which must be considered when implementing and operating an OGD portal. In this way, the schemes serve as an aid for making decisions as well as for designing the necessary portal elements.

The paper makes one principal contribution. The classification schemes illustrate the elements necessary to provide OGD via web portals in a systematic manner. Thus, the proposed schemes help researchers and practitioners to better understand the components of OGD via web portals. In addition, the classification schemes illustrate the various approaches to provide OGD web portals. The schemes prepare the ground for further research in this emerging field, especially for quantitative research.

## 2. Methodology

To develop the classification schemes, we follow a qualitative, exploratory two-step research approach. In step 1, we examine the similarities and differences as well as typical instances and their characteristics of OGD best practices. To do this, we conducted a multiple case study analysis as proposed by Eisenhardt (1989) and Yin (2009). We analyzed documents and portals of OGD initiatives in the USA, Great Britain and New Zealand. In step 2, we explore and refine the case study results by findings from relevant literature. By adding characteristics that are common from a theoretical perspective, we were able to develop classification schemes with a strategic and operative dimension that have a high generalizability for the OGD provision.

### 2.1 Data collection

We selected case studies from countries which can be described as first movers and best practitioners in this field. They have implemented OGD portals successfully several years ago – the USA, Great Britain and New Zealand. More so, these countries are working already on a large scale diffusion of OGD. We identified two areas as data sources: (1) central documents from the selected countries, such as the "Memorandum on Transparency and Open Government", legislative texts such as the "Freedom of Information Act" in the UK or coalition programs including "The Coalition: our program for government", and (2) concrete implementations of OGD initiatives and their functionality. In total, we identified 17 OGD portals, which consist of a huge number of sub-portals, e.g., the idea portal on Data.gov.uk (Table 1).

**Table 1:** Identified OGD portals for data analysis

Country	OGD portal ( <i>URL</i> )	
USA	The White House ( <a href="http://www.whitehouse.gov/">http://www.whitehouse.gov/</a> )	Data.gov ( <a href="http://www.data.gov/">http://www.data.gov/</a> )
	IT Dashboard ( <a href="http://www.itdashboard.gov/">http://www.itdashboard.gov/</a> )	Recovery.gov ( <a href="http://www.recovery.gov/">http://www.recovery.gov/</a> )
	USASpending.gov ( <a href="http://usaspending.gov/">http://usaspending.gov/</a> )	Regulations.gov ( <a href="http://www.regulations.gov/">http://www.regulations.gov/</a> )
	Challenge.gov ( <a href="http://challenge.gov/">http://challenge.gov/</a> )	U.S. Department of Justice ( <a href="http://www.justice.gov/">http://www.justice.gov/</a> )
UK	Data.gov.uk ( <a href="http://data.gov.uk/">http://data.gov.uk/</a> )	Department for International Development ( <a href="http://www.dfid.gov.uk/">http://www.dfid.gov.uk/</a> )
	Number 10 Downing Street ( <a href="http://www.number10.gov.uk/">http://www.number10.gov.uk/</a> )	UK Parliament ( <a href="http://www.parliament.uk/">http://www.parliament.uk/</a> )
	Direct.gov.uk ( <a href="http://www.direct.gov.uk/">http://www.direct.gov.uk/</a> )	Businesslink.gov.uk ( <a href="http://www.businesslink.gov.uk/">http://www.businesslink.gov.uk/</a> )
NZ	Data.govt.nz ( <a href="http://data.govt.nz/">http://data.govt.nz/</a> )	Geodata.govt.nz ( <a href="http://geodata.govt.nz/">http://geodata.govt.nz/</a> )
		Data.LINZ.govt.nz ( <a href="http://data.linz.govt.nz/">http://data.linz.govt.nz/</a> )

### 2.2 Data analysis

After the identification of the relevant data sources, we performed a qualitative data analysis by examining the documents and implementations as mentioned above (Miles & Huberman 1994). More so, to identify the different instances and characteristics, the data analysis adopted open and axial coding set out by Strauss and Corbin (1998). Two experienced coders were involved in the coding process. After the first step of iterative data analysis, known as open coding, emergent concepts and categories suggested by the data were selected and named. In the next step, known as axial coding, we put those data back together in new ways by making connections between the categories and concepts. For example, we identified concepts that answer the question "Which political level is responsible for the OGD portal?" (i.e., we named the category "Level of responsibility"): for the USA, we identified the White House and Department of State that are responsible for OGD portals; for the UK, we found the Chief Secretary to the Treasury; and for New Zealand we discovered the Department of Internal Affairs. As a consequence, we were able to name two instances: federal (White House), federal and ministry (Department of State, Chief Secretary to the Treasury, and Department of Internal Affairs). In the next step, we enriched these findings with existing knowledge from literature and connected these concepts/instances with the appropriate category.

## 3. Results

Based on the multiple case study analysis and its findings, we developed three classification schemes for the OGD provision via web portals. Their setting bases upon the creative technique of morphological boxes developed by Zwicky (1966). This technique allows the structuring and investigating of a set of relations contained in multi-dimensional problems. As a consequence, we derived the content of our classification schemes from the findings of the case studies.

In addition to the formal structure of the morphological boxes, we had to tackle with structuring the content. As a consequence of the findings of the case study analysis, we divided the classification schemes into two dimensions: the strategic and the operational dimension. To underpin this result, we reviewed literature. The finding was: the planning of strategic objectives and their implementation and operation of OGD is consistent with managing a company (Rüegg-Stürm 2005).

### **3.1 Strategic dimension**

The strategic dimension of the classification scheme addresses the fundamental and long-term orientation of the OGD portals. The case based analysis revealed that the formulation and implementation of a strategy presents a crucial step in the planning of an OGD portal. Table 2 displays the characteristics and their instances relevant to the strategic dimension.

**Type of strategy.** *Which type of strategy is used for the introduction of OGD portals?* The distributed competences and responsibilities that characterize this introductory process necessitate a clearly defined strategy: a top-down or bottom-up approach (Buytendijk 2010). For the top-down strategy a central authority needs to identify clear goals. The direct involvement of stakeholders and interest groups affected by the strategy is not absolutely necessary. In contrast, when pursuing a bottom-up strategic approach, the stakeholders have to be involved actively (Buytendijk 2010; Elcock 1996).

**Central political commitment.** *Do target agreements exist between all parties involved in the implementation of the OGD portal?* In order to achieve an opening of the state and its data, all interested parties should ideally agree to a common goal agreement (commitment), similar to the concept of management-by-objectives (Drucker 2007). The purpose of this procedure is to generate commitment and acceptance for the implementation of the OGD portal (i.e., Orszag 2009).

**Level of responsibility.** *Which political level is responsible for the OGD portal?* Based on the findings of the case study evidence and based on the criteria of federalism, we suggest a separation into the following instances: federal government, state governments and local authorities. Additionally, a subdivision in the respective local government institutions or ministries is possible (e.g., Data.govt.nz that is operated by the Department of Internal Affairs New Zealand).

**Freedom of information act.** *Does a freedom of information act exist as a basis for the introduction of an OGD portal?* For the introduction of an OGD portal it has to be clarified whether a Freedom of Information Act exists. They constitute an important basis for the introduction and provide fundamental rights for stakeholders to information held by the state or a state institution. With the help of a Freedom of Information Act a state commits to the release of information. The publication of specific data can only be withheld in exceptional cases.

**Stakeholders.** *Which stakeholders are involved into the implementation and provision of an OGD portal?* Based on the case study evidence, we conclude that Freeman's stakeholder model (Freeman 2010) can also be transferred to the implementation of OGD portals. The state assumes the role of the company. Stakeholders in the surrounding field of the state are: citizens, companies and non-profit organizations as well as the state itself in form of the institutions such as government, administration or ministries.

**Involvement of stakeholders.** *In what way can stakeholders be involved into the introduction of OGD portals?* During the introduction of OGD portals, and specifically in the identification of requirements, it is important to clarify what data and information are needed to ensure transparency. More so, participation opportunities for stakeholders should be identified. To determine the necessary requirements, stakeholder involvement is recommendable. This involvement can be conducted directly (e.g., using ideas competitions like the Open Data Challenge (Open Knowledge Foundation 2011)) or in an indirect manner (e.g., based on wikis and blogs).

**Identification of demand & supply.** *Who determines the supply and demand of data and information?* To estimate the cost of implementing and operating an OGD portal, it is necessary to specify the supply and demand. According to Elcock (1996), two perspectives exist: market- and resource-based. In the analyzed case studies the demand was frequently calculated based on the market, e.g., by the possibility that users of British

data portals can submit requests for records to the government. In other cases the authorities were obliged to publish high quality data.

**Table 2:** Classification scheme for OGD portals – strategic dimension

Characteristics	Instances			
	Top-down		Bottom-up	
Central political commitment	Yes			
Level of responsibility	Federal		State	Municipality
	Government		Ministry	
Freedom of information act	Yes		No	
Stakeholder	Citizens	Companies	Non-profit organizations	State
Involvement of stakeholders	Direct		Indirect	
	Idea competition		Taskforces	Wikis/Blogs
Identification of demand & supply	Market-based		Resource-based	
	Consultation	Competitions		
Data policies & standards	Yes		No	
Provision of data	Based on requests	Proactive		Required by law
Copyright	Copyright of the state		National copyright	
Terms of usage	Commercial		Non-commercial	
Licensing	None	Own		Standardized
Organization of data	Central	Federal		Decentralized
Involvement of external stakeholders	Yes		No	
Portal-software	Supplied by third party		In-house development	
Portal-hosting	Operated by third party		Operated in-house	
Degree of open government	Transparency with indirect participation	Transparency with direct participation	Transparency with direct participation and collaboration	
Motivation for participation	Competition	Monetary	Mentoring	Patent

**Data policies & standards.** Do standards or policies for the publication of OGD exist? The case study analysis disclosed that the formulation of data policies and/or standards is essential for the OGD portal implementation (i.e., Department of Internal Affairs (2011)). These policies and standards determine for instance characteristics (e.g., openness, protection, or costs) of data and information. **Provision of data.** In what manner are data and information in OGD portals provided? It is important to identify in which manner and form the data is provisioned. One possibility is to provide data based on requests of customers. An expanded form represents the proactive publication, i.e., ministries and departments will cover self-initiated the need for data, so that requests from the stakeholders are no longer necessary. The third alternative is the publication of data and information because it is mandated by law (i.e., Orszag (2009)).

**Copyright.** How is the legitimate copyright of the published data protected? Information usually has a copyright. Depending on the country, such information is subject to different nationally regulated copyrights. These inter alia protect the author against the unlawful reproduction or illegal use elsewhere of his/her works. The need for copyright protection is particularly important in the context of re-use of data and information. Ideally, a copyright legislation exists for the introduction of an OGD platform (e.g., like the Crown Copyright).

**Terms of usage.** What are the terms of usage for the data and information published on an OGD portal? Whenever data and information are protected by copyright regulations, the scope of use plays a significant role and has to be examined carefully. In some cases, the commercial usage of data may not be desired or even forbidden by the owner. Our case studies disclosed that the commercial usage was generally possible except one case where the licensing explicitly prohibited it (i.e., The National Archives 2012).

**Licensing.** *To which license are the data and information subject to?* A license can grant under existing copyright the individual exploitation rights to a user (e.g., for retransmission, modification, etc.). This can enable the usage of the data through a third party – either commercial or non-commercial (see terms of usage). To clarify a liability or the disclaiming liability requires a contractual agreement between the user and the author. This can take place, for example, in the form of a license agreement between a licensor (here: the state) and a licensee (in this case a third party).

**Data organization.** *In which form are the data and information organized?* It is important to clarify how data and information are stored and managed respectively. In accordance with Weill and Ross (2004), proposed types of architecture for IT governance and the case study analysis (e.g., Data.gov, Data.gov.uk and Data.govt.nz) we propose the following three types of data organization: central, federal, and decentralized.

**Involvement of external stakeholders.** *Are external stakeholders integrated in the process of creating transparency, participation and collaboration?* In addition to internal stakeholders, such as government, ministries or public authorities, the involvement of external stakeholders is possible for the introduction and operation of OGD portals. An example from the case study analysis is the involvement of the service provider ecoDrive for the acquisition of energy consumption data in UK government departments (Data.gov.uk).

**Platform software** *Who provides the software platform for the OGD portals?* The decision for the type of portal software is closely connected to the involvement of external stakeholders or service providers. The state has the choice between a make or buy solution. Thus, either the software is developed in-house (e.g., Data.govt.nz) or provided externally by a third party (Krcmar 2010).

**Portal hosting.** *Who is responsible for the hosting of the OGD portal?* Two aspects are important with regards to the portal hosting. First, where (location) is the portal hosted? Second, by whom is the portal hosted? For instance, the portals analyzed in the USA and UK were hosted by external service providers such as Socrata or CKAN (e.g., Data.gov und Data.gov.uk). In contrast, New Zealand hosts its in-house developed portal on itself.

**Degree of Open Government.** *Which level of OGD should be achieved?* Whenever, a new OGD portal is introduced, the degree of open government has to be identified. One has to decide to which degree and in which form these three principles will be implemented. But one has to keep in mind that transparency presents a prerequisite for the implementation of the other two principles.

**Motivation for participation.** *How is the participation of stakeholders rewarded or how are they motivated to participate or collaborate?* The introduction of an OGD portal presents an ongoing process. An OGD portal can only be coined a success, whenever new innovations are created through the re-use of data and information. According to Reichwald and Piller (2009), the following forms of motivating citizens, companies and other organizations to be innovative exist: innovation competitions, monetary incentives, mentoring and patenting.

### **3.2 Operational dimension**

After the identification of the strategic orientation of an OGD initiative, the public administration has to concentrate on the concrete implementation and operation of an OGD portal. Table 3 and 4 illustrate the characteristics and their instances relevant for the implementation and operation of OGD portals, one from the vendor perspective (table 3) and one from the user perspective (table 4)

**Supply.** *What kind of supply does the OGD portal contain?* In a first step, the supplier of an OGD portal has to decide on what kind of supply he wants to provide with the portal: merely data or applications or data and applications. The provision of data can be separated in raw data and linked data. Linked data are aggregated data sets based on different topics and different sources.

**Supplier.** *Who is the supplier for the data of an OGD portal?* Our results from the case studies indicate that the supplier of the OGD is either the public administration, a third party or in some cases both. The results of our case study analysis illustrate that third parties are particularly providers of applications.

**Revenue model.** *What is the price for the usage of an OGD portal?* OGD are no scarce goods. Thus, from a micro-economic perspective, these data do not have to have a price, since no scarcity exists (Mankiw 2000).

However, some cases illustrate that pricing for OGD is possible. In this case, the public administration has to decide, whether they want to have the market price or merely a price, which covers the marginal costs.

**Table 3:** Classification scheme for OGD portals – operational dimension (supplier perspective)

Characteristics	Instances					
	Data		Data and applications		Applications	
	Raw data	Linked data				
Supplier	Public administration		Third party		Both	
Return model	Marginal costs		Free of charge		Market price	
Type of data provision	Non-recurring		Recurring		Direct access	
Data access	Download		Visual		API	
	Not machine-readable	Machine-readable	Analysis	Analysis plus saving		
Data format	Proprietary			Non-proprietary		
Data description	Structured meta data			Textual description		
Granularity of OGD	High		Low		Free selectable	
Interval for updates	Daily	Weekly	Monthly	Yearly		

**Type of data provision.** *Is the provision of the OGD dynamic or static?* Here, public administrations have to decide, whether they want to provide the OGD non-recurring or in recurring intervals. The analysis of our results discloses that the recurring type is dominating. This situation bases on the requirement of a contemporary provision of data and information (Orszag 2009). In contrast to the non-recurring and recurring type of data provision, the supplier of OGD can also allow direct access to the data.

**Type of data access.** *What type of data access does the OGD portal allow?* Based on the case evidence, we derived four types of data access: (1) to download the data; (2) merely to look at the data, downloads are not allowed; (3) a direct access via an API; and (4) mixed access forms, i.e., consumer are allowed to look at and/or download the data and/or have a direct access. If the data is downloadable or merely visible, we found four sub-characteristics: (1) not machine-readable data; (2) machine-readable data; (3) analyses of the data on the OGD portal; and (4) analyses of the data on the OGD portal and the possibility for saving these (e.g., at Data.gov).

**Data format.** *What kind of data format does the OGD portal provide?* This characteristic leads to the discussion whether the data and information are published proprietary or non-proprietary. Data in a proprietary format are created with proprietary software. Consequently, to work with these data proprietary software is required. On the contrary, to work with data in a non-proprietary format, open source software is sufficient (DiBona 2005).

**Data description.** *How are the data described?* It is not enough to merely provide data to consumers. It is also important that consumers are able to understand what the content of the data implies. Based on the results of our case study analysis and the literature review we derived two data descriptions: the textual description and the description via structured meta data.

**Granularity of OGD.** *In which granularity are the data and information on the OGD portal offered?* Our results show, that the different stakeholders of an OGD portal have different interests. For instance, citizens are not interested in the highest level of details, whereas companies need this level of detail for applications and other purposes. Based on the case studies, we derived three instances for this characteristic: low (e.g., at Data.gov, Data.gov.uk, and Data.govt.nz), high, or free selectable granularity (e.g., at USASpendig.gov).

**Interval for updates.** *In which intervals are the data and information of the OGD portal updated?* While suppliers providing data and information non-recurrently do not have to think about certain update intervals, suppliers with recurring data have to think about the intervals. An example for recurring data is financial data. For these data it could be wise to update them daily.

**Different views.** *Does the OGD portal provide different views for the consumer?* Due to the plurality and the different content of OGD, their provision can lead to an information overload from a consumers' perspective.

In order to inhibit an information overload, the supplier of an OGD portal has to decide whether he provides different views for the customer (Ullman & Widom 1997).

**Table 4:** Classification scheme for OGD portals – operational dimension (consumer perspective)

Characteristics	Instances				
	Yes		No		
Information search	Full text search		Full text search and filtering		Filtering
	Textual		Tagging		Visual
Feedback	General		In relation to data and information		
	Social networks	Blogs	Comments	Comments plus rating	Rating of data sets
Advertising	Social networks	Messages	Reutilization	Integration	Marketing for applications
Types of participation and collaboration	Information	Comments	Reutilization	Petitions	Contests
Identification of new requirements	Data inquiries	Contests	Idea portals	Feedback	

**Information search.** *In which manner can the consumer search for data and information on the OGD portal?* In addition to the different views for the customer, customers have to have the possibility to search for data and information on their own. Based on our case study results we identified three instances for information search: full text search, full text search and filtering, and filtering.

**Feedback.** *How can the consumer give feedback?* To enhance the supply of OGD in a constant manner and to raise their quality, customers have to have the possibility for feedback. The provision of the OGD and the operation of the OGD portals should be attended by a two-way communication between supplier and customer. Our results show that two types for feedback exist: general or in relation to data and information.

**Advertising.** *How can consumers advertise for the supply on OGD portals?* In order to foster the diffusion of OGD, the OGD portal should offer the possibility for advertising. This is similar to advertising of other products. The case evidence disclosed the following four form of advertising that are suitable for OGD: social networks, messages, reutilization, integration and marketing for applications (e.g., at Data.gov and Data.gov.uk).

**Types of participation and collaboration.** *Which forms of participation / collaboration does the OGD portal enable for its consumers?* According to Emmer and Vowe (2004) three forms of individual and political communication exist: receptive (e.g., information), participative (e.g., comments, reutilization, petitions) and interpersonal communication (e.g., contests, direct contact). These forms vary between simple information sharing with stakeholders to direct contacting through the government.

**Identification of new requirements.** *How can consumers submit new requirements to the operator of an OGD portal?* Subsequently to the initial requirements analysis (i.e., strategic dimension), new requirements should be collected from the consumers in order to advance the opening of the state. The state as the supplier of OGD should continuously collect incoming improvement requests and suggestions by the consumers. Rupp and Schüpferling (2009) recommend the following techniques, which can also be applied for identifying the consumer requirements for OGD portals: data inquiries, contests, idea portals and feedback templates.

#### 4. Implications

The proposed classification schemes have implications for research and practice. For practitioners, they provide a structured overview of the characteristics which have to be considered when implementing and operating an OGD portal. In addition, the schemes can aid practitioners in making decisions as well as in designing the portal elements. The classification schemes offer information on the necessary strategic and operative dimensions of an OGD portal. Since citizens and companies worldwide demand more transparency and participation possibilities from their governments (McDermott 2010), more time and consideration needs to be invested into the design and organization of OGD portals. The proposed classification schemes provide a concrete structure, which is also adaptable to specific situations and political contexts, for an OGD portal implementation and provision.

Besides the implications for practice, the classification schemes also have implications for research. This research paper proposes a descriptive model in form of classification schemes for the implementation and operation of OGD portals. Within this research paper, we offer a first attempt of an integrative definition of OGD portal. In addition, this research paper relies on the creative method of morphological boxes and as a result presents a first approach to the design of OGD portals. The various OGD aspects discussed within this paper provide a wide range of avenues for future research. For example, the identified elements prepare ground to seek for the success factors of OGD portals.

## **5. Conclusion**

The objective of this research paper was the systematization of the implementation and operation of OGD portals. Therefore, we identified the important milestones and tasks, which need to be considered when starting an OGD portal. Throughout our research endeavor we realized that only few research articles exist on the topic of OGD portals. As a consequence, we conducted multiple case studies in which we analyze concrete examples of OGD portals. The case study analysis proved to be a good support for determining the number of instances. However, future research is needed for further in-depth analysis of the schemes's components.

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# Mediated Emotions and Politics of Dissent

Kassandra Rothenstadt

Vrije Universiteit Brussel, Brussels, Belgium

[krothens@vub.ac.be](mailto:krothens@vub.ac.be)

**Abstract:** The present theoretical exploration constitutes a part of a larger doctoral research which seeks to analyze the role of emotion and affect in politics of dissent and the extent to which ‘new media’ technology impacts and/or reconfigures the dynamics of the two as well as of contemporary power relations. Specifically, the study seeks to critically assess the widely celebrated claims about the ‘online’ medium’s democratic and liberating potential along with the role that has been assigned to emotion and affect in political activism ‘on’ and ‘offline’. The research takes as its case study the Occupy movement as an example of political activism, which has been ignited by powerful emotions of indignation and shaped by ‘online’ ‘mediascapes’ operating as part of global cultural flows (Appadurai 1990). This exercise will permit to evaluate the possible consequences for the emotion-action dynamic that is so essential to political engagement. The question that is now being increasingly asked is how institutionalized powers appropriate the medium, thereby subverting its liberating potential. McLuhan in his day warned against the numbing effects of the media, while many contemporary academics and political commentators insist that it might be another form of “opium for the people” and a social control tool used to placate dissent by homogenizing and manipulating emotions, thought, and ultimately behaviour. Thus, the concepts that this study aims to theoretically scrutinize are ‘online mediascapes,’ ‘political activism,’ ‘emotion’ and the ‘power dynamics of political engagement.’ This analysis will draw mainly upon cultural-philosophical and media-theoretical perspectives, but also on sociological and critical perspectives. By following such a trajectory, it enables to grasp online mediascapes as well as emotions in their institutional and technological sense as ‘moulding forces’ of communicative action, thereby permitting to research them empirically as part of the mediatisation process.

**Keywords:** emotions, online political activism, mediascapes, occupy movement, power relations

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## 1. Introduction

The year 2011 has been labelled the year of the ‘indignant’ as protests swept the globe in a new exercise of people power and in which media played an undeniable part. Indeed, the emergence of new and interactive communications technology has reshaped media environments and cultural space in a meaningful, profound way seeming shifting the power balance in support of human agency rather than of social structure. Mediated experiences or ‘mediascapes’ (Appadurai 1990) circulate in space and time at an unprecedented speed, and spaces for collective emotions have increased and are no longer territorially or politically bound. This ‘new media’ technology offers new transnational ways of participation and activism with new spaces for construction of communities, identities and shared experiences.

The last couple of decades after the fall of communist system in the former Soviet Union have also witnessed an increased proliferation of the neo-liberal logic, which culminated in a profound crisis of capitalist ideology. In this same period a multitude of factions of dissent have come to the fore, one of which is the Occupy movement, which seek to problematize and challenge the neoliberal hegemony and strive to find creative spaces for alternative visions of the future. These creative spaces, however, have been catalysed at their inception by powerful emotions of indignation and discontent. Thus, the Occupy, like the other movements in the past year, can be said to have been born out of two elements: powerful emotions of political indignation and the affordances of virtual technology. As modern times are characterised by authoritarian capitalism, which relies on manufactured sentiment and media, Thrift (2008) suggests that ‘online’ political activism could provide an alternative to this, “a possible rematerializing and energizing of democracy through the creation of intensive environments. And intensive environments as political scenes are not only ideologically pre-planned, but open to a different kind of reactions/participation” (p.4).

The Occupy movement represents a particularly interesting case study because it has been perceived to embody precisely this rematerializing of democracy as it attempts to articulate an alternative vision for the future to authoritarian capitalism through the revival of direct, community-based and deliberative models of democracy, employing affective and discursive strategies organised over an ‘online’ as well as an ‘offline’ public sphere. Although the emergence of Occupy Wall Street was a much ‘messier’ process in terms of media use than it was presented in mass media (Gerbaudo 2012), it was nevertheless, as Castells put it, “born digital” (2012, p. 171). Initially, it was set in motion by emotional cries of outrage expressed in various blogs, namely, Adbusters, AmpedStatus and Anonymous, among others. It took some time, however, to gather momentum

from the time that the hashtag #occupywallstreet was registered on June 9, 2011 to the first demonstration on September 17, 2011.

The emergence of Occupy Wall Street “was characterized by a tortuous development” (Gerbaudo, p. 102) in which social media failed to turn sympathizers into actual participants, being “only partly responsible used as a means for a choreography of assembly, setting the scene for public protest” (p. 102). Consequently, while these demonstrations of political indignation and discontent have prompted a crucial debate on the nature and potentiality of an alternative civilization, these protests have also prompted another debate – on the nature as well as the social and political potentialities of the Internet. As “online” mobilization often builds on ‘offline’ interactions between the technically literate and socially capable individuals, new repertoires of contention enabled by digital technology seemed to reveal limited empowerment capabilities. This prompted a return to established views that traditional protest skills and resources, together with political and social capital, remain central to analysing political mobilization over digital networks. In addition, because in the contemporary network society (Castells 1996), power is multidimensional and also organized around networks, the liberating promises seem to be progressively hindered as the same technology is increasingly used for propaganda, surveillance, censorship and control. These developments suggested a shifting of power landscapes once again towards the power structure. Therefore, amidst increasing doubts about the Internet and new media as tools of liberation and democratisation, and the tendency of institutionalised powers to use any available medium to exert their influence as a means of manipulation and social control, the connect between emotion and action within the context of ‘online’ political activism must be readdressed.

However, In order to understand digital activism and the role of emotion in this process within the context of shifting power landscapes and from a cultural, sociological and philosophical perspectives involves moving beyond dichotomous conceptualisations of both digital media and emotion as either tools of liberation or oppression. It also involves critically reassessing the traditional interpretation of the emotional as distinct from objective reason, belonging rather to the realm of the subjective, which has no place in political and moral judgment. By following such a trajectory, it would permit to grasp digital activism as well as emotion in their institutional and technological sense as ‘moulding forces’ of communicative action and research them empirically as part of the mediatisation (Hjarvard 2008) process.

To this end, this paper explores the place of digital activism in the shifting landscapes of power by investigating the way in which ‘online mediascapes,’ ‘political activism,’ ‘emotion’ and inherent ‘power dynamics’ interrelate and how this interrelation applies to the Occupy case, addressing the outlined problematics by the following theoretical questions: (1) it is essential to establish from the outset what is the relationship between emotion and rational and moral judgment in order to understand (2) the emotion-action dyad that is so essential to political engagement; subsequently, it is then possible to investigate the key question of this theoretical treatise, that is, (3) the way in which ‘online’ media impacts and/or reconfigures not only political emotion and engagement, but also the way power is exercised, which in turn affects and shapes the very constituents of political dissent.

## **2. Emotion and rational judgment**

Recent and past research has established that emotions are central to rational choice making and social adjustment, and involve complex cognitive, evaluative and intentional content, thereby forming an essential part of our system of ethical reasoning. Stevenson’s emotivist theory, for example, sees ethical sentences not as expressions of propositions, but of emotional attitudes (1944). Hume (1751), similarly, considered morality to be related to fact, but “determined by sentiment” (p. 5).

In the political field, where a long-standing bias toward cognitive accounts has dominated, the common practice, according to Marcus (2000), “at least since Madison (1961 [1787]), has been to treat emotion as an unavoidable factor in politics that should be constrained and minimized so that reason dictates judgment with minimal distraction (Callan 1997).” Nevertheless, recent social science research incorporated ideas from neurological and behavioural science (Greene et al. 2004; Prinz 2006; Schnall et al. 2008), establishing that emotions are central to rational choice making and social adjustment and involve complex cognitive, evaluative and intentional content, thereby forming an essential part of our system of ethical reasoning (Greene & Haidt 2002; Blair 1995). From the cognitive philosophy perspective, De Sousa (1987) considers emotions a perception mechanism that has a crucial role to play in rational beliefs, desires and decisions by

transgressing the gridlocks of pure reason. Nussbaum (2001) also contends that emotions are best understood as thoughts or cognitions and are in fact a form of judgement informing intentional perceptions and beliefs (2001, p. 30).

### **3. Political activism and emotions**

By connecting the subjective and the rational in our system of ethical reasoning, emotion is, thus, a necessary precondition for a conscious existence because emotion can confer agency by continuously questioning, evaluating, critically assessing and checking against its inbuilt exigencies the legitimacy *of a priori* constructions or newly offered propositions. Consequently, emotions are a fundamental element in political activism where knowledge alone, according to Mestrovic (1996), is not enough to result in action. Action based on information assumes a connection between the emotions and the intellect. There is a vast body of research that demonstrates the active presence and role of emotions not only in politics of dissent, but in all political processes (Marcus 2000). Lasswell (1948) has argued long ago that politics is the expression of personal emotions.

Especially over the last decade or so, social scientists have increasingly recognised the importance of emotions to the functioning of social movement activism. Since then, there has been an ever-increasing scholarly research that aims to bring emotions into social movement studies (Flam and King 2005; Goodwin et al. 2001). Juris (2008) points to the fact that emotion is not an incidental aspect of activism, but that it is strategically deployed and cultivated by organisers to incite sufficient commitment amongst activist collectives so as to maintain their on-going participation. This can be fostered through the formation of affective attachments to the cause as well as among activists, and to produce particular emotional moods during protests and other activists' work. Pulido (2003) similarly considers "emotions, psychological development, souls and passions" as comprising the 'interior' dimension of social movements (p. 47). Kim (2002) warns that any account of social movement activism that ignores the emotional dynamics "risks a fundamental misunderstanding of the dynamics of collective action" (p. 159). As Eyerman (2005) states, social movements are often involved in "transforming as well as articulating values, and in the process, creating new and alternative structures of feeling" (p. 42).

Recent research has focused on the moral conduit to collective action. Group-based feelings of anger about collective injustices are an important motivational force in collective protest participation to defend collective moral principles (Leach et al. 2006). This assumption is based on the idea that anger is characterized by an agitated phenomenological experience which should galvanise or incite group members' motivation to fight back when injustice is perceived (see Leach et al. 2006, p. 1234). Moral principles inform the extent to which social and political situations are perceived as unjust, functioning as reference points that reveal discrepancies between actual and ideal situations (Stitka, et al. 2005). From this perspective, the Occupy movement can be described as a thoroughly emotional movement because it erupted spontaneously, impelled by profound indignation and moral outrage directed at the social and economic inequality, the growing disparity of wealth, the injustices of finance capitalism and the seemingly complete bankruptcy of such concept as democracy.

### **4. Online media and emotional political activism**

As today's social life is increasingly mediatised (virtualised), the political and the public sphere are also virtual; and the virtual, by consequence, is political and public. Thus, a study of contemporary social life is always a study of (virtual) media. Internet and new media have ushered in revolutionary changes to the processes of communication and interaction in the digital age, becoming not only an instrument in organising traditional activism, but a new context that is changing the very character and possibilities of political activism (Knudsen & Stage 2011). Online media enable, it has been widely claimed, the construction of autonomous communication spaces, free from the control of institutional power (Castells 2012), in this way empowering and rendering more effective social and political activism. In an increasingly mediatized world, online communication media increasingly play a role as catalysts and tools of change (Castells 2012; Shirky 2011; Tufekci 2011). The democratising potential of the internet has been widely researched (for ex. Agre 2002; Dahlberg 2001; Jenkins & Thornburn 2003).

Studies have also established that the Internet confers agency and prompts individuals to appropriate the medium and take action (Feenberg 2009; Bakardjieva 2009); it facilitates the emergence of 'counter publics' (Dahlberg 2001); it enables 'subactivism' or politics that unfolds at the level of subjective experience and

submerged in everyday life (Bakardjieva 2009). The Internet reinforces existing patterns of offline political participation, while at the same time, mobilising a new pattern of online political participation (Nam 2012); it promotes political discussion, which in turn leads to greater political and civic engagement (Zhang et al. 2010), and most importantly, it overcomes distance and time barriers to create communities, raise consciousness and mobilise people for offline activism (Harlow and Harp 2011). In the context of online activism, emotions of group-based anger about collective injustices shared online is an important motivational force in collective protest participation (Leach, Iyer & Pedersen 2006).

In the Occupy case, while it was widely considered to have been “born on the Internet, diffused by the Internet, and maintained its presence on the Internet” (Castells 2012, p. 168), the evidence suggests that social and other online media failed to turn sympathisers into actual participants and acquired salience only in the subsequent sustainment phase being used as ‘mediascapes’ (referring to electronic creation and dissemination of both information and images) to create interest in the occupations and invoke a sense of solidarity between ‘physical occupiers’ and ‘internet occupiers.’ And while Occupy was initially conceived as a Twitter movement, it failed to elicit an emotional connection with the public, gaining momentum only after “a redefinition of its identity as a popular (rather than countercultural) movement representing the ‘99%'” (Gerbaudo 2012, p. 102), where the 99% Tumblr blog “came to constitute a point of *emotional condensation*: a wailing wall on which the identity of a new-born movement might coalesce” (p. 118).

## **5. The power dynamics of digital activism**

Critics have warned that shifts in the structure of empowerment are always accompanied by shifts in the power structure, which appropriate the tools for its own ends. Castells’ grounded theory of power (2009), which provides the background for the understanding of such contemporary social movements as the Occupy, is based on the premise that power relations are constitutive of society because those in positions of power fashion the institutions according to their values and personal interests. Power is exercised either through coercion or through symbolic means, that is, the construction of meaning in individuals’ perception. Symbolic power functions by persuasion, by altering the cognitive and emotional perception and reasoning of the individual and directing them towards desired ends. This has proved the most effective means to dictate the fate of the institutions, norms and values on which societies are organized, explicating “why the fundamental power struggle is the battle for the construction of meaning in the minds of the people” (Castells 2012, p. 5).

In the contemporary ‘network society’ (Castells 1996), “power is multidimensional and also organised around networks, which exercise their power by influencing the human mind predominantly (but not solely) through multimedia networks of mass communication. Thus, communication networks are decisive sources of power-making” (Castells 2012, p. 7). Those who wield power are, therefore, those who have the capacity to set the agenda, identified by Castells (2012) as the programmers and the switchers. The former manage the programming of each of the main networks on which individuals depend (government, the military, finance, science and technology, media, etc.), while the latter exploit the network connections (interactions and reciprocal action between financial, political, media, business and academic elites, etc.)

Chomsky has repeatedly warned about the role of mass media as a propaganda tool for manufacturing consent in contemporary politics, stating that they are “effective and powerful ideological institutions that carry out a system-supportive propaganda function by reliance on market forces, internalized assumptions, and self-censorship, and without overt coercion” (1988, p. 306). He also underlined that “it's not the case, as the naïve might think, that indoctrination is inconsistent with democracy, rather [...] it is the essence of democracy” (Achbar & Wintonick 1992). The Internet can be used for liberatory ends, assist activism, provide access to information which would otherwise be unavailable, but it can also be used for surveillance, coercion control and propaganda by corporations as well as by government (Newsnight 2011).

The Internet’s privacy and security is, consequently, increasingly questioned. McLuhan was probably among the first who recognised the developing pattern of commodification of privacy, stating “privacy invasion is now one of our most important knowledge industries” (McLuhan & Carson 2003, p. 335). As Cammaerts’ (2012a) analysis of potentials and constraints of mediation in the cases of such ‘online’ political sites as WikiLeaks and Anonymous “exposes serious structural constraints to the over-reliance of (radical) protest movements on market-based internet or mobile platforms. These platforms are not secure and the companies that run them can, for whichever reason, decide to close down an account, delete the content, withhold funds and/or violate

the privacy of their users" (p. 16). The use of Internet as a tool for manipulation and control has been closely studied by Morozov (2011), concluding that the Internet can and is used by certain governments to sustain authoritarian regimes, mastering the use of cyberspace for propaganda purposes. He calls this tactic 'spinternet' – a combination of spin on the one hand, and the Internet on the other.

Furthermore, activism practised on the Internet, according to many authors, is of questionable value (e.g. Eaton 2010; Zuckerman 2001). Eaton (2010) calls the activism practised on the Internet as 'fast activism' – it is the consumerist approach to life that is also infiltrating the social movement sector, in which the latter is adapted to the former. Zuckerman (2001) identifies it as 'slacktivism,' that is, support for a cause with minimal effort. By lowering the cost involved in activism, one also lowers its value in the public eyes, discrediting the voices of activists and cheapening the significance of the actual cause.

Given the importance of emotions in political mobilisation and politicisation, these represent a chief threat, becoming as a consequence the primary target of manipulation and subversion. Illouz (1997, 2007) reiterates that emotions are not just individual, embodied responses to external factors; emotions are also political and can be utilised to maintain the *status quo*. Irvine (2008) brings to attention the fact that sometimes the issues and causes that we contest through activism are themselves the result of emotional political configurations, in which emotional reactions can be strategically produced through discourse to shape public opinion. While the 2011 global political protests demonstrated that emotions can also be a powerful force for positive social change and can be cultivated to effectively challenge the unjust *status quo*, there are constant speculations debating to what extent have those uprisings been deliberately orchestrated for the execution of covert political and/or economic strategies.

Both coercive as well as symbolic means of power enforcement have been applied to the Occupy movement, with evidence to the former serving as the numerous violent evictions and arrests not only of protesters, but also of journalists who were trying to cover the event (Bershad 2011). Evidence also suggests that active censorship and other tactics of meaning perception have been deployed, creating controversy surrounding the movement's origin, key objectives and ultimate aim. As Žižek pointed out (2012), "over the last few decades, we have witnessed a whole series of emancipatory popular explosions which have been reappropriated by the global capitalist order, either in its liberal form (from South Africa to the Philippines) or in its fundamental form (Iran)" (p. 74). The Occupy has been interpreted as a "communist movement run by socialists" having as sole intention "to bring down the free enterprise system" (Snyder 2011). Beck has proclaimed it the SEIU-driven (Service Employees International Union) world Marxist revolution, funded by the non-profit organization Tides Centre, which is partly funded by Soros (Beck 2011). Reuters reported of Soros' connection to Adbusters, the magazine that launched the Occupy movement (Klein 2011).

It has also been suggested that Occupy Wall Street has been co-opted by MoveOn.org – an American public policy advocacy group that is said to be raising campaign funds for the US Democratic Party – for Obama's re-election (Horn 2011). In this respect OWS was interpreted to represent the Liberal Democrats' response to the Republican Tea Party movement. A mixture of populism and libertarianism, the Tea Party gave voice to a variety of indignant opposition to Obama's government. But it eventually became clear that the movement was "bankrolled by Koch Industries, among other corporations, and captured by the right of the Republican Party as storm-troopers to be sacrificed in the final stage of the electoral process" (Castells 2012, p. 158). Still others have seen the Occupy movement as the promise of a 'new world order' or a 'Third Way' that would be neither capitalist nor socialist, but bridge between the two. Stiglitz (In Klein 2011) and former Soviet statesman Gorbachev as well as the late Pope John Paul II (Gorbachev 2011) have expressed their support for such a world order (2011). All these controversies suggest that observers of the Occupy movement, as of similar protest movements in the past, are distrustful and are aware that 'astroturfing' – the creation of "fake grassroots organisations usually sponsored by large corporations to support any arguments or claims in their favour, or to challenge and deny those against them" (Cho et al. 2011, p. 571) – is a widespread historical practice.

## **6. Frame of study and discussion**

Throughout history, social movements have been dependent on the existing communication mechanisms that were available in a given context. Today, with the advent of online digital communication technology donning unique and unprecedented affordances, the processes of communication and interaction have resulted in a

reconfiguration of time and space, “opening doors of perception and new spheres of action to mankind” (McLuhan & Carson 2003, p. 66-67). The formation of the emotion-action connection that is so essential to political engagement has been facilitated by the Internet and new media through their many affordances: widely accessible public sphere permitting to express one’s views, connect with the likeminded and organize activist events, thereby lowering the threshold for political participation and, in turn, altering the power dynamics of participation. However, after twenty years of living with online media, it is clear that there is a need for a more nuanced view of digital technology than the celebratory assumptions that the Internet, credited with great democratising and liberating potential from disinformation and domination, is going to be the catalyst of change and an agent of glorious revolution.

Rather, the evidence implies that technological tools, irrelevant of their affordances, are embedded into the antagonistic and power matrix of contemporary society, thereby having no pre-determined or in-built effects or determinations. Beyond determinist or instrumental views of technology, it is useful to discern that the actual implications depend on contexts, power relations, individuals’ ability for autonomy, discernment and independent thought, which in turn shape the capacity for struggle and mobilization. The tensions in the ideological, political and economic structures of society create politics of dissent, rather than technical affordances *per se*. Thus, In addition to an in-depth theoretical review of the existing literature, the research path that I will follow is to conduct qualitative and quantitative empirical studies with the aim of ascertaining, first, to what extent, then, activism has actually become ‘digital’ and what configurations of technical, social, and political skills were present in the Occupy protesters which enabled the movement to be formed and sustained. Second, how have ‘online mediascapes’ enabled or transmuted the exercise of power by means of ideologies and their associated subjectivities (but specifically, capitalist ideology, and how have these affected the way political dissent movements as is the Occupy have been framed and perceived (emotionally and cognitively). Finally, what implications do these changing landscapes of power involve not only for the way protest is done, but most importantly for the ethical-existential conceptualisations of ‘authentic’ human existence as the ultimate human good. I plan to use critical discourse and content analysis methodologies, applying a triangulation method of interviews, observations, questionnaires and documents (web archives) of the movement.

Despite the study’s relevance for a more nuanced understanding of the place of digital activism as well as of political emotion within a context of shifting landscapes of power, the study does entail a number of limitations. First, the conceptualisation and operationalisation of ‘emotion’ is challenging to define on its own, but the specific political emotions of indignation and moral outrage pose special difficulties. Second, the quantification of emotion in textual form is very complex and can have multiple interpretations, thus involving a certain degree of risk of misinterpretation. Third, similar problems are foreseen to be encountered with the concept of ‘authenticity,’ which can prove to be limiting and/or too broad and vague. Other unforeseen limitations must be factored in, such as interviewees’ (non)compliance, issues of access to archives, structural constraints, etc.

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# **Non Academic Papers**



# **INVENIO: A Practical Solution for e-Government Document Management**

**Flavio Costa, Jean-Yves Le Meur and Tim Smith**

**IT Department, CERN, Geneva, Switzerland**

[Flavio.Costa@cern.ch](mailto:Flavio.Costa@cern.ch)

[Jean-Yves.Le.Meur@cern.ch](mailto:Jean-Yves.Le.Meur@cern.ch)

[Tim.Smith@cern.ch](mailto:Tim.Smith@cern.ch)

**Abstract:** Invenio is an open source software package which provides tools to manage digital assets in large scale digital and web driven document repositories. Its scope covers all aspects of document management from document ingestion through classification, indexing, and curation to dissemination. Invenio complies with interoperability standards that aim to facilitate the efficient dissemination of content and uses a library standard flexible metadata format. Invenio's capabilities make it an ideal solution for repositories of medium to large sizes (several millions of records). After introducing Invenio the paper will describe a practical approach to implement solutions for diverse aspects of e-Government on top of Invenio. Examples of e-services will include the use of Invenio for blog archiving, e-procurement processes at CERN, document stores of administrative and social interest and electronic Bulletins. This paper will be useful to any Government bodies wishing to enhance relationships with communities either outside or inside (citizens, businesses, other Government bodies, as well as employees) based on electronic documents of all types. Invenio was originally developed at CERN in 2002 to run the CERN Document Server, managing today around 1.5M records in high-energy physics. Invenio is now being co-developed by an international collaboration comprising institutes such as CERN, Deutsches Elektronen Synchrotron (DESY), École Polytechnique Fédérale de Lausanne (EPFL), Fermi National Accelerator Laboratory (Fermilab) and Stanford Linear Accelerator Center (SLAC) and is being used by over forty non-profit scientific and non-scientific institutions worldwide. Invenio serves a wide variety of electronic documents (including articles, books, journals, photos) and multimedia content such as pictures, presentations, talks, posters, plots, audio podcasts and videos and is freely available for download. Because of the software architecture and the wide coverage of document types, Invenio is very flexible and well suited for very diverse uses.

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**Keywords:** e-government, document repository, e-procurement, e-services, blog, interoperability

## **1. Introduction to Invenio**

Invenio (<http://invenio-software.org>) is an Open Source software suite of modules enabling you to run your own document repository or digital library on the web. The technology offered by the software covers all aspects of document management from ingestion through classification, indexing, and curation to dissemination. The flexibility and performance of Invenio make it a comprehensive solution for management of document repositories of moderate to large sizes (several millions of records). Invenio complies with standards such as the Open Archives Initiative (OAI <http://www.openarchives.org/>) metadata harvesting protocol (OAI-PMH) and uses MARC 21 (MARC 21 2012) as its underlying bibliographic format.

### **1.1 Overview**

Invenio has shown its value in very different domains like e-procurement and web journal publishing, and is expanding into blog preservation and archival. It has typical web 2.0 features for a collaborative approach to document management, customizing and sharing the Invenio experience.

Invenio's features make it a comprehensive digital repository and archiving solution both for the user and the administrator. The powerful search interface enables the user to look for and find records according to their criteria, using multiple fields, boolean queries and regular expressions. Records are organized in collections of various levels, grouped by type or other common fields they may have, making it easy for the user to look for similar records based on their interests. Social tools and features also give a chance to the users to personalize their experience, joining user groups, commenting on or reviewing records, creating personal sets of documents (baskets) or sharing them within groups of users, setting alerts based on their interests, exporting rss feeds based of their search queries, etc.

The system can handle not only articles and books, but also photos, videos, theses, etc. Records maintained by Invenio can be organized in collections that can be defined on top of any query. Users are offered either simple

or advanced search interfaces. They can query specific fields, such as title, author, etc., sort the results or apply a ranking criterion (like word similarity).

Users can restrict their search to a set of specific collections or sub-collections, and the results returned can be merged into a single list.

Users can also customize the output format of the results: by default a summary of the results is displayed (brief HTML) but other formats such as detailed HTML, HTML MARC, XML and others are also provided. Invenio has been translated into 26 languages and supports Unicode for information retrieval. Users can also register an account in order to access restricted collections or to use Web 2.0-like services (baskets, alerts, etc.).

As far as the administrators are concerned, Invenio's modular architecture enables them to control each part of the platform separately and handle the workflow of each record and user action more efficiently. New records can be submitted manually or harvested automatically, while the MARC 21 format used for the metadata is extensible making it easy for the administrator to define new types of records or custom fields of metadata. At the same time, multiple output and export formats are supported. An elaborate editing tool helps the administrator monitor and modify the different versions and revisions of each record and its attached files while data extraction tools can be used to extract keywords from records based on specific taxonomies, as well as other data. A custom task scheduler is included in the platform giving the administrator the chance to automate basic system operations and maintenance tasks, such as indexing, ranking, collection caching etc.

## **1.2 Invenio: From a CERN solution to an International Collaboration**

Invenio dates back to 2002 when its development started at CERN (the European Organization for Nuclear Research, Geneva, Switzerland, <http://www.cern.ch>) in order to run the CERN Document Server (CDS, <http://cds.cern.ch/>). CDS nowadays manages over 1'500'000 bibliographic records in high-energy physics, covering articles, books, journals, photos, videos and more, it has approximately 8'000 registered users, representing a large portion of the high energy physics community, although the majority of users are not registered (more than 40'000) and serves around 25'000 queries per day. Since 2002 Invenio is freely available under GNU General Public License. The development team behind Invenio is a multinational collaboration of software engineers from various institutions such as CERN, Deutsches Elektronen Synchrotron (DESY, Hambourg, Germany, <http://www.desy.de>), École Polytechnique Fédérale de Lausanne (EPFL, Lausanne, Switzerland, <http://www.epfl.ch/>), Fermi National Accelerator Laboratory (FNAL, Batavia, Illinois, USA, <http://www.fnal.gov/>), and SLAC National Accelerator Laboratory (SLAC , Menlo Park, California, USA, <http://www.slac.stanford.edu/>). Invenio is used worldwide by more than forty organizations and scientific institutions.

CERN and the international scientific community are committed to a long lasting effort for Open Access (Sponsoring Consortium for Open Access Publishing in Particle Physics website, <http://scoap3.org>). Invenio is fully in line with the Open Access philosophy and with the idea of facilitating the exchange of documents and information that is at the origin of the invention of the WorldWideWeb at CERN (Berners-Lee 1989).

A solid and long lasting support to the evolution and progress of Invenio is setup thanks to its adoption by collaborating institutions and organisations in Europe (including the European Union), in the USA (including the SAO/NASA) and the United Nations (International Labour Office).

## **2. Invenio: Strong features for e-Government solutions**

How can the power of Invenio already be used for e-Government?

As a comprehensive document repository system, Invenio already has the basic features you need to run your e-Government solutions and e-services, as discussed in this Chapter. Some important functions specific to e-Government applications are already available (or are being developed) and with Invenio you will easily be able to add features to fulfil your requirements of today and the evolution in the future. These options are discussed in Chapter 3.

## **2.1 Standard document repository features useful for e-Government**

Invenio was designed for document repositories. A lot of the needs of document repositories are shared by e-Government applications and e-services, including long term preservation, ergonomic and quick search, flexible and powerful classification and taxonomy of the documents, social and cooperative tools, interoperability, scalability, high performances with high numbers of documents and of users.

The search and performance abilities of Invenio apply to the full content stored in the system, meaning both the metadata and text of up to millions of documents, through full text indexing of all items. Searching can then be performed, at the choice of the user, in some metadata (title, abstract, date, etc.), in the text contained in the documents or in both. And Invenio will always provide the answer instantaneously.

Invenio provides functions to automatically convert and standardise file formats at submission (upload) time. These and other features are already available in Invenio as a very advanced document repository software (Andro, Assalin, Maisonneuve 2012).

## **2.2 Long term preservation**

Long term preservation is assured by Invenio based on the most advanced and proven concepts and practices. The targeted format of documents for archiving is PDF/A-1 (Portable Document Format, PDF 1.4), which is indeed the version of the PDF format conceived for long term preservation archiving, in its most constraining but also most conservative sub-version.

Although relying on a very simple and direct way of storing documents in a file system, a specific module (BibDocFile) is dedicated to provide complex functions associated to fulltext files. In this way Invenio can group different documents associated to the same record (including the different versions which may be needed during the lifecycle of the document) as well as different formats, and can associate to documents various information like the type of document, description, comments, etc.

### *2.2.1 Standards for long term preservation*

The standardization of the metadata is probably more important than the file format when aiming at long term preservation. The use of a standard which is widely as possible recognized as such, provides a practical advantage in long term preservation. The fact that the standard is widely used favours a longer life cycle for that standard, hence reduces the risk that a system becomes obsolete because of the standard it is based on reaching end of life. In addition, the standard being widely used favours interoperability (which in turn promotes longer life of the standard and of the systems based on it). Invenio uses MARC 21 (MARC 21 2012) as the standard for metadata. Although many other standards exist which have been developed more recently, MARC is widely used and rates better in several aspects than the best alternative standards. These aspects typically include granularity and consistency of metadata and extensibility, all aspects which are relevant for data preservation. Hence, MARC 21 is at the same time a conservative choice and well suited to long term preservation. Also for future proofing, Invenio is in the process of becoming independent from any particular standard for metadata, enabling it to adopt any standard.

## **2.3 Invenio: Open solution**

Invenio deals with any type of document and can be considered compatible even with future document types and formats. In fact the documents referenced by the metadata are simply and directly stored in the file system and linked via pointers. Hence any document that can be stored in the file system is potentially dealt with by Invenio. With Invenio's modular structure it is also easy to integrate modules performing tasks specific to each document type.

Invenio uses wide and recognized standards in document management to favour openness to other systems and documents, such as:

- the US Library of Congress standards for bibliographic information description (MARC 21) to store metadata. (An option under development will allow to store metadata with any type of other standard)
- OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting) as protocol to exchange records with other systems, which allows Invenio to interoperate with other institutional repositories

- Unicode to support all characters (accents, etc.) providing full internationalisation and compatibility with any language
- JSMath to support mathematics expressions (equations, etc.)
- These standards and openness of Invenio's approach allow the following:
- Harvesting and import of documents from other repositories (and let Invenio content be harvested, according to very fine and customizable access rights)
- Harvesting and import of metadata and the establishment of pointers to other repositories
- Integration of other repositories through external collections. This comprises the access to journals and books, including pay services, hence with access rights limited to communities covered by the fees.

Another aspect of the openness of Invenio is its ease of integration with external systems. The modular structure and development methodology allows integration with other systems in very efficient ways. An example of the integration with external systems is given for the workflow, at the end of 2.4

## **2.4 Collaborative and social tools and features**

Invenio includes full "web 2.0" and collaborative features, as expected, since CERN, "where the web was invented" (Berners-Lee 1989) is the driving force of its development and because of the long history of use by a large community with different, demanding and to the edge of technology requirements.

The community of users of Invenio (the users of an Invenio community) can:

- define their own user profiles
- group documents in users baskets and share them, either as a static choice or dynamically as a result of a query
- Receive alerts by mail at chosen frequency. Invenio is also compatible with RSS.
- Rate documents
- Comment on documents
- Cite documents

Features like statistics on citations and views or "people who have viewed this page have also viewed" are available.

There is also a fully customizable workflow allowing approval and state transitions of documents, with options like integration with a commenting phase, automatic change of classification and metadata, confidential circulation, comments for approval saved as a separate document, etc.

Optional features are also available to set up any type of workflow for the commenting, approval, sharing processes in the submission, revision, deletion phases of the document lifecycle.

The interface between Invenio and other systems (ERPs) at each stage of the workflow is made possible in a variety of ways, including:

- Via APIs (Application Programming Interface). Each function and action in Invenio can be performed with a command call, based on the modules of its structure
- Via emulating the user interface submitting input data, documents and actions as allowed by the interface. In this way all the data checks and validations can be exercised, including those implicitly or explicitly contained by the interface.

Both options are possible with Invenio using XML, but other standards can be easily adapted.

## **3. Specific features and developments for e-Government in Invenio**

Invenio also offers other features that are in the e-Government domain: e-procurement, e-journals publication, blogs preservation (this last feature is under development), etc. Such features which are typically not core functions of document repositories, are available or under development since Invenio's architecture is favourable to the integration of virtually any functions. Hence it appeared efficient and convenient to add to Invenio functionalities that are not typical of digital libraries (and profit from Invenio's classical features and of

the synergies of using an integrated solution). In the same way, other non-digital library functions and, in particular, e-Government functions and e-services can be easily added and will be added.

Although developed for and by scientific institutions, Invenio is ready for use in many other sectors/domains, including administration and/or e-Government purposes. Examples are given below:

### **3.1 The e-Procurement use case in the CERN document server**

Scientific institutions can be large international organisations which have to comply with very strict and complex rules for procurement, common to Public Administration. CERN uses Invenio to perform the documentary part of the procurement process interacting with third parties (e-procurement). This covers:

- The “Invitation to tender” (ItT) process (possibly with a preliminary official qualification phase) with all the needed documents available to companies (optionally by invitation) with access rights depending on the phase and type of procurement phase. It includes the information to stakeholders (with different views and access rights) and limiting the access (and archiving the documents) automatically at deadlines. In a typical ItT process at CERN, in a first phase the Procurement Service loads the information about the tender, partly automatically via a link with the ERP system and including deadlines for the main steps of the process. The documents and the information attached to them is stored in a collection (folder) dedicated specifically to the ItT. The Procurement Service will trigger the dispatch of e-mails to the firms that were recorded in the ERP system as to be invited to tender. The ItTs are access restricted in Invenio at the collection level and the invited companies are given access rights. Also the representatives of the CERN Member States in charge to liaise with national industries will be notified by e-mail and they will be given access to ItT documents, too. They will access also some documents intended to help them in proposing other companies for the ItT. These documents must not be accessible to firms and access rights are set for them also at the level of the document. If new firms are accepted by the Procurement Service in due time, they will receive an invitation by e-mail and follow the same conditions and restrictions of the firms invited at the beginning. At the deadline for the firms to answer, Invenio will automatically change some metadata (category of the document) which will trigger the change of the collection to which the documents of the ItT belong to. The new “Archived ItT” collection is not accessible by anybody but the Procurement Service.

**Figure 1:** Collection corresponding to the qualification procedure (Market Survey) MS-3912, with deadlines and documents

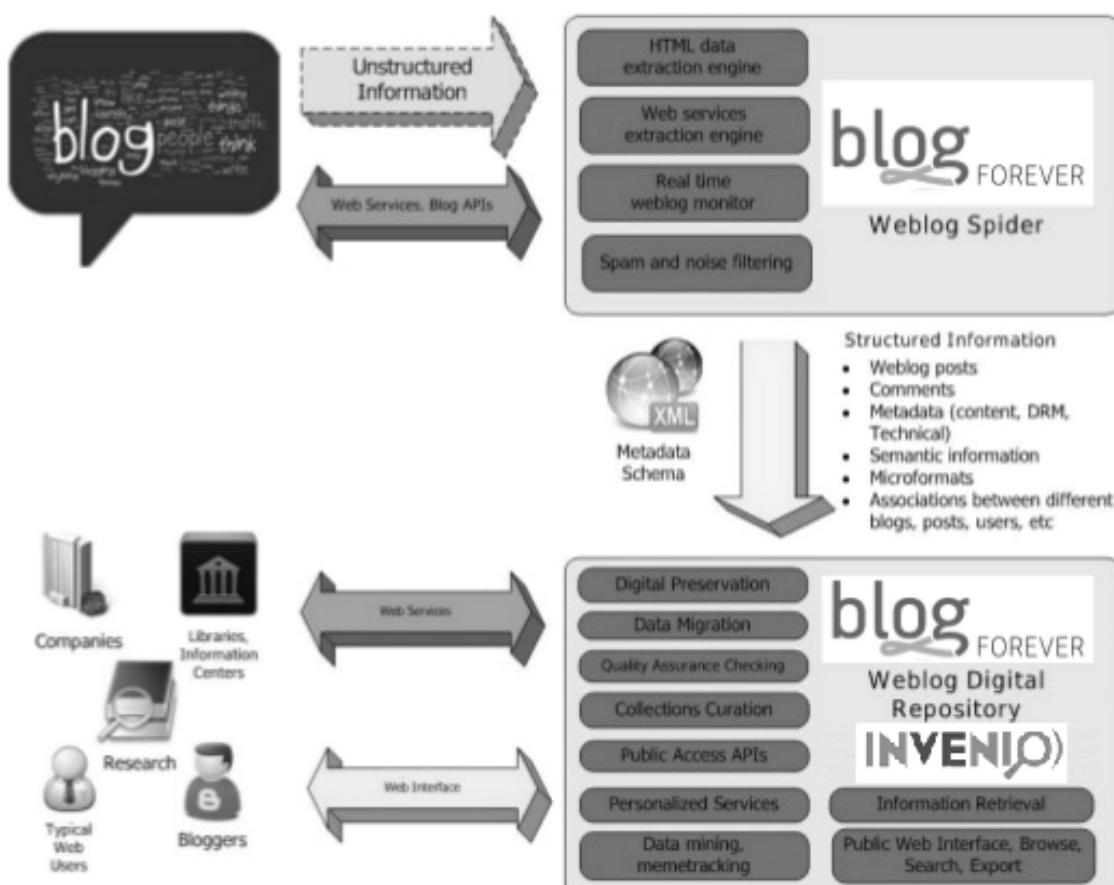
- The bidding by the firms, respecting strict confidentiality. It includes a preliminary phase where the bid is prepared by the firm (and not accessible by the Procurement Service), the submitted phase (the documents become inaccessible to the bidder) when the Procurement Service Open the bids and start the

assessment, the Evaluation Panel phase and the archive. It includes interactions and uploading files by the firms. The different steps are triggered automatically according to a pre-defined calendar.

- In a typical bidding phase depending from the ItT mentioned above, a firm would upload the documents in a collection that only that firm can access, at the beginning. At the time of the deadline for the tenders, Invenio automatically changes the metadata of the documents in the offers, which triggers a new classification in a collection which is forbidden for access by the companies and allows the Procurement Service to start the Assessment step. This means that the members of an Evaluation Panel gain access to a part of the documents which allow them to evaluate the offers. At the end of the evaluation, the Procurement Service triggers the next step and another automatic change of metadata which "moves" the documents of the offers in an archive collection which is forbidden to the members of the Evaluation Panel, too.

### 3.2 Blogs preservation

Basically any piece of information that can be saved as a file in the file system can be considered as a "document" for Invenio. Based on this consideration, anything can be conveniently stored in Invenio and profit from Invenio features/characteristics (Google-like search mode, fast search and retrieval engine for large amounts of data, etc.). BlogForever (BlogForever Project <http://blogforever.eu/>) is a collaborative EU funded project (FP7, Seventh Framework Programme of the European Commission Community Research and Development Information Service - CORDIS) aimed at saving knowledge stored in blogs dialogs and discussions. Its key objective is to *develop robust digital preservation, management and dissemination facilities for weblogs*. These facilities will be able to capture the dynamic and continuously evolving nature of weblogs, their network and social structure, and the exchange of concepts and ideas that they foster; pieces of information omitted by current Web Archiving methods and solutions. It is composed mainly by a crawler, which selects information in the blogs, and the repository where this information is stored. Invenio was selected as the repository for these blogs item and the Invenio team takes part to the joint effort to set up an instance of Invenio to optimize the integration with the crawler.



**Figure 2:** Schema of the BlogForever system

BlogForever will develop robust digital preservation, management and dissemination facilities for weblogs. These facilities will be able to capture the dynamic and continuously evolving nature of weblogs, their network and social structure, and the exchange of concepts and ideas that they foster; pieces of information omitted by current Web Archiving methods and solutions. The final output of BlogForever will be a simple weblog digital archiving solution that any user, user group or institution could use to preserve their weblog(s) and ensure their authenticity, integrity, completeness, usability, and long term accessibility as a valuable cultural, social, and intellectual resource. A multitude of parties will benefit from the project, including libraries and information centres, museums, universities, research institutes, businesses, and bloggers. The vision of the project is to build a simple end-to-end digital archiving solution for weblogs that any user, user group, institution or organisation could use to:

- easily preserve their weblog(s) in a cost efficient manner safeguarding their authenticity and integrity
- promote open access to information
- manage large volumes of weblog archives
- interact with their archives in various ways such as full text searching, tagging, sharing and reusing content
- collaborate with other users using the archive's content
- publish selected information to the web

### 3.3 The web journal

The cataloguing possibilities and the search engine of Invenio are useful elements to integrate in a module which displays documents and information with the classical approach and features of a Web Journal.

At CERN the Weekly Bulletin is an Invenio web journal, where articles and other information are gathered into Invenio documents according to pre-established criteria and displayed in an appealing way to employees, the physics community and public.

The screenshot shows the CERN Bulletin homepage. At the top, there is a navigation bar with links for News Articles, Official News, Training, Announcements, Events, and Staff Association. Below the navigation bar, there is a search bar with the text "english | français" and a "search" button. To the right of the search bar, it says "Issue No. 41-42/2012 - Monday 8 October 2012" and "Printable version - Subscribe".

**IS IT A TRIANGLE?**

LHCb Event Display

In the theory of the Standard Model, the masses, interactions and physical states of quarks – the basic constituents of matter – are described mathematically by a matrix known as the Cabibbo-Kobayashi-Maskawa (CKM) matrix. Three angles enter into the definition of the elements of the matrix. If their sum is not 180°, new physics might be the reason. >>

**READY, SET, LOGO!**

A word from the DG

Over recent months, you might have noticed a crisp new look beginning to appear at CERN, our vehicles carry uniform branding, signage is being refreshed and slowly but surely, everything from letterheads to websites is coming into line with CERN's new graphic charter, which we're now giving an official launch. >>

**LHC REPORT: A TOUGH RESTART**

The third LHC Technical Stop of five days took place in the week of September 17. Getting back to normal operation after a technical stop can sometimes be difficult, with debugging, testing and requalification required on the systems that have seen interventions. Fiddling in a selection of other problems can make for a frustrating time. >>

**THE GRID IS OPEN, SO PLEASE COME IN...**

During the week of 17 to 21 September 2012, the European Grid Infrastructure Technical Forum

**OFFICIAL NEWS**

REMINDER: Extension/suppression of allowance for dependent children aged 20 to 25  
Elections to the Senior Staff Advisory Committee ("The Nine") 2012  
REMINDER: Compliance with Operational Circuits No. 2 (Rev. 1) on "Conditions of access to the fenced CERN site"

**TRAINING AND DEVELOPMENT**

Technical training - places available  
Safety Training - places available in October  
Management and communication courses - places available  
Learning and Development Policy available on the web

**ANNOUNCEMENTS**

Changes in the e-mail policy for people without CERN affiliation  
Vaccination against seasonal influenza: a reminder

**EVENTS**

Séminaire de physique corpusculaire  
Monday 8 October: Exhibition, presentation, nibbles

**STAFF ASSOCIATION**

Public meetings

**Figure 3:** The headlines of one of the CERN Bulletin issues

### 3.4 Other cases and applications

The International Labour Organisation (ILO, an agency of the United Nations) is using Invenio to store 120'000 documents about labour legislation and practices, the history of labour organisations.

It is also used by ILO to keep parties and the public informed about conferences and conventions and their reports, and also about the works of the ILO Governing Bodies.

In Switzerland, a couple of Invenio installations in the education domain were developed. Edudoc ([www.edudoc.ch](http://www.edudoc.ch)) is the document repository of the Swiss Conference of the Cantonal Directors of Public Education. It contains the official gazettes for education matters, official reports, laws and other documents (bills, minutes of parliamentary speeches, etc.), education press, press cuttings, plenary minutes, etc.

The screenshot shows the homepage of Labordoc. At the top, there's a navigation bar with 'Search', 'Resources ▾', 'Help ▾', and language links 'English', 'Français', 'Español'. The logo of the International Labour Organization is in the top right. Below the navigation is a search bar with fields for 'Search', 'any field', and a 'Search' button. There are also links for 'Search Tips', 'Advanced Search', 'Ask a librarian', and 'e-docs only'. A 'Focus on:' section features a 'Global Wage Report 2012-13' thumbnail, followed by five categories with images: 'Migrant workers', 'Disability in the workplace', 'HIV/AIDS', 'Youth employment', and 'Fundamental principles and rights at work'. Below this is a 'Narrow by collection:' section with two main categories: 'ILO publications' (selected) and 'Other publications'. Each category has sub-options like 'books', 'journal articles', etc., with counts. To the right, there are sections for 'Latest publications by ILO', 'ILO meetings', 'ILO Conventions', 'ILO journals', and 'ILO Conventions: background and preparatory work'.

**Figure 4:** The homepage of Labordoc, the institutional document repository of the International Labour Office of the United Nations

The Canton of Freiburg (CH) ([www.friportal.ch](http://www.friportal.ch)) uses Invenio as a portal to store documents dedicated to pedagogy. Besides the documentation part (including a multimedia encyclopaedia for teenagers), it contains a section dedicated to the latest news and a section reserved for teachers. It is also provides links to sites allowing exchanges between classes of students and collaborative activities.

The Engadine Cultural Archives (CH), a public institution, runs an Invenio server (<http://search.kulturarchiv.ch/>) to collect and disseminate historical, cultural and artistic items from the Engadine region, which corresponds to a particular mountain region in Switzerland where a minority language is used. Documents include: books, catalogues, letters, postcards, pictures, newspapers, maps, and other objects (coins, machines, etc.). The maps are "static" PDF files at present, but in analogy to the way that the Acrobat reader is plugged in, other applets could be easily plugged into Invenio to provide additional functions enriching, perhaps interactively, user experience with maps and geographic information stored in Invenio.

The screenshot shows the homepage of the edudoc.ch server. At the top, there is a banner with the text "Présentation générale: Concept (pdf)" and links for "Documentation technique", "Champs MARC utilisés (pdf)", "Définition des collections (pdf)", "Thésaurus IDES - CSRE - CSPS (pdf)", and "Politique d'indexation (pdf)". Below the banner, there is a search bar with fields for "Any field" and "search", and buttons for "browse" and "Search Tips :: Advanced Search". A sidebar on the left lists categories under "Narrow by collection", including "Berichte", "Gesetzgebung und offizielle Dokumente", "Zeitschriften", "Presseeschau", "IDES-interne Dokumente", "SKBF-interne Dokumente", "Infopartner", "EDK Plenar", "DEDKVER", and "IDES und SZH Bibliotheken (Papier-Dokumente)". A large image of a document is displayed above the search bar. On the right, there is a "Focus on" section with links to various categories like "Erfasste Dokumente nach Institution", "Dokumente zu Kantonen", "Dokumente zu FL", "Suche nach Artikeln von bestimmten Zeitschriften", "IDES-Umfragen und -Dossiers", "EDK-Dokumente", "IDES-Literaturdatenbank", and "SZH-Literaturdatenbank".

Figure 5: The homepage of the Edudoc server

The screenshot shows the search results for "Apfelbaum" at the Engadine Cultural Archives. The search interface includes a search bar with "Apfelbaum", a dropdown menu for "Titel", and a "Search" button. Below the search bar are sections for "Search collections:" (set to "any collection") and "Sort by:" (set to "Item first"). The results are displayed in a table format with columns for "Culture archive", "Number of records", and "Search took". Three items are listed:

- 1. Archivalie: Apfelbaum mit Haus**  
Bezeichnet unten rechts: „F.Jenny“; Farbnegativ: 24 x 36 mm,  
Nr. 20/27  
[Details](#)
- 2. Archivalie: Blühender Apfelbaum**  
Bezeichnet unten rechts: „H. Jenny“; Farbnegativ: 24 x 36 mm,  
Nr. 14/14  
Thema:  
[Details](#)
- 3. Archivalie: Apfelbaum**  
Bezeichnet unten rechts: „H. Jenny“; Farbnegativ: 24 x 36 mm,  
Nr. 14/13  
Thema:  
[Details](#)

Each item has a thumbnail image to its right. At the bottom of the page is a "ADD TO BASKET" button.

Figure 6: Results of the search for pictures' titles. The thumbnails are expanding to large size images, allowing a virtual museum-like visit

#### **4. Invenio future developments**

Apart from the Blog preservation effort, the main functional developments of Invenio under way include the ability to store metadata in any standard (at present only MARC 21 is used) and extending its scalability into the 100s of millions of documents range through sharding techniques. In addition there are many features under development such as the tooltips type news feature to enable focusing the attention of users on relevant aspects, both from the technical and the content points of view.

The Invenio development policy foresees to release at least two minor releases per year on average, each including improvements and new functionalities.

#### **5. Conclusions**

In short, Invenio is a powerful and flexible document repository software which can help you store and propose to citizens millions of documents of any type providing efficient and ergonomic search and retrieval functionalities. Invenio offers other varied functions such as e-procurement or blog preservation. Already today it is ready for future document formats, it allows sharing and interaction with your users and partners and it deals efficiently and beneficially with their feedback. Furthermore Invenio can easily integrate new functions and features to support policies of e-Government and e-services that you may need in the future.

The comprehensive approach of Invenio provides the administrator and the organisation adopting it with synergies and efficiency in training, support, development, scalability and in following the evolving needs of your community.

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# Accelerating e-Government Implementation With a new Framework for Decentralised Change Support

Jeroen Meij<sup>1</sup> and Jeroen Pastoor<sup>2</sup>

<sup>1</sup>KPMG Advisory N.V., Amstelveen, The Netherlands

<sup>2</sup>Stichting ICTU, The Hague, The Netherlands

[meij.jeroen@kpmg.nl](mailto:meij.jeroen@kpmg.nl)

[Jeroen.pastoor@ictu.nl](mailto:Jeroen.pastoor@ictu.nl)

**Abstract:** This paper describes the evolution and implementation of a framework for decentralised change support applied to the monitoring of the large scale e-Government plan in the Netherlands. It reflects on theoretical backgrounds in agile, motivational and gaming theories and how these have been translated into the interaction with participating local actors. We will describe the functional and technical outline of the framework with the various building blocks including the unifying ontology backbone. We will report on user acceptance and on results achieved so far, and conclude with ideas on how this could be applied to other e-Government plans. The Dutch government has formulated ambitious e-Government goals. The Dutch roadmap for e-Government implementation reaches until 2020 and is aimed at a nationwide improvement of services and processes through use of information technology. The Netherlands is characterised by a decentralised structure, where local governments (municipalities, provinces and regional water authorities) perform many public services. The role of the municipalities is essential to the interactions between citizens and government. Furthermore, software vendors play an important role in reaching the e-Government goals, supplying solutions aligned to central directives, infrastructure and standards. How local actors reach the e-Government goals is largely up to them. However the government has started a wide range of projects to develop and use the central parts of the e-gov infrastructure and support local actors in the change process. To provide insight into the speed and the extent at which the goals are being realised, a monitoring and governance infrastructure had to be implemented. To achieve this, the Framework for Decentralised Change Support (FDGS) has been developed. The FDGS is a framework built on Web3.0 technology which exploits public and commercial sector collective data and knowledge resources. The framework collects data of project progress, calculates data quality metrics for e-gov processes and calculates potential and realised benefits. It is based on the principle that contributors of information are rewarded for their efforts with information valuable to them. The system provides private accounts for local actors, in which feedback is received. This feedback is given through a dashboard and several progress indicators. At the same time, an overall view of the performance on an aggregated level is given, providing benchmarking and governance data. The backbone of the framework is built upon an ontology, which unifies concepts and data from all sources in a single, expandable model. The model can be queried from a universal interface and delivers data to any connected web app. Security is enforced to separate private data from open data. In many large scale efforts, differences in definitions may arise. The unifying ontology helps to identify the misalignments and thus contributes to harmonisation. First experiences indicate that municipalities greatly appreciate the support and feedback that is offered to them through the framework and are motivated to intensify their efforts. Moreover, because data and e-Government concepts from disparate sources are linked and presented in one place, new governance insights are obtained.

**Keywords:** monitoring, progress, change management, decentralised, benefits management, motivational theory, e-government

## 1. E-Government in the Netherlands

Citizens and businesses demand better service provision from the government with fewer rules and reduced administrative burdens. In other words, a fast, efficient, client-orientated government. That is why Dutch government bodies collectively aim to improve their services by using smart and reliable IT solutions. This requires proper (electronic) instruments.

The Netherlands is characterised by a decentralised structure, where local governments (over 400 municipalities, 12 provinces and 25 regional water authorities) perform many public services. The role of the municipalities is essential to the interactions between citizens and government. Municipalities are considered the first and most important point of contact.

For 2020 improving service provision to business and citizens is the primary objective of the Dutch National Implementation Program known as the i-NUP. The i-NUP is a joint priorities program of municipalities, provinces, regional water authorities and central government. It presents a list of prioritised components ('building blocks'), in three functional groups: Services for citizens, Services for businesses and the National registrations.

Among services for citizens we find Web accessibility guidelines, Digital ID and a Civil Service number. For businesses a digital ID and an information service is planned. The National registrations consist of common registers of Addresses and buildings, Persons, Topography, Real estate, Work and income, Vehicles, etc.

These facilities together form the basic infrastructure for the realisation of eGovernment. The i-NUP not only wishes to give priority to these facilities, but also aims to enhance the control over the realisation process.

Various levels of government have collectively agreed to implement this basic infrastructure (and to start using it). Therefore the government started a wide range of projects for the development, implementation and application of the different components of the basic infrastructure, supporting local actors in the change process. How these local actors (municipalities, provinces and regional water authorities) reach the e-Government goals is largely up to them.

Besides these local actors also software vendors play an important role in reaching the e-Government goals. Their challenge is to supply software solutions which are well aligned to central directives, infrastructure and standards.

## **2. Monitoring and motivation**

To provide insight into the speed and the extent at which the basic infrastructure is being realised, implemented and used, a monitoring and governance infrastructure had to be implemented. From a basic need to monitor the progress of e-Government, steps were taken to grow towards a more comprehensive and bidirectional monitoring system. In this chapter we will describe the theories applied during the development of the system.

### **2.1 Initial need**

Initially, only a survey was conducted twice a year. In this survey the responsible parties for each of the components of the basic infrastructure were asked to indicate which municipalities have implemented the component and which have not done so yet. The results were shown in a map with all municipalities, their overall progress and progress for a selected component. Because the components usually consist of many technical and procedural parts, the definition of 'implemented' is often the subject of discussion. Thus, a need was perceived to measure more objectively and to provide municipalities with more and better actionable feedback. For the monitoring framework, two design principles were clear from the very start:

1. There had to be a unifying structure that could combine and expose all monitoring data and
2. Local actors like municipalities had to be seduced to participate by offering them something in exchange for their cooperation.

### **2.2 Motivational theories in the context of work and gaming**

To be able to give proper feedback on a municipal level, the municipalities had to be involved more intensely. This required more effort from the municipalities and a willingness to supply detailed data, which could show some weaknesses in the progress within the municipality. So why would a municipality participate in all this? This was exactly the question we had to ask ourselves. How could we motivate these local actors not only to participate in the monitoring, but also to increase their efforts in realising the e-Government goals?

We started by looking into motivational theories. Herzberg (1959) divides between Motivators and Hygiene factors. Herzberg considers money to be a Hygiene factor, while (task) Enrichment and Empowerment are considered motivators.

Dan Pink (2010) investigated motivational factors for professional workers and came to a surprisingly intuitive list of three elements: Purpose, Autonomy and Mastery. Like Herzberg, he considers Money to be a hygiene factor (frased as: Get money out of the way). Purpose, Autonomy and Mastery are widely applied in Agile software development methods like SCRUM, where motivation is essential for the performance of the self organising teams involved. We consider Autonomy and Empowerment to be related concepts.

Then we investigated research about gamification theories. Why are games often so successful at motivating players?

Medina (2005) gives an overview of research on the topic, among others based on learning motivation research by Mitchell (1993) and Malone (1987). Ryan and Deci's (2000) self determination theory is largely congruent with the findings of Pink. Malone and Lepper's (1987) Intrinsic motivation theory adds the notion that Intrinsic motivation is enhanced by surprises, control, choice, power and the individual balance between skills and challenges. Clark (2007) summarises research on this question in seven main factors. If we combine these factors with the previously mentioned observations by Medina we find some overlap (Autonomy and Purpose/goals) but also find some potentially interesting factors we could add:

- Intrinsic motivation (and the balance between intrinsic and extrinsic motivation)
- (Building) Self confidence (by scaled design and self reflection opportunities)
- Challenge (by scaled design, enough challenge for early success, Individual balance between skills and challenges and a gradual increase in challenges)
- Feedback (seeing your progress as you move towards your goal)
- Social (social approval or disapproval by people who matter to you)

Several observations from Brady (2002) helped us to place the ideas in a centralised vs. decentralised context.

### **2.3 From monitoring to acceleration**

The next challenge was to implement at least some of these motivators in the monitoring infrastructure, so municipalities would be motivated to participate. From our review of motivational literature we arrived at the following shortlist of motivational factors of which we have tried to integrate the first five in the monitoring framework:

- Purpose
- Autonomy
- Mastery
- Build confidence and challenge
- Social approval
- Get money out of the way

*Purpose* is likely to be perceived by engaging municipalities in a Central-Local partnership and by anticipating the outcomes of the changes, providing evidence that changing is beneficial on a local level (too). Also the benefits on a central level should be made clear.

*Autonomy* (related to Empowerment) is achieved by allowing every municipality to decide on their own path to realisation, allowing actors to act in alignment with the local situation. Furthermore coaching is provided on a local basis. Feedback mechanisms have to be put in place which provide feedback during the process on an actionable level.

*Mastery* can be achieved by providing municipalities the opportunity to excel. Among other things, local performance is measured and local feedback is given. Also performance is (mildly) compared on a central level. Through active participation, well performing municipalities could guide others and help to develop the knowledge needed.

*Build confidence and challenge*: municipalities are guided through the process step by step, new information and challenges are offered when they reach the next step. Coaching provides self reflection opportunities.

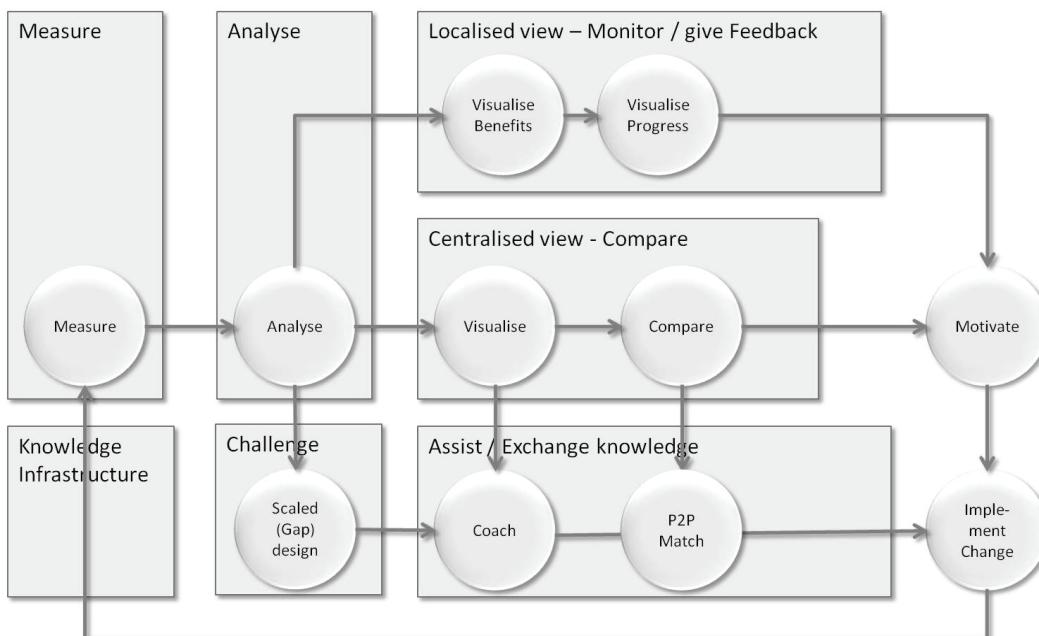
*Social approval*: municipalities are enabled and stimulated to help colleagues in peer groups, giving them the opportunity to perform an example role.

*Get money out of the way* (related to Subsidiarity and Empowerment): of course, it helps to a large extent when some way of funding is provided to support the changes on a local level

While important and in various ways addressed in the Dutch e-Government programme, *Get money out of the way* is beyond the scope of this paper and will not be discussed here.

### 3. The framework

In an evolutionary way, many functional elements of the framework have been developed at the moment of this writing. Information is gathered in Measuring units or progress tracking sites, analysis is performed and local feedback as well as central monitoring is provided. This is supported by coaching and knowledge exchange functions. New challenges are provided when appropriate. Whenever necessary, a coach is involved in the process and helps the municipality to overcome obstacles. A common knowledge exchange backbone is an integrated part of the infrastructure. Figure 1 gives an overview of the functional elements.



**Figure 1:** Schematic view of the functional elements of the framework

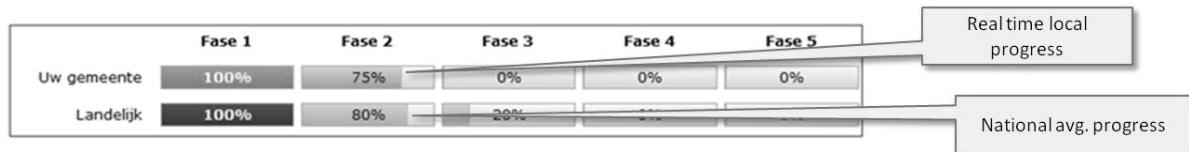
#### 3.1 Project progress sites

##### 3.1.1 Measuring

The most straightforward measuring tool is the Project progress site, where a form generator is used to generate questionnaires, divided into distinct phases. After a local project manager has filled out all questions in a phase, he submits the form for review by the coach. The coach evaluates the form data and approves the phase or decides to intervene and contact the local project manager. Phases are not necessarily consecutive. Because information is offered regarding each phase, this helps in motivating the project managers to *Build confidence* and offers them new *Challenges* through the questions for the next phase (two motivational factors). Some project progress sites use quantitative data from other sources to ask the local project manager for more information or additional details. Sometimes the project manager may be asked to provide an explanation for the test results. Many question types are available in the questionnaires, from yes/no to open questions.

##### 3.1.2 Localised view

The progress of the municipality is shown in a progress bar and is viewed together with the average progress or the planned progress. The bar is shown in the same screen as the questionnaire. This adds to the motivational factor *Autonomy* by providing feedback, but also could contribute to *Mastery*, because the relative performance of the municipality becomes visible instantly. Progress which has been approved by the coach shows in a more saturated colour.



**Figure 2:** Project progress bar for a municipality

### 3.1.3 Centralised view

The overall National progress for the project is shown in a map on the project site and other sites. The coach has a progress overview screen of all municipalities he is responsible for. Although no case management has been implemented, coaches can keep track of interventions and add remarks to a phase for each municipality.

## 3.2 Data quality and benefits analysis site: i-Spiegel®

### 3.2.1 Measuring

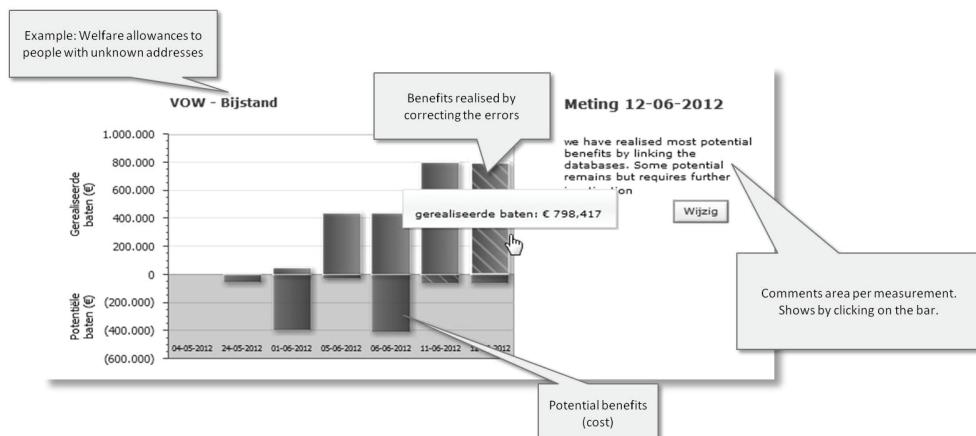
The i-Spiegel website is a more complex measuring instrument. The site performs two measuring tasks: the analysis and interpretation of errors in uploaded data files and the handling of data errors calculated offline. As of 2013, development is moving from off line to online analysis. The website frontend handles all authorisation, user interaction and visualisation tasks. Comparisons and calculations are performed in a separate backend system. Examples of data files are address files for addresses used in municipal processes, combined with process specific data fields like tax value.

### 3.2.2 Analysis

i-Spiegel calculates data quality in databases used for many municipal processes. One important principle is the comparison of datasets used in these processes with the main common registers (Persons, Addresses and Buildings and Companies). When critical elements don't match, data quality is not considered 100% for that record. For several processes, when data quality errors are found, an additional calculation predicts potential benefits that can be realised when the error is corrected. In other words, the website calculates the cost of data errors of processes in the municipality. This information helps to gain local support for the implementation through the principle of *Purpose*. Municipalities can upload their data as often as they want.

### 3.2.3 Localised view

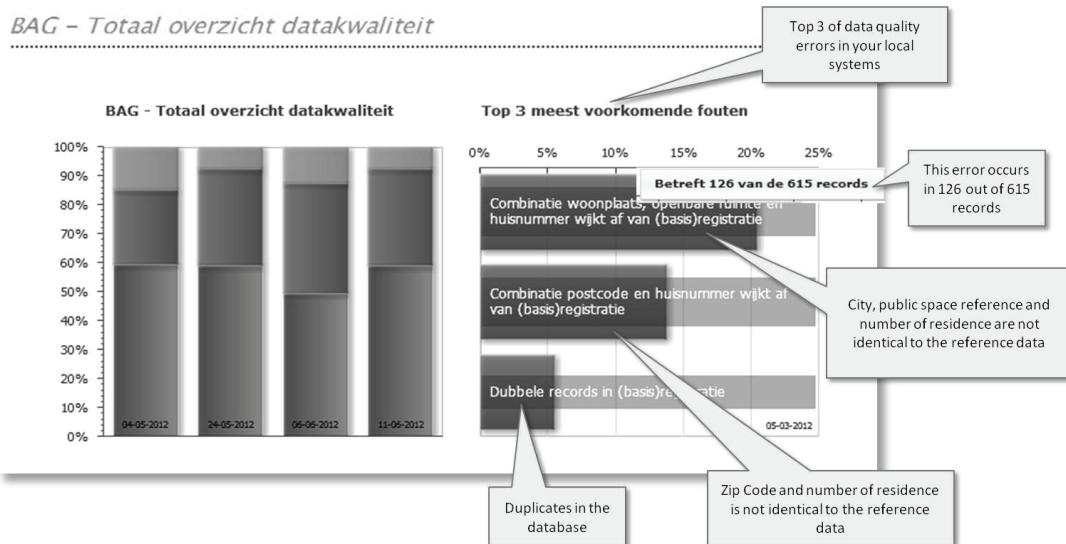
Potential benefits and data quality are presented in dashboards and detailed charts. Care has been given to provide enough detail to make the information actionable. The municipality is motivated to act, on one hand by envisioning the benefits that may be achieved as shown in Figure 3 (contributing to the *Purpose*) and on the other hand by providing actionable information (contributing to *Autonomy*). Actionable information may consist of detailed error type descriptions as shown in Figure 4, but also through a downloadable error file.



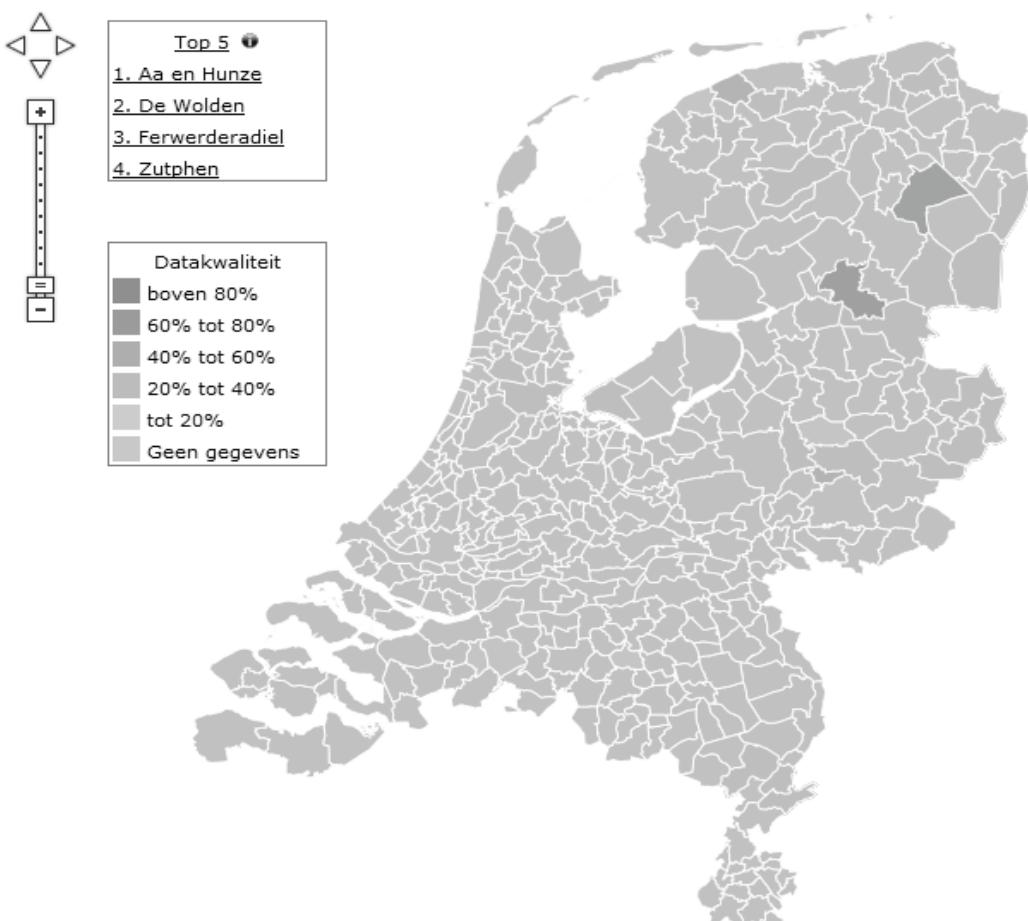
**Figure 3:** Benefits indicator, showing cost that could be avoided and realised benefits

### 3.2.4 Centralised view

The centralised view consists of a map showing overall data quality in all municipalities, combined with a top 5 of best performers.



**Figure 4:** Data quality indicator, showing the exact nature and quantity of the most frequent errors in the tested data set of a municipality



**Figure 5:** Data quality map, clicking on a municipality reveals additional details. Note that the picture is based on a small set of demo data

### 3.3 Overview of motivational factors

In table 1 we provide an overview of the motivational factors we feel we have integrated into the framework at this moment.

**Table 1:** Motivational elements

Motivational factor	How	Functionality
Purpose	Insight into potential benefits	i-Spiegel
Autonomy	Offering actionable information, direct feedback through progress bar, downloadable error files	i-Spiegel, Project progress sites
Mastery	Information, mild comparison, guide status	Centralised progress of all functions, interactive map and top 5
Build confidence and challenge	Questionnaire – applicable information combination, Repeated data quality measurements	Project progress sites and project sites, i-Spiegel
Social approval	Mild comparison, helping out colleagues	Central Views and top 5, matching through coach
Get money out of the way	E-Government programme	N/A

### 3.4 Supporting functionality

#### 3.4.1 Municipal reference architecture and software catalogue

The architectural web catalogue is a source for reference data about municipal processes, standards, suppliers and software products. The web catalogue acts as a mother table for many monitoring projects. The catalogue provides a standardised list of municipal processes and lists all suppliers for municipal software products including the standards compliancy of software releases.

#### 3.4.2 National release planning

Linked to the e-Government components, the responsible product managers are involved in maintaining the national release planning, which is a record of all products and product releases related to the twenty e-Government components. These releases may be versions of a software reference product, a standard or regulation, or a connecting service. Through the release planning, software vendors and municipalities know when new releases are due and are able to anticipate on this. Also dependencies between products and releases are made visible.

#### 3.4.3 Knowledge infrastructure ontology

As a unifying data framework, an ontology has been put into place. The ontology is connected to all e-Government monitoring sites and offers features to query across the total collection. Through a standardised query interface apps or websites may collect data and show the data in the desired format for this specific application and audience.

Furthermore, the ontology offers limited reasoning capabilities over the total data set. An important aspect of the creation of the ontology has been the alignment of governance, management, municipal and technical domain concepts. Although all domains mentioned are involved in the e-Government programme, often definitions and perceptions of concepts are totally different. The alignment of concepts makes it possible to connect different data sets in the ontology.

A difference between an ontology and a database is the explicit naming (and meaning) of relationships between concepts. This is illustrated below, where some relationships for the concept ‘customer’ in an insurance context are shown. More or less formal restrictions on the relationships may be imposed so reasoning becomes possible.

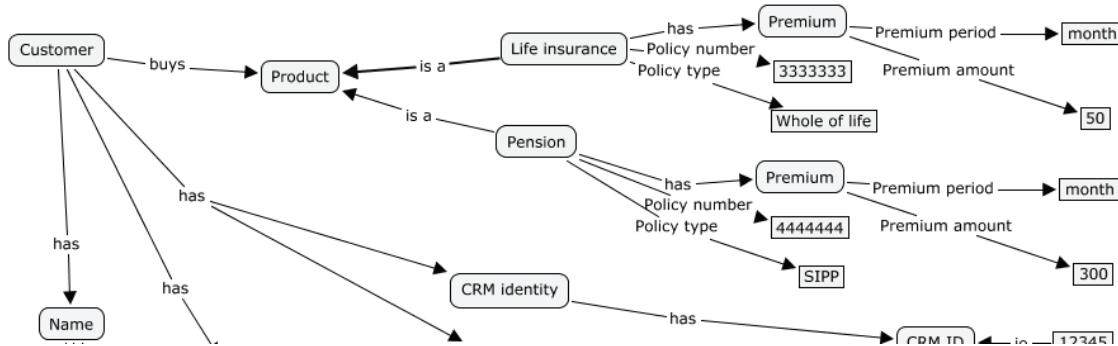


Figure 6: Example of concepts and relationships within an ontology for an insurance domain

## 4. Infrastructure

To complete the description of the framework, some technical information is provided in this chapter.

### 4.1 Technical components

The form generator is a custom development based on the Symfony framework. The form generator creates the forms for data collection that may be integrated into various PHP based CMS platforms. The forms will store submitted data in separate databases outside the CMS system. This ensures portability and facilitates the link to the Knowledge infrastructure ontology. The Open Source systems Drupal and Joomla have been used for CMS functionality so far.

The map is derived from GEOZET viewer, which in turn is based on the Open Source Openlayers project. The ontology is based on the Virtuoso Open Source edition and uses SPARQL as a query language.

### 4.2 Private and public data

During the course of the project, it was found that from a motivational perspective, the balance between local feedback and public scrutiny is a very delicate matter. For this reason, most of the detailed local feedback data is considered private data, only accessible to the municipality and the Ministry of the Interior and Kingdom relations. More generic local data is presented in the overview maps. Thus, the local entities have secure access to their own private dashboards. To accommodate for public as well as private data from municipalities, the ontology has also been equipped with a security layer. This layer provides authorisation services to protect the private data.

## 5. General applicability

Started from a specific e-Government need, gradually a platform has evolved that will be applicable to many decentralised change processes. The Framework for Decentralised Change Support or FDCS is a scalable platform which offers project progress tracking and information delivery for local actors in the change process. At the same time the centralised views offer insight in the nationwide progress per project or for the complete programme. Reference data is fed into the system and disclosed to the project sites through the unifying knowledge infrastructure. The knowledge infrastructure also provides a view on all project progress data through the SPARQL query interface. Any website or app may use this interface to collect the desired data.

Furthermore, by providing a file upload facility for local actors, detailed analyses can be made of the data quality of local data, with or without a direct link to the central reference data sources. The data quality is made visible to the local actors in a private dashboard. In some cases a downloadable error file is supplied to support the improvement of data quality. An important feature is the calculation of potential benefits based on errors found. These potential benefits (or avoidable costs) prove to be a significant motivator for change by the local actors.

Although initially targeted at municipalities, the system proves to be equally applicable to government agencies and other public service organisations. Project progress tracking and data quality analysis for this type of organisations can easily be integrated in the framework. Examples include Public housing organisations and

regional water authorities. Applications may include other large organisations in cases where a motivational approach is preferred.

## **6. Conclusion and roadmap**

First reactions from local actors and project owners towards the new framework are very promising. All actors welcome the abundant feedback and the time savings that can be made through the use of the services offered by the framework. The calculated potential benefits already prove to be a great help in gaining local political support for the change process. At all stages, care must be taken to guard the balance between public and private progress data to ensure trust and commitment from the local actors.

Because of all the detailed data that is available within the framework, it will be relatively simple to integrate an automated peer to peer matching process which links local actors to each other for support and knowledge exchange. A match could be made because they are confronted with the same problem or because they have the same software supplier, but also because one seems to have mastered a problem the other yet has to tackle. Also, further action will be undertaken to integrate the delivery of information into the progress tracking process. In this way there will be more control over the scaled design and the balance between skills and challenges. Both matching and integrated information delivery are in prototyping stages at the moment.

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# **WHITEPAPER CLOUD - Possible use of Cloud Technologies in Public Administration**

**Toni Seifert<sup>1</sup>, Uwe Brünnicke<sup>2</sup>, Wolfgang Danzinger<sup>3</sup>, Christian Gebauer<sup>4</sup>, Rudolf Hellerschmidt<sup>4</sup>, Biljana Skrbic<sup>3</sup> and Martin Swiderek<sup>5</sup>**

**<sup>1</sup>IT-Dienstleistungszentrum Berlin, Berlin**

**<sup>2</sup>Dataport AöR, Hamburg, Germany**

**<sup>3</sup>Bundesrechenzentrum GmbH, Vienna, Austria**

**<sup>4</sup>Magistrat der Stadt Wien, Vienna, Austria**

**<sup>5</sup>Hessische Zentrale f. Datenverarbeitung, Wiesbaden, Germany**

[toni.seifert@itdz-berlin.de](mailto:toni.seifert@itdz-berlin.de)

[uwe.bruennicke@dataport.de](mailto:uwe.bruennicke@dataport.de)

[wolfgang.danzinger@brz.gv.at](mailto:wolfgang.danzinger@brz.gv.at)

[christian.gebauer@wien.gv.at](mailto:christian.gebauer@wien.gv.at)

[rudolf.hellerschmid@wien.gv.at](mailto:rudolf.hellerschmid@wien.gv.at)

[biljana.skrbic@brz.gv.at](mailto:biljana.skrbic@brz.gv.at)

[martin.swiderek@hzd.hessen.de](mailto:martin.swiderek@hzd.hessen.de)

## **1. Introduction**

### **1.1 Objective**

The objective of the Whitepaper Cloud is to offer the decision-makers in the public sector an overview of cloud services, to point out the risks as well as the need for action, and to encourage a mutual exchange of know-how and experience throughout Europe. [...see page 6]<sup>1</sup>

**Keywords:** cloud computing, public administration, innovation, standardised procedures

### **1.2 Management summary**

The New trends in technical innovation, development and implementation shape our daily lives as much as ongoing changes in administrative processes. Increasingly, these are digitised and electronically processed. Technical trends and corresponding regular updates of established procedures and the information technology (IT) infrastructure are cornerstones in making even administrative work processes more economical and efficient. European public IT service providers will continue to work with different sovereign tasks, unequal basic infrastructures as well as varying stages of development in the optimised operation of computer centres. Yet together, the Euritas members can make a big difference: the different starting points of the public IT service providers involved in Euritas offer an ideal basis for establishing common best practices. This bundling of requirements and interests can influence both manufacturers and standards, and can thus shape the optimal operating environment for European public IT associations.

European public IT service providers can utilise cloud computing to offer their clients demand-oriented and flexible sources of supply for information and communication technology (ICT) – if the required basis is established in the years to come. For this reason, the Euritas Cloud Working Group has identified the following areas of action to promote the utilisation of cloud technologies across Europe in the future:

- Preparation and development of cross-border standardised procedures and a legal framework for the European administrative environment
- Formulation of guidelines and manufacturer-independent standards for the utilisation of cloud technologies in the European administrative environment

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<sup>1</sup> In this way marked areas in the complete document are shortened for paper submission, the page number [...] is a direct page number reference to the original non shortened whitepaper document.

- Compiling best practices and economic indicators for public administrative IT services (planning, implementation and operation)
- Development of suitable benchmarks and bases of valuation to obtain cloud services and cloud operating environments from a cloud service provider
- Exchange of experience in the operation and design of service catalogues (cloud offers) for establishing suitable nationwide and cross-border IT services

Manufacturer-independent cloud services are not available yet. They will, however, be a decisive factor in future investment decisions. Depending on the speed of development of standards, procedures and guidelines, cloud services will gain increasing importance for public administrations. The following factors have been identified for having an influence on the success of cloud initiatives in European administrations:

- Hardware-oriented cloud technologies present a much lesser challenge than organisational structuring and the holistic implementation of processes for the provision and procurement of cross-border cloud services.
- The larger the quantity of sales, the more cost savings and scaling effects can be achieved.
- European cloud initiatives require multidisciplinary teams of experts, providing specialist administration know-how, legal expertise in the European environment, compliance knowledge regarding standards, guidelines, norms, technical expertise as well as organisational and standardisation knowledge.

The standardisation of operational processes will enable cost savings once cloud technologies are introduced in public administrations. However, the real cost savings potential can only be proven upon the development, implementation and operation of joint solution scenarios. Nonetheless, the decision to implement cloud computing in public administrations must not be restricted to costs alone. Many other aspects and areas related to the complex operation of computer centres of non-profit organisations – such as the consolidation of servers and procedures – affect the decision-making process. Currently, many things are still difficult to measure and cannot be compared (yet), given their heterogeneous structures. Numerous questions related to the complex field of cloud computing thus arise. For example: how can a public IT service provider use an economic efficiency model to transparently and comprehensibly transfer and evaluate, e.g., human resources which were displaced for other activities, accelerated processes, satisfied customers, faster product and service development cycles as well as shorter value-added chains?

It is the aim of the Euritas White Paper to offer initial guidance to these viewpoints. Given the various situations, sovereign tasks, political guidelines and interests of the different European public IT service providers, different cloud scenarios will also be used. This makes it even more important to counter the exuberance for cloud technologies with careful consideration for sustainability and value-adding benefits. The results of this White Paper provide an overview of the future market demand and the frameworks required for an economically viable implementation of cloud technologies. In addition, the White Paper provides an overview of what needs to be done from a European perspective to enable the successful utilisation of cloud services.

## **2. Definitions**

### **2.1 Introduction**

[...see page 8] Cloud computing is a development of familiar technologies and solutions, expanding them to include the concept of demand-driven elasticity. The related topics here are grid computing, outsourcing and application service providing. Cloud computing is a particularly flexible form of outsourcing that involves shorter contract periods (hours or months), suitable elasticity (demand-driven addition or reduction of resources) and lower or even non-existent investment costs.

### **2.2 Cloud computing definition**

[...see page 8] The basic features attributed to cloud solutions are very interesting in the pan-European context, because in general, the provision of IT services can be handled less expensively and more efficiently with a maximum level of automation and a high level of flexibility. This is achieved by using visualisation technologies and abstraction mechanisms. Payment is made in accordance with individual consumption. [...see page 9] The widely accepted definition by the American standardisation agency NIST expresses this as follows:

"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."<sup>2</sup> In addition to the regional definitions used in Germany, such as the one BITKOM<sup>3</sup> uses in its publications, the cloud criteria specified internationally by the "National Institute of Standards and Technology (NIST)" can also be enlisted for the cloud definition, as well as for assessing whether or not a service complies with the requirements of cloud services.

- Measured services: The use of resources and services is measured and transparently monitored, controlled and charged, subject to use.
- Rapid elasticity: The service resources can be scaled up or down as required, at any time and to any extent.
- On-demand customer self-service: Procurement of services as called for by the user, without direct interaction with the provider (self-service portal).
- Broad network access: Services can be reached via a network (Internet), standard access via a browser is possible from a wide variety of platforms.
- Resource pooling: Using a shared, location-independent IT infrastructure resource pool of (multi-)tenancy-capable virtualised resources that are allocated dynamically.

### **2.3 Service model types**

[...see page 10] The typical distinguishing features and attributes of these forms are as follows:

- Public cloud: Cloud services offered over the Internet to vast numbers of users and available on the market to anyone.
- Private cloud: Private clouds are understood to mean cloud services provided over a private network, such as within a company Intranet.
- Hybrid cloud: Hybrid clouds combine the so-called public cloud services with those of a private cloud.  
[...see page 10]

### **2.4 The service levels of a cloud**

If you take the most established definitions of cloud computing, cloud computing offers can be categorised into three basic service levels<sup>4,5</sup>. These service levels and service platforms build on one another in a hierarchical structure, as shown in the illustration (figure 1)

The business scenario uses a holistic strategy to determine which forms of cloud computing are referred to. It is generally true that the potential for standardisation increases, the closer you are to the infrastructure-related cloud services (IaaS). The possible applications are also more universal on the basis of uniform infrastructure resources. The higher the level (PaaS and SaaS), the more specifically this environment is adapted to demand. So essentially, three service models have emerged in the references and are listed below:

- IaaS - Infrastructure as a Service
- PaaS - Platform as a Service
- SaaS - Software as a Service

[...see page 11]

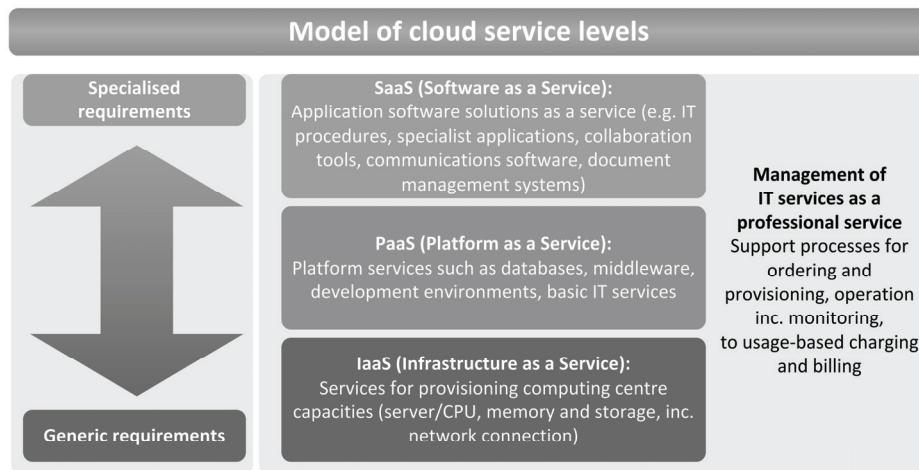
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<sup>2</sup>See The NIST Definition of Cloud Computing (National Institute of Standards and Technology, Information Technology Laboratory)

<sup>3</sup> Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V. (BITKOM)

<sup>4</sup> See Definition of Cloud Computing such as NIST, BITKOM, DMTF

<sup>5</sup> See Höllwarth Tobias, Cloud Migration, mitp, 2011



**Figure 1:** Cloud service levels (source: see EuroCloud)

## 2.5 Prerequisite for cloud use

To further develop existing IT and the use of cloud technologies, it is advisable to introduce a *standardisation and centralisation process* and, if necessary, to initialise an organisational development process as well.

[...see page 12] *Consistent standardisation of the organisational procedures and processes is also required in addition to this technical standardisation. This is essential for operation, use, fault management, billing, and setting the performance level for service use from the cloud. It may be necessary to realign the organisation, or individual areas.*

[...see page 12] Cloud services are provided online, either on the Intranet, via virtual private network (VPN) or on the Internet. So the essential technical basis for using centrally provisioned cloud services is an adequate and stable network connection that complies with and ensures data security.

As the industrialisation of information processing, cloud computing tries to see the entire process as a service, from ordering, provisioning and using to setting the performance level and automatic billing over the entire usage time of the IT. The holistic view of the core business process of a public IT service provider (from procurement to automated billing) should optimise the use of the existing resources as much as possible. There are many aspects to consider in preparatory planning. [...see page 12 and following pages]

The aim of each cloud solution integration is not only to benefit from the economic advantages and the provision of services with attractive and effective content, but ultimately to increase customer satisfaction. This correlates closely with the performance of the individual applications, service availability and simple operating and provisioning mechanisms.

For cloud offers to be acceptable, pre-defined, protected and abstracted infrastructures must be set up that are reusable and modular, as the underlying conditions and requirements for the operation of cloud computing solutions. The focus here is heavily on the virtualisation and security of the ICT systems. The availability, integrity, reliability and confidentiality of the data and information processed within the cloud infrastructure must also be ensured. The IT infrastructure, modern monitoring and surveillance tools and dynamic software, supported by self-service mechanisms for the service users, ensure flexibility, scalability and automation of the IT services on offer.

## 3. The underlying conditions and challenges of public administration

### 3.1 Opportunities and potential of cloud computing in administration

Current cloud considerations focus heavily on reducing costs and on efficient service provision, while striving to keep the same level of security and quality for the services that public IT service providers produce for their customers and the citizens in general. The cloud operator and the cloud provider should therefore be looked

at individually, as the level of maturity achieved by each public IT service provider with regard to optimised computing centre operation already differs in the classic issues of centralisation, consolidation and virtualisation. [...see page 12 and following pages]

The IT services to be provided for a larger user community are standardised, in order to achieve the expected economies of scale. A number of small service units can be combined by a central shared service centre, where similar processes and procedures are brought together. The shared use of these service offers allows public agencies and public IT service providers to organise their IT infrastructure more efficiently, optimise their procedures and reduce their costs. [...see page 15] So whatever the cloud issue, the following advantages can be achieved by pooling know-how and by centralising and virtualising the IT infrastructures:

- Accelerating the complete procedure and shortening turnaround times when implementing projects and customer orders,
- Simplification and transparency, as well as improving the handling and comprehensibility of complex IT systems and solutions and standardisation and flexibility, as well as interoperability and the integration of processes and concepts,
- Optimised sizes for standard products thanks to the fixed cost depression effects,
- Optimised utilisation of the centrally operated IT systems (Green IT),
- Removing avoidable interfaces, data redundancies, departmental boundaries,
- Increasing employee motivation with defined and more simple procedures,
- Achieving increased reusability thanks to standardisation and Future viability and scalability. [...see page 14]

This is enough to ensure that what are currently individual operations (areas of technical specialisation), such as servers, storage and network, must and will be brought together in future. The opportunities and potential listed below can be achieved in the short and medium term through cloud computing, by consistently automating processes, subject to the current level of maturity of computing centre organisation:

- Reducing production and development times, as well as production start-up costs,
- Increasing IT capacity, competitiveness and the quality of products and solutions,
- Increasing customer satisfaction. [...see page 15]

Taking the viewpoint that automatically provided IT services are more economically efficient if high sales volumes and large quantities make economies of scale possible, it is also attractive to analyse the cross-border EU-wide potential and to exploit this once it proves to be economical. However, to do this, it is necessary to resolve all the technical, organisational, administrative and legal questions in order to create uniform, EU-wide underlying conditions, by establishing standards, specifications and guidelines, for example.

### **3.2 Compliance with legislation, standards and specifications**

It is crucial for European public IT service providers that the use of public cloud services is currently excluded for many government IT procedures because the legal situation has yet to be finally resolved. This applies in particular to services where the protection requirements of the data and information are high or very high, or that involve classified data. This inevitably produces market restriction with regard to the use of the commercial cloud solutions of third-party suppliers. In many European countries, the principles of power separation and federalist structures also exist (e.g. separating the legislative, executive and judicial areas of responsibility), with their distribution also being reflected in operation and in the supporting provision of IT services in major public IT associations.

Among the most important underlying legal conditions are compliance with the data protection act and maintaining the integrity of data from sensitive areas or even classified data. [...see page 15] Checks to ensure compliance with official notification and licensing obligations are also included, as is compliance with the legal licensing issues for the use of dynamic cloud solutions. Suitable licensing models and ensuring compliance are essential factors for the acceptance of cloud solutions. As well as these typical issues, there are legal, regulatory and sector-specific requirements throughout Europe that must also be followed. [...see page 15] The agreed classic service level agreements provide the opportunity to define availability, reliability and

performance promises in the contractual relationships, as well as to measure and assess them. However, this is not currently creating a pan-European and mandatory legal framework for cross-border IT service provision and use.

An overview of the relevant legal areas and the (selected) questions that have been identified is given below [...see page 16]:

- Data protection legislation regarding personal data (EU data protection regulation),
- Public procurement law and IT contractual legislation (EU public procurement directive),
- Liability and warranty,
- Business, commercial and criminal procedure legislation,
- Jurisdiction in all liability and warranty questions,
- Compliance, IT security (compliance with legislation, standards and specifications)
- Licensing conditions and compliance with copyright law,
- Standard terms and conditions and "take it or leave it" agreements,
- Obligation to record and provide information in traffic data (access protocols). [...page 16]

Errors in these areas can quickly lead to considerable financial losses for the cloud service provider and those involved in general. It is therefore absolutely essential that there is careful, legal support to the project, right from the start. The legal assessment will resolve a great many individual aspects and detailed questions and must include a detailed examination of the initial legal situation in the countries involved.

[...page 16] These legal considerations on practically feasible and implementable business models for a pan-European cloud, as well as working out the advantages and disadvantages of the models from a purely legal viewpoint (contractual relationships, questions of liability, sub-contractors, accepting and excluding providers), are absolutely essential for the initial analyses when considering EU-wide cloud solutions. [...page 16]

Euritas would like to suggest that these investigations and considerations continue logically and that the unresolved issues and questions are dealt with gradually in structured projects.

### **3.3 IT security criteria and requirements**

[...page 17] The basic paradigm for data and information protection used to be classic perimeter protection. The starting point in the past was the assumption that there was a clearly defined boundary between network segments with regard to "internal and external access". This ensured that it was possible to have central checkpoints (firewalls) for all data and communications traffic. [...page 17] Mobility, the dynamic approach to terminals and IT infrastructures, the large numbers of mobile and private devices (e.g. notebooks, universal serial bus devices (USB), personal digital assistant (PDA), mobile phones and smartphones) and the increasing interaction between the various networks, all make it clear that progressive and distributed checks, as well as additional data security, are necessary. So it is essential to implement another approach to the protection of data and information, namely protecting the data and information itself. [...page 17] In an open structure, elementary protection of data and information applies. This particularly includes - especially in the public sector - the protection of personal data by encrypted data transmission, as well as safe data storage and data management. So, subject to the particular need for protection of the data and information being processed, a combination of the two approaches, i.e.

- perimeter protection (e.g. firewalls, intrusion detection)
- protection of data and information (e.g. encrypting the data)

must be implemented in practice. In this context, it is necessary to undertake security analyses to ponder the fact that the elementary data and information security aims in data and information processing, i.e.

- availability (the capacity of information to be accessible and useful for an authorised person)
- integrity (the accuracy, completeness and credibility of the information)
- confidentiality (protection of the capacity of the information to only be accessible or made known to authorised natural or legal persons or processes)

obviously have to be guaranteed in cloud offers. It is necessary in the context of a European cloud to make sure that additional security aims are derived from the three main categories quality, time and costs (for example conformity, authenticity, obligation, effectiveness, efficiency). [...page 18, shortened text and figure] The issue of virtualisation and platform independence, which is the basic technology for cloud services, has organisational prerequisites that have to be implemented and also included in the descriptions of standards that have yet to be developed. Virtualisation combines the risks and threats from the physical and virtual server worlds. [...page 18 and 19]

A technical and organisational cloud security policy must also be established. This allows requirement and indicator-based monitoring and control, which is the basis for carrying out regular audits. This can also be the basis for verifying that the underlying conditions have been observed and for identifying potential improvements.

### **3.4 Quality criteria for cloud offers and services in administration**

[...page 20] The selected aspects shown below allow you to assess the quality of a cloud service or as a cloud service provider, to be guided by the high standard of quality required for service provision. These criteria are geared to the EuroCloud criteria catalogue, which is applicable throughout Europe. As a general requirement, a weighting should be given with regard to the necessary level of accomplishment of the areas given below by way of example<sup>6</sup>:

- IT and data security, control possibilities and compliance,
- Flexibility, transparency and scalability and service quality and its measurability,
- Integration capability and expenditure, as well as economic efficiency,
- Cost structures for long-term planning,
- Possibility of integration with existing IT infrastructure,
- Access technologies (inc. access management),
- Data import and export, secure data deletion (e.g. when services are discontinued).

[...page 20] Wide-ranging expertise is required to further test the quality of performance with regard to data security, technical operation and the organisational processes, to ensure that the respective requirements are met. This is why certificates are usually brought in, because they concisely cover the security aspects and the reliability of the service provider.

*What is essentially being checked here are the legal aspects and the reliable provision of technical services, as well as data protection, data security and compliance with basic standards of quality for business processes and application design, which is a particular obligation for public IT service providers.*

### **3.5 The challenges of using cloud technologies**

If public IT service providers take on the cloud issue, there are some important points that need to be acknowledged and also critically examined. Strategic dependence on a single cloud service provider (CSP), for instance, should be avoided. [...page 21]

The opportunities and risks must be assessed with regard to economic efficiency, improved response time in line with changing resource needs, strategic risks such as "loss of know-how/skills" and strategic dependence on CSP, as well as vulnerability to attack and dependence on a network infrastructure.

As the proviso is that a contract needs to be fulfilled economically (fair market prices and offers), however, you must be aware that in the public administration environment, there are a great many different specialist applications (professional diversity) as well as a technological diversity with many unique special requirements. The need for flexibility in public administration through task planning is currently not as great as it is in the business sector. Nevertheless, it is already possible to discern trends that will bring a new understanding of the

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<sup>6</sup> See <http://www.eurocloud.at/projekte-termine/zertifizierung.html>

roles of the contracting agencies to the customer/supplier relationship (e.g. service level agreements and requirements). [...page 21] This will mean changing the control objects of IT service provision in future.

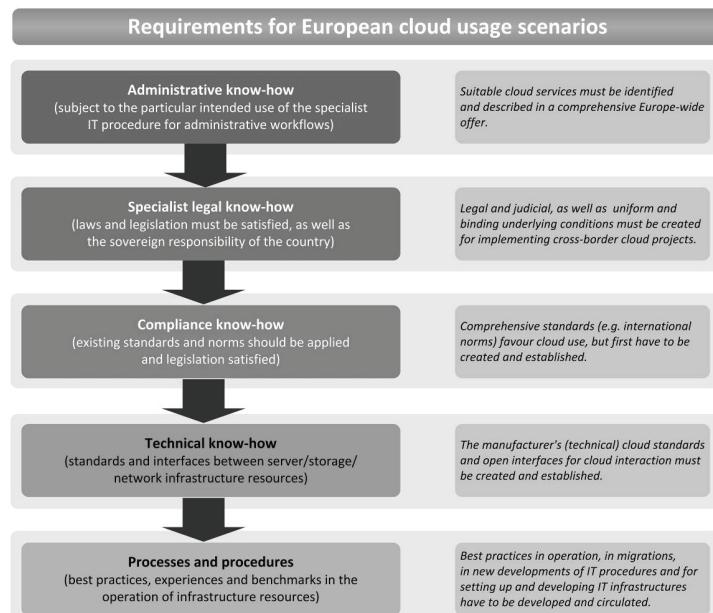
[...page 21] Special attention should be paid not just to the service itself, but also to the processes between providers and customers. Also to be considered in this connection are the processes required for ordering, provisioning, operating and charging for the services. Manufacturer-dependent cloud standards do not currently exist, but will be highly significant for future investment decisions.

[...page 22] Also important in the future will be the development of benchmarking methods to help the European public IT service providers in their cost/benefit analyses. It must also be possible here to take into account the specific situation (level of maturity of optimised computing centre operation) of the public IT service provider and possible cloud provider.

However, no savings can be expected in the short term because parallel operation is necessary and investment has to be made in the set-up and establishment phases of the service-oriented provisioning model for ICT services. Potential savings can also only be assumed if the processes, interfaces and services are standardised, which should particularly encourage inter-organisational cooperation and the virtualisation of administrative units. Starting with the sovereign responsibility of public administration that is financed by taxpayers, who want "cheaper" administration as quickly as possible, costs should fall quickly.<sup>7</sup>

This counterbalances the euphoric headlines of the advantages to be achieved with cloud computing technologies (see section 3.1), as it currently only anticipates the gains in effectiveness and efficiency that can be achieved, which have yet to be verified by operational experience and intense debate about the new possibilities. Setting up general centres of excellence or combining interdisciplinary expert groups in Europe is still an approach worth considering, so that know-how and empirical values can be pooled and passed on to other public IT service providers – with a view to establishing best practices.

It therefore remains vital to assemble an interdisciplinary team of experts to implement pan-European applications, so that their specialist administrative know-how, legal know-how in the European environment, compliance know-how with regard to standards, directives and norms, technical know-how and organisational process and standardisation know-how can be included. The illustration below makes the connections clear:



**Figure 3:** Requirements for European cloud usage scenarios (Source: ITDZ Berlin, Toni Seifert, May 2012)

<sup>7</sup> See Danube University Krems study: Kosten- & Entscheidungsmodelle für Cloud Computing in der öffentlichen Verwaltung (commissioned by the Federal Computing Centre - BRZ)

[...page 23]

## 4. Possible use of cloud solutions in public administration in Europe

### 4.1 Cloud aims and stages of development of public IT

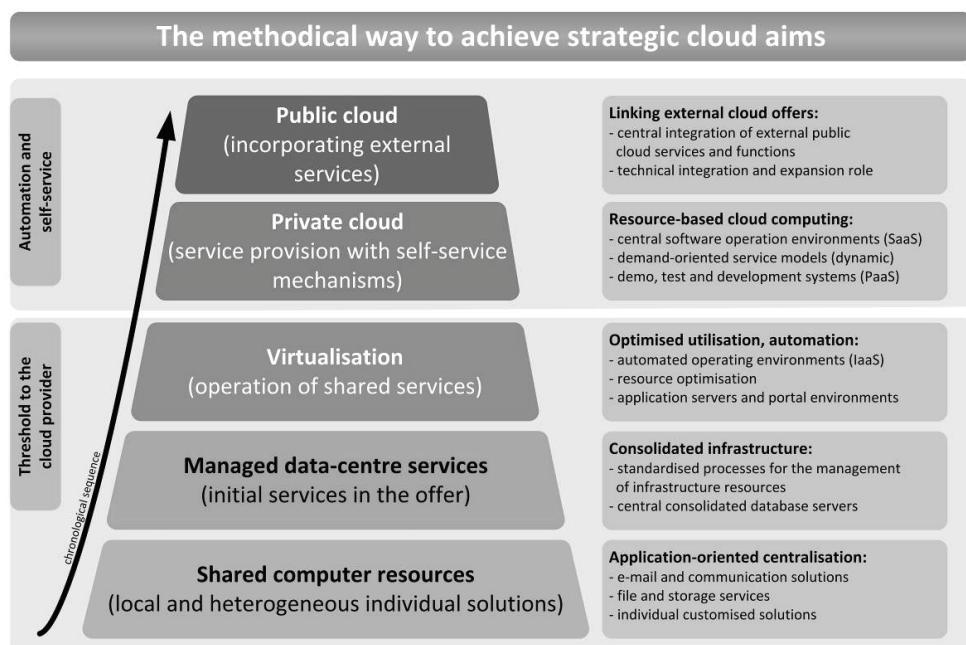
To choose the right technology to operate the cloud offers, it is necessary to define a suitable cloud strategy for the organisation and to classify and prioritise the cloud aims. The aims that can be pursued with a cloud strategy are diverse and not always equally useful. The aims stated below, for example, can be pursued with a cloud strategy:

- Economic and environmental aims (e.g. cost saving and green IT),
- Location aims (consolidating servers and computing centre locations),
- Optimising and changing personnel qualifications (pooling know-how),
- Market aims (providing advanced IT services; new customers and products),
- Organisational aims (setting up shared service centres).

The following issues are regarded as the basic elements of implementation:

- Service catalogue: Establishing services in accordance with clearly defined guidelines. Automatically assigning service levels to infrastructure attributes.
- Service analysis: Optimising services with centralised monitoring, measurements and showback or chargeback functions, to improve transparency and cost and SLA management.
- Automation: Faster implementation of services through the integration and automation of provisioning, protecting and operating processes.
- Self-service: Supporting your IT and your end users by providing a self-service portal for service requests.

The aims established in the cloud strategy form the basis of a structured and methodical approach. These are already being pursued in most computing centres and some have already been implemented. The following illustration shows the possible stages in development - up to the cloud provider:



**Figure 4:** The methodical way to achieve strategic cloud aims (see BRZ, ITDZ Berlin, May 2012)

[...page 25] An evaluation of the individual levels of cloud maturity is not forced in this context, because the particular sovereign responsibility, political standards and also the financial capacity and size of the public IT service provider can exert a relevant influence on development.

## **4.2 Factors encouraging the use of cloud technologies**

If you look at the advantages that favour the use of cloud technologies, we currently still lack operational experience, best-practice approaches and comparative indicators for implementation in public computing centres. However, nobody disputes that the cloud environment and investment in setting up suitable infrastructures are helped by achieving large-volume sales of standardised and uniform IT services. This leads to economies of scale and optimum utilisation of the IT resource pool, so that the cost for the cloud infrastructure and for cloud management is no higher than the potential benefits to be achieved.

The joint development of best practices for cloud operation and a consistent transfer of know-how between cloud operators and also between operators and potential users of the cloud infrastructure also encourages the optimum availability of central cloud services and efficient IT service provision.

Based on the experiences of operation in large cloud environments, it makes sense to prepare TCO models (Total Cost of Ownership) and an extensive economic feasibility study, to make clear the potential savings. Of course, this also includes the viewpoint that best practices should be developed and used for cloud solutions in projects, during migrations, the development of new IT procedures or even renewing existing complex specialist procedures. This helps to maintain compliance when, for example, "shared" IT infrastructures are used by different administrative bodies, or when cloud solutions are used in the various countries of the European Union.

The intention to standardise interfaces in cloud environments is also important, as this also helps to encourage interoperability. The development of basic manufacturer-independent industry standards (e.g. standard components, standard interfaces, SLA standards, process standards) will encourage the use of cloud infrastructures and cloud applications, as in future, these will also allow you to alternate between the various different cloud components and providers technically, organisationally and commercially. [...page 26] Public IT service providers can also have a positive effect on the current rapid advance of development by gauging specific requirements and communicating possible ideas and solution scenarios. One of the biggest challenges here is the shared handling of rights and identities of those participating (developers, administrators, users) in the cloud solution, with interfaces that are considered to be technical as well as organisational (rights management and role concepts, access management).

[...page 26] The selection of a technology partner produces a certain dependence on a technology partner, which can only be resisted if cloud operators demand open technical standards (...evidence from the technology partner). This is a prerequisite for the future-oriented development of European cloud services for public administration precisely for this reason, as well as to avoid the use of a central solution meaning greater dependence on a complex cloud structure or a single provider.

These cloud services must be geared to a higher level of standardisation, which may also involve restricting flexibility for customers. This is the only way for the cloud service provider to maintain control of many users on one infrastructure, as well as to achieve economies of scale.

The current situation is no different as far as applications and specialist administrative applications are concerned either. From the present perspective, they mostly still only rank as "not yet" cloud ready, as historic developments frequently follow stand-alone ideas (operation in a protected environment devoted to the particular office). However, new developments suggest that the cloud idea is being taken up to optimise operation and that development of the classic specialist applications is moving towards multi-tenancy capability on dynamic infrastructure resources, using advanced web technologies. In addition to the issues we have mentioned, there are fundamental policy and legal decisions to be made with regard to cloud technologies - such as standards for centralisation and consolidation of heterogeneous IT infrastructures. But because the initial situations are legally different for the individual European countries and the public IT service providers, these fundamental decisions are not going to be brought about in the short term. It will also be useful if the Euritas members involved in the cloud working group could evaluate and implement a comparable approach in the potential analysis and subsequent cloud readiness assessment, as well as selecting the implementation strategy, so that the individual results could then be evaluated and implemented. These results make it possible to prioritise the relevant IT services when developing pan-

European and cross-border cloud technologies for public IT service providers and can also assist the development of cloud aims and strategies in the pan-European environment of public IT service providers.

## **5. Closing remarks and outlook**

Data and information that is hosted centrally, shared nationally and used via web-based access technologies will be an ongoing "trend" in public administration as well. However, it is necessary to analyse individually which applications, services, data and information are suited to being processed in this way. Because of the unique position enjoyed by public IT service providers, the primary responsibility is still to take the special sensitivity of sovereign and personal data and information processing into account. [...page 27] The system evaluation phase must therefore be longer and more in-depth, because the potential effects of a malfunction or an act of sabotage in a complex cloud environment would be felt by a vast user group in internal departments, complete administrative departments, offices and European public IT associations, as well as by individual users.<sup>8</sup>

In future, cloud computing will offer the possibility of buying virtually unlimited, location-independent IT services at any time and in keeping with need, on the basis of standards that have yet to be developed. This will also allow European public IT service providers to act with greater flexibility and scalability and to develop new business models and concepts. [...page 27] The gradual process in iterative steps is an approach to implementation that has to be taken into account in the sovereign responsibility of the taxpayer-funded European public service IT providers, with a view to achieving a balanced risk ratio. [...page 27] The cloud can offer cross-border EU-wide potential for a collaboration to bring about shared services. Legal frameworks must also be created for this. Committees will be working flat out in the cloud context to advance pan-European availability of this type of cloud solution. [...page 27 and following pages]

## **Appendices**

Chapter 6 with (Selected) legal questions for European cloud projects and Project and solution reports of Euritas members was shortened for paper submission (to meet 5000 words).

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<sup>8</sup> See Danube University Krems study: Kosten- & Entscheidungsmodelle für Cloud Computing in der öffentlichen Verwaltung (commissioned by the Federal Computing Centre - BRZ)

# **Work in Progress Papers**



# **Design of the Electronic Course on e-Government Interoperability Essentials**

**Alla Anohina-Naumeca<sup>1</sup>, Vjaceslavs Sitikovs<sup>1</sup>, Piotr Goetzen<sup>2</sup> and Michal Chmielecki<sup>2</sup>**

<sup>1</sup>Riga Technical University, Riga, Latvia

<sup>2</sup>Spoleczna Akademia Nauk, Lodz, Poland

[alla.anohina-naumeca@rtu.lv](mailto:alla.anohina-naumeca@rtu.lv)

[vss@latnet.lv](mailto:vss@latnet.lv)

[piotr.goetzen@gmail.com](mailto:piotr.goetzen@gmail.com)

[michmielecki@gmail.com](mailto:michmielecki@gmail.com)

**Abstract:** Efficient and effective delivery of cross-border and cross-sectoral e-Government public services is crucially dependent on interoperability, provision of which directly contributes to the achievement of the goals of the Digital Agenda for Europe in particular and the Europe 2020 Strategy in general. In this context, main issues, knowledge units, best practice, and legal base of interoperability must be done fully understandable for all (staff of local, regional, and national public administrations, national institutions and agencies, managers of e-Government projects, public service developers, policy makers, etc.) who are involved in defining, designing, and implementing Europe-wide public services. However, at the moment there are no known learning courses on interoperability in the EU member countries. The LLP Leonardo da Vinci project "ELGI - e-learning for e-Government" addresses this issue and aims at the development of an innovative e-learning course for acquiring knowledge concerning interoperability. The e-course is intended to be useful for three main target groups: decision makers responsible for the process of legislating in the field of e-Government, public administration staff who are/will be users of public services, and contractors or, in other words, organizations involved in development and delivery of public services. The current paper presents work-in-progress related to the design of the mentioned e-course. It covers all main aspects of the design starting from steps that were undertaken to create an information base needed for production of the e-course content and finishing with the detailed specification of the e-course structure. Therefore, the paper specifies the information base of the e-course, course aims, target groups, organization of learning process, modules, and topics. Moreover, each topic is presented in terms of its content and learning outcomes. The e-course will allow target groups to acquire all the actual knowledge on interoperability in one place.

**Keywords:** interoperability, e-government, e-course

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## **1. Introduction**

The importance of interoperable public services (PSs) has been acknowledged as an essential component of EU Commission's efforts to contribute to improvement of the Single Market and making Europe an attractive place to live, work, and invest. Regardless that the Member States are responsible for interoperability of their own systems, interoperability at European level is needed in order to implement common EU policies. Currently, there is a huge number of ongoing efforts in establishing of interoperability, but at the same time no learning courses exist for acquiring corresponding knowledge by target groups directly or indirectly involved in development of e-Government. The project "ELGI- e-learning for e-Government" (2011-2013) aims at producing an e- course for delivering knowledge concerning interoperability. The paper presents work-in-progress related to the design of the mentioned course. The methodology undertaken includes the following steps: 1) conducting the state-of-the-art research at EU and national level with aim to create an information base needed for production of the e-course content; 2) creating the curriculum, and 3) producing learning objects. The paper is organized as follows. Section 2 describes steps related to creation of the information base of the e-course. Section 3 pays attention to the course aims, target groups, and learning method. Section 4 presents the detailed curriculum. Conclusion and directions of future work are discussed in Section 5.

## **2. Creating the information base**

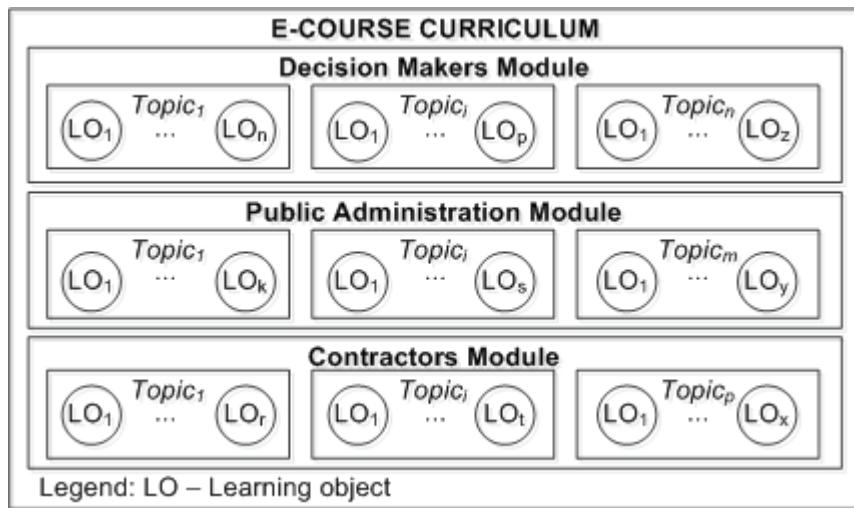
In order to identify information sources needed for creation of the e-course content, the following activities were carried out simultaneously:

- Research on EU policy and practices:

1. Identification of initial information sources by studying materials available at <http://europa.eu>;
2. Analysis of the information sources and fixing references to additional sources;
3. Searching of additional sources;

4. Producing the report (Anohina-Naumeca, Latiseva, and Sitikovs 2012).

Steps 2-3 were performed repeatedly until no more sources were found.



**Figure 1:** Curriculum of the e-course (adopted from (Goetzen et al 2012))

- Research on national policy and practices:
1. Development of a report template with aim to unify information from different countries;
  2. Producing initial reports by filling the template with information specific for each partner country;
  3. Reviewing the reports by the leading partner and producing the set of final reports (Bulins et al 2012, Casalino, Rubichi, and Mastrofini 2012, Georgogianni 2012, Goetzen, Chmielecki, and Hernes 2012, Manolov 2012, Ubrich, Gomez, and Chiusdea 2012).

Sources comprising the information base at EU level are presented in (Anohina-Naumeca and Sitikovs 2012). Information at national level is related to legal framework in the field of e-Government, organizational and technical aspects of interoperability, best practices and systems on trial.

### 3. E-course specification

The e-course is intended to provide the necessary knowledge for all who are involved in legislating, preparation, and development of e-Government and PSs in order to ensure common language and awareness needed for a) their effective intercommunication, b) understanding of needs and requirements concerning PSs, and c) design of new e-Government tools and systems compatible across EU. Therefore, the e-course is designed for three main target groups (Goetzen et al 2012):

- Decision makers (DM) – people who are responsible for legislating in the field of e-Government (e.g. national policy makers);
- Public administration (PA) staff – people who are/will be users of PSs (e.g. managers of e-Government projects, social partners, local, regional and national administration, etc.);
- Contractors – companies involved in development and delivery of PSs (e.g. managers of e-Government projects from the side of developers).

Besides the mentioned above, the aims of the e-course are the following (Goetzen et al 2012):

- to ensure awareness on legal regulations in order to develop interoperable solutions applicable across EU;
- to demonstrate best practice examples in order to avoid development of complex, useless, and ineffective solutions;
- to raise awareness of possible barriers for interoperability.

It is envisaged that any person interested in the subject can join the course using the online e-learning platform. Interaction with a teacher is not planned and on-campus presence is not required. A learner will have possibility to study at his/her own pace, time, and place. The e-course will provide detailed topics with

self-assessment tests (an essential part of the e-course) and various multimedia objects such as animation, audio and video podcasts. The learner will follow the e-course topic by topic (Goetzen et al 2012).

#### 4. Structure of the curriculum

The curriculum has a modular structure which is presented in Figure 1. Therefore, the e-course is divided into three modules: DMs Module, PA Module, and Contractors Module. The set of specific modules results from the need analysis done at the beginning of the project in all partner countries. Each module consists of a set of topics. Each topic includes a set of learning objects. Such an organization of the curriculum allows tailoring of the e-course to the needs of the target groups. Each of the group needs specific knowledge which can be delivered as specialized topics available only to a particular group. At the same time, there are topics which are common for members of all groups (Goetzen et al 2012). Therefore, each target group will master its module independently from other groups.

All the topics are divided into four groups: common topics and topics specific for a particular target group. Their organization into modules together with topic titles and IDs is shown in Figure 2. Table 1 presents the detailed specification of the topics in terms of their content and learning outcomes.

Decision Makers Module	Public Administration Module	Contractors Module
C-1 Introduction to the e-course		
C-2 Introduction to eGovernment and concept of interoperability		
D-P-1 Legal regulations of interoperability		CO-1 Interoperability barriers
D-2 Interoperability barriers	P-2 Interoperability barriers	CO-2 European interoperability architecture
D-3 Interoperability initiatives	P-3 Interoperability initiatives	CO-3 Technical aspects of interoperability
D-P-4 Organizational aspects of interoperability		CO-4 Semantic aspects of interoperability
C-3 Interoperability – the best European practices and pilot projects		
C-4 Interoperability – the best national practices		
C-5 Standardization and compliance verification		
C-6-11 Organizational, semantic, and technical aspects of interoperability by country – 6 topics		

**Legend:** C-1-11 – Common topics; D-2-3 – Topics only for decision makers; P-2-3 – Topics only for public administration; CO-1-4 – Topics only for contractors; D-P-1,4 – Common topics for decision makers and public administration

**Figure 2:** Organization of the topics into the modules (topics are ordered from top to bottom)

**Table 1:** The topics of the e-course

Topic ID	Content	After studying the topic, the learner will know:
C-1	Introduction	organization of the e-course; topic goals; usage principles of the e-platform
C-2	Main concepts related to interoperability	definition of PA, PS, e-Government, and interoperability; e-Government strategic focuses and maturity model; types of interoperability; main parties involved in development and usage of PS; interaction scenarios where interoperability is needed; benefits and beneficiaries of interoperability
C-3	Best European practices and pilot projects	European programmes and large scale pilot projects (IDA I, IDA II, IDABC, ISA, eTEN, CIP ICT PSP, MODINIS, eCODEX, epsOS, PEPPOL, SPOCS, STORK) and their contribution to interoperability
C-4	Best national practices and pilot projects	examples of projects and systems specific for each partner country
C-5	Role of standardization, mechanisms of selection of appropriate standards and methods for ascertaining of compliance with requirements of interoperability	essence of standardization processes; types of standards and standardization bodies; need for standards to achieve interoperability; methods of selection and evaluation of standards; conditions and limits for application of standards; European best practices in application of standardization to achieve interoperability;

Topic ID	Content	After studying the topic, the learner will know:
		methods for establishment and management of standards registers; nature of interoperability compliance; European best practices for compliance verification
C-6-11	Organizational, semantic, and technical aspects of interoperability in the partners' countries	organizational advantages of interoperability; main elements of semantic and technical aspects
CO-1	Interoperability barriers	interoperable metadata standards; interoperable content management; multiple protocols and languages
CO-2	Common vision of the European Interoperability Architecture (EIA)	place of EIA in the common interoperability governance pyramid; past efforts in development of EIA; European Interoperable Infrastructure Services; definition and essence of EIA
CO-3	Technical aspects of interoperability	basic concepts of technical interoperability; main technologies; standardization processes; rudiments of information exchange; main aspects of telecommunication and networking; human interface design; interoperable content management; incident handling interoperability
CO-4	Semantic aspects of interoperability	definition of semantic interoperability; main semantic conflicts; activities for achieving semantic interoperability; key factors of semantic interoperability
D-P-1	Legal documents, initiatives, and events on e-Government and interoperability	EU and national legislation on e-Government and interoperability; historical context on documents, events, and initiatives related to interoperability
D-2	Barriers that can hinder progress towards realizing the concept of e-Government and substantial legal, political, administrative, social, institutional, and cultural differences between the Member States	barriers for development of e-Government; substantial differences between the Member States
P-2		barriers concerning interoperability in PA; important PSs in the EU that seek to span national and regional boundaries
D-3	Interoperability initiatives important for decision making on interoperability	current political context; European interoperability governance pyramid; European Interoperability Strategy
P-3	The main concepts of the European Interoperability Framework (EIF) and National Interoperability Frameworks (NIFs)	essence of the EIF; recommendations for PAs; principles of the EIF; concept of interoperability governance; conceptual model for creation of PSs; interoperability levels and agreements; NIFs
D-P-4	Organizational aspects of interoperability	definition of organizational interoperability; activities for achieving organizational interoperability; key factors

## 5. Conclusion and future work

Taking into account that interoperability of PSs is tightly related to the goals of the Digital Agenda for Europe and the Europe Strategy 2020, the target groups involved in development of e-Government need to have appropriate knowledge about interoperability issues and the current state-of-the-art. The ELGI project is producing the e-course aimed to solve this problem. At the moment the e-course design and production of its content is completed. The further steps include: 1) developing the e-course, 2) localizing the e-course, 3) testing the e-course by each project partner, and 4) performing pilot testing and further improvement of the e-course.

**Disclaimer:** This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

## **Acknowledgements**

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# Public Services Provision in a Cross-Border Framework: The Bihor - Hajdu-Bihar Euro-Region Case

**Daniel Badulescu, Alina Badulescu and Catalin-Adrian Bucur**

**University of Oradea, Oradea, Romania**

[daniel.badulescu@gmail.com](mailto:daniel.badulescu@gmail.com)

[abadulescu@uoradea.ro](mailto:abadulescu@uoradea.ro)

[polbucur@yahoo.com](mailto:polbucur@yahoo.com)

**Abstract:** Cross-border cooperation (CBC) is an important means to foster good neighbourhood relations between communities located on both sides of a border. One important form of CBC are the euro-regions, fostered by the political changes in the beginning of the last decade of the 20th century and the accession of Central and Eastern European countries to the Council of Europe and then to the European Union. The settlement and development of more than 100 euro-regions in last 50 years prove and confirm that the vision of the first promoters was correct. The cooperation in public services at euro-regional level creates various opportunities and advantages for local communities on both sides of the frontier and contributes to improving the quality and diversity of public services' provision. This paper focuses on the Bihor - Hajdu-Bihar Euro-region, which is the most recently settled euro-region in Romania and covers two NUTS 3 units in Romania and Hungary. As part of a wider research project addressing issues such as aims and achievements, benefits and limits, effectiveness and efficiency, sustainability and future prospects etc., this paper investigates, using a survey-based research, some relevant aspects concerning the benefits, sustainability and prospects of the cross-border cooperation actions, as from the perspective of the experts questioned, i.e. police managers and public order management staff. The paper also draws preliminary conclusions and provides further insights for ensuring the sustainability and enhancing the effectiveness of future cross-border cooperation programs.

**Keywords:** public services, cross-border cooperation, police and public order, Bihor - Hajdu-Bihar Euro-region, benefits and sustainability

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## 1. Introduction

The late 80s and early 90s experienced unprecedented political, social and economic changes in Europe, whose consequences are still present. Suggestive as they say, the EU integration process "melts" internal borders of the EU (e.g. European single market) but at the same time, "freeze" outside borders, for example, Schengen Agreement (Topaloglou, et al., 2005). These processes led to a significant geographic expansion of cross-border cooperation, taking the form of intergovernmental commissions at regional / local level, cross-border Euro-regions or "associations" with similar structure. As Perkmann (2007, p. 3) stated, "the classical form of a Euro-region is the 'twin association': on each side of the border, municipalities and districts form an association according to a legal form suitable within their own national legal systems".

Studies on cross-border cooperation development begin with Krugman's *core-periphery model* (1991), but new extensions and developments have emerged since then. Moreover, researchers have applied core-periphery model to Euro-regions, as usually border areas are peripheral regions (Uiboupin, 2007), (Niebuhr, 2005), (Topaloglou & Petrakos, 2006), (Katri-Liis Lepik, 2009).

Applying and adapting the concepts and objectives of European regional policy to the realities of border regions' development have led to a set of fundamental principles in this area. Thus, beside the key principles of regional development, i.e. subsidiarity, decentralization, participatory partnership and transparency (European Commission, 2001), the Association of European Border Regions (AEBR) has added two more principles for successful cross-border cooperation (Association of European Border Regions; European Commission, 2000), i.e. the existence of a joint program or a concept for cross border development, and joint structures at regional / local level and independent sources of funding.

According to AEBR, regional cooperation relates to the following areas and sectors: environment, agriculture and planning; transportation and telecommunications security; economics and labour; border populations, social protection and public health, education, research, culture (Association of European Border Regions; European Commission, 2000). Among other relevant sectors, public order and security is undoubtedly one of the main categories taken into consideration within the cross-border cooperation, addressing issues such as the security on cross-border road and rail traffic fluidity, business and civil security, natural hazards

prevention, the development of procedures for cross-border alert and assistance for emergency services (fire intervention, civil defence, public order and safety).

## **2. Cross-border cooperation in public services in Bihor - Hajdu-Bihar Euro-region**

One of the most recent (i.e. settled since 2002) euro-regional structures is Bihor - Hajdú-Bihar Euro-region, located in the North-Western part of Romania/Eastern part of Hungary, on the Romanian-Hungarian border area. Bihor - Hajdú-Bihar Euro-region aims to foster cooperation by maintaining and developing good neighbourly relations, identifying areas of potential cross-border cooperation, promoting cooperation within established programs, promoting euro-regional cooperation with other international organizations, supporting the Euro-region's entities in the euro-integration process (Romanian Encyclopaedia, 2010).

Bihor - Hajdú-Bihar Euro-region has been involved in several cross-border projects that have received pre-accession funds of PHARE CBC even before 1998 (i.e. when the border between Romania and Hungary became eligible for this program). Thus, during 1996 – 2003, 28 million euros were allocated for cross-border projects for the Romanian part and 34 million euros for the Hungarian one (BRECO, 2012). Subsequently, the PHARE CBC (Cross-Border Cooperation) Program was implemented in Romania (from 2004 to 2006), together with INTERREG IIIA sub-program in Hungary.

A simple overview of the actions and projects undertaken highlights on public service: modernizing local roads, border services, population registering services, preventing common impacts of flooding and waste by decisions based on integrated monitoring and information, operational data transfer, radioactivity and heavy metals content joint operational monitoring, CBC for sustainable development, local management performance and local development, euro-regional centre for cross border crime prevention and fight, etc. (BRECO, 2012). Currently, the CBC Program Hungary-Romania 2007-2013 continues the previously implemented programs: INTERREG IIIA Hungary and PHARE CBC in Romania, expanding and developing the results and lessons already learned (BRECO, 2012). The distinctive feature of this period is the focus on the objectives of the Lisbon and Goteborg strategies, with greater emphasis on competitiveness and environmental issues, and joint (both European and national) financed projects.

## **3. Research design**

For better understanding and anticipation of possible future developments in cross-border cooperation, we conducted, during November-December 2011, a survey-based research, targeting experts and cross border project managers involved in public order and civil protection institutions, across the Hungarian-Romanian border (from Bihor County - Romania and Hajdú-Bihar County - Hungary). As part of a wider research project addressing issues such as aims and achievements, benefits and limits, effectiveness and efficiency, sustainability and future prospects etc., we focus on this paper strictly on the questions related to the benefits, sustainability and prospects of the cross-border cooperation actions. The research has been carried out starting from a designated questionnaire consisting of 20 questions (9 opened and 11 closed). The questionnaire was administered to 52 experts, project managers or managers/deputy from: Regular Police (36), Border Police (8), Gendarmerie (4), Emergency and special interventions services (4), all located in border areas. 27 were from Romanian institutions and 25 from Hungarian ones. In this paper we present the preliminary results related to issues concerning the benefits, sustainability and prospects of the cross-border cooperation actions already undertaken.

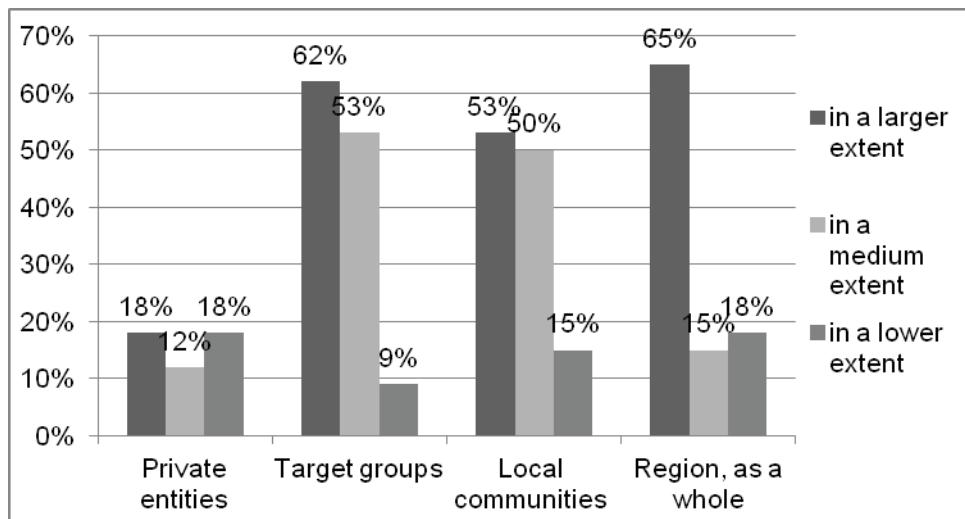
## **4. Preliminary results**

The responses to valid questionnaires have indicated a number of 72 actions undertaken within cross-border cooperation actions in Bihor - Hajdu-Bihar Euro-region, the majority of them being the mixed patrols and the actions undertaken within PHARE CBC and HU-RO Programs. In the followings, we present some preliminary results derived from analysing the responses provided to several questions addressed within the questionnaire related to the benefices and sustainability of the joint actions.

### **4.1 The main actual beneficiaries of CBC programs**

To understand the way cross border cooperation programs in public order services have achieved their overall objectives, by improving the activity of institutions, communities and Euro-regions as a whole, is a key step in the analysis of the effectiveness of these programs, regardless of the extent, duration and variety of stakeholders. Even a preliminary view emphasizes the experts' opinion a main category of beneficiaries are the

local communities, exactly those who were addressed public order services, whether these services have local, regional or national extension. They are considered as actual beneficiaries in an almost same extent as the effective target groups of each project, and followed by the region as a whole (see Figure 1). Although the prevalence of these groups (local communities and the region as a whole) could generate some criticism due to the high level of generalization, the role of these collaborative projects has been exactly to create a secure environment for economic, social, cultural activities, and to involve a large number of participants on both sides of the border.



Source: Own calculations based on data set

**Figure 1:** The main actual beneficiaries of cross-border cooperation programs

#### **4.2 Are the benefits sufficiently important, equitable and sustainable to promote a new framework for development or to enhance cross-border cooperation in the field of public services?**

Cross-border cooperation is still a new approach and the present stage relates to creating the foundations for future cooperation, both in administrative sector and in economic, social and cultural areas. The challenges and objectives of public order activities cannot be isolated and limited within the borders of a country. The crimes and antisocial behaviors, and the consequences of incidental or deliberate human actions and destructive natural phenomena could endanger life and assets, exceeding and crossing the formal borders.

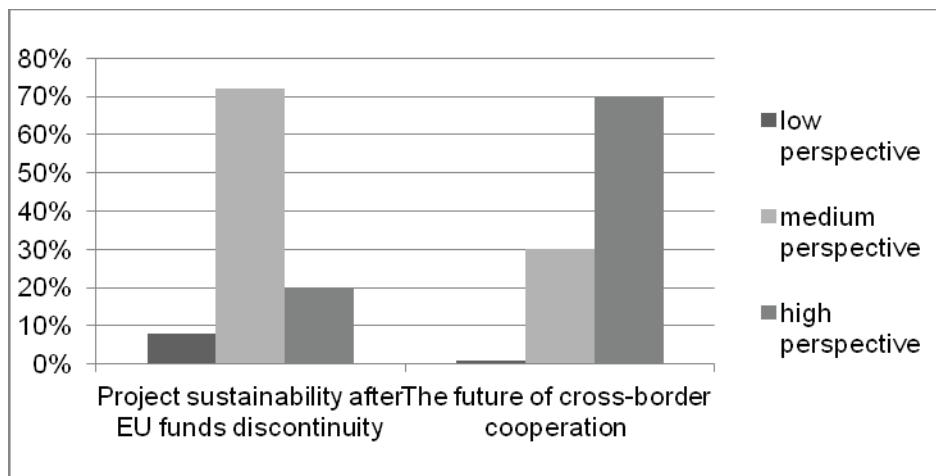
The survey data have indicated the respondents share mutual interests and objectives and a high awareness on these issues. 44% of them "agreed" that the benefits of existing cooperation are "strong" and "sustainable" enough to constitute a framework for further development or to enhance cross-border cooperation in the field of public order and security; 47% "largely agreed" with this statement, and only the remaining 9% did not agree or did not respond to this question. The optimistic answers indicate a tempered optimism, based on daily work realities, but also express the relatively limited experience in these programs. In other words, although there are high expectations from this cooperation, the results are the most important element of validating their effectiveness.

If separately analyzed by origin country of the respondents, it can be noticed a relatively balanced distribution: both in the case of Romanian and Hungarian respondents, each option ("yes" or "mostly yes") sharing approximately 48-50% of the answers. This is particularly important when considering the chances of new cross-border cooperation actions and the fact that expectations and confidence in the success of these programs exist, in similar forms, on both sides of the border.

#### **4.3 The prospects of cross-border cooperation in the field of public order and security**

Concerning the main threats and risks associated with cross-border cooperation programs, and particularly how actions and projects can go further and continue in the future, the opinions converge on the idea of their future sustainability. Nevertheless, the optimism must be tempered and turned in a more realistic register

when considering the sustainability after ceasing the EU funds, due to the effective limitation of financial resources and budget constraints. Although in our analysis the issue of funding and future resources supply were collateral treated, they are important both on short, medium and long term. The majority of the respondents (i.e. 70%) scored positive the prospects of cross-border cooperation, but they (72% of the respondents) were clear moderate when assessing their future sustainability after EU funds ceasing (see Figure 2).



Source: Own calculations based on data set

**Figure 2:** Project sustainability and the future of cross-border cooperation

## 5. Preliminary conclusion

The euro-regional framework for cross-border cooperation in public services is a relatively new issue in the study of public services provision. The preliminary results obtained after a survey-based research focused on different aspects of the effectiveness of the cross-border cooperation Bihor – Hajdú-Bihar Euro-region indicate that the actions undertaken within EU co-financed projects have a significant importance both on the specific target groups of the projects and the local and regional communities. It is very important and challenging at the same time to ensure the future sustainability of these actions and projects, by following up and investigating the situation of these actions after ceasing the EU funding, and by carefully analysing measures to further support cross-border cooperation actions as to exceed the current initial stage

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# The use of System Development Methodologies in the Development of e-Government Systems

**Lesego Ditibane, Magda Huisman and Nehemiah Mavetera**

**North West University, Potchefstroom, South Africa**

[lesego.ditibane@nwu.ac.za](mailto:lesego.ditibane@nwu.ac.za)

[magda.huisman@nwu.ac.za](mailto:magda.huisman@nwu.ac.za)

[nehemiah.mavetera@nwu.ac.za](mailto:nehemiah.mavetera@nwu.ac.za)

**Abstract:** E-Government systems have made a breakthrough over the past decades with government departments now providing services online. The development of e-Government systems in South Africa has raised major concerns when coming to the System Development Methodologies (SDMs) used. The professionals involved in the development of e-Government systems indicate that so far, there have hardly been any specific SDMs designed for the development of e-Government systems. This study discusses the use of SDMs in the development of e-Government systems. It is believed that SDMs can help improve the quality of systems developed, reduce costs, and increase efficiency and effectiveness. Using qualitative methods, the study proposes a conceptual framework that matches required e-Government systems characteristics and the different types of SDMs that can be used to develop such systems.

**Keywords:** e-government, system development methodology, conceptual framework, Information, Communication and Technology, South Africa

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## 1. Introduction

According to Al Ahmar (2010) and Avison and Fitzgerald (2003), SDMs are promoted as a means of improving the management and control of the software development process. They are also important for standardizing the development process and the final product by specifying activities to be done and techniques to be used in a proper and chronological manner.

To determine the use of SDMs in the development of e-Government systems, this study addresses the following research objectives:

- to investigate the SDMs used in the development of e-government systems.
- to identify the challenges and problems that are encountered by the developers of e-government systems.
- to determine the suitable SDM's that addresses unique aspects of e-government systems.

In order to address the above research objectives, a selection of SDMs and e-Government systems are analyzed, their suitability to the study is justified; their common and unique characteristics as well as their challenges are described. The rest of the paper is as follows: Section 2 looks at the definitions given to SDM, Section 3 discusses different SDMs used in developing systems, and Section 4 gives an overview of e-government systems while Sections 5 and 6 addresses the research method used and the proposed framework respectively.

## 2. Definitions of SDM

For the purpose of this study, we defined SDM using Avison and Fitzgerald (2006) and Huisman and Iivari (2005) definitions, that a SDM is a collection of procedures, different approaches, tools and techniques, methods, process models, and documentation aids which can help system developers to implement new information systems. This definition will assist the researchers to measure the use of SDMs in the development of e-Government systems by assessing the aspects involved. The next section discusses SDMs used in this study and it also provides a justification of these methodologies.

## 3. Brief overview and justification of the selected SDMs

In this study six most commonly used and recent SDMs were selected and discussed as follows:

- a) Structured Analysis, Design, and Implementation of Information Systems (STRADIS) – is a process-oriented SDM and it is suitable in the development of any systems designed for specific problem solving irrespective of the size and type of such systems. It is also relevant when there is a backlog of systems waiting to be developed and insufficient resources to devote to all the potential new systems.

- b) Information Engineering (IE) – is a blended SDM and it is suitable in the development of systems which are designed for trading in a wide range of industries and organizations. This SDM views data as the building block of systems and it also recognizes the impact of the processes involved in the development such systems.
- c) Rational Unified Processes (RUP) - an object-oriented SDM and is suitable in the development of computerized systems. This SDM is only appropriate for large systems in large organizations.
- d) Extreme Programming (XP) - is a rapid development SDM and it is appropriate for problem solving of small and medium size application systems and organizations.
- e) Effective Technical and Human Implementation of Computer-based Systems (ETHICS) – is a people-oriented SDM and is suitable in the development of systems which would enhance the quality of the work environment, the jobs, and the skills and knowledge of people in an organization. This type of SDM is much more appropriate in the development of systems in large organizations.
- f) Soft Systems Methodology (SSM) – is an organizational-oriented SDM and is suitable in the development of systems of human activity situations with existing complex problems.

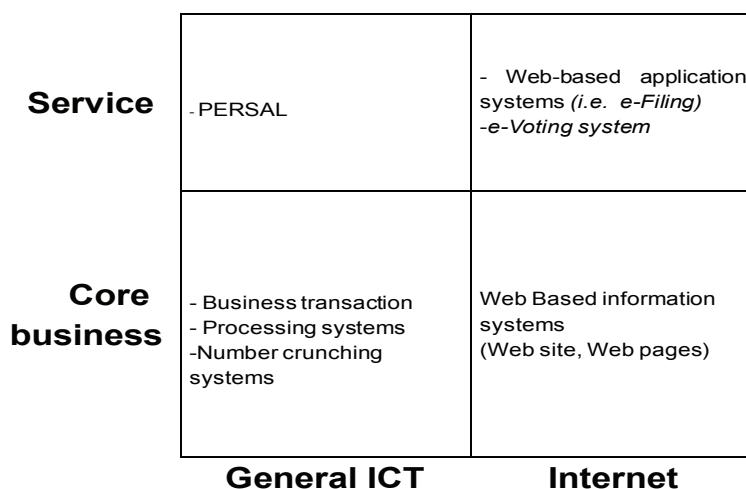
Since most of the SDMs discussed above are touted to be used for a variety of systems, they can also be suitable in the development of e-government systems. The next section discusses the e-Government systems, the types of e-Government systems and the challenges of developing e-Government systems.

#### **4. E-Government**

e-Government emerged from the term e-commerce which is defined as “the sharing of business information, maintaining business relationships and conducting business transactions by means of telecommunications networks” (Molla 2001). The concept of e-Government focuses largely on electronic service delivery and some additional channels of interaction among governments, businesses, and citizens (McClure 2000). The service delivery of e-Government systems is mainly focused on the number and the type of online services offered (Farelo & Morris 2006).

##### **4.1 Definition of e-Government system**

Researchers such as Layne and Lee (2001) defined e-Government focusing largely on the range of technologies that can be used, the use of internet, accessibility and service delivery. Figure 1 shows a proposed theoretical framework that is used in this study to explain e-Government systems.



**Figure 1:** Proposed theoretical framework for e-government systems

Based on the above proposed framework in Figure 1, e-Government system can be defined as the use of general Information Communication and Technology (ICT) and the internet,

- to improve the core business operation in government and,

- to deliver government information and services faster and at a reasonable price to the public and private sectors, community members, consumers, employees as well as other government officials across the country.

#### **4.2 Types of e-Government systems**

The focus of e-Government systems is to deliver services to four main customers. The following are four different types of e-Government systems:

- Government-to-Citizen (G2C) is the type of e-Government systems which provide information dissemination like basic citizen services such as license renewals, ordering of birth/death/marriage certificate and filling of income taxes (Sharma & Gupta 2004).
- Government-to-Business (G2B) is the type of e-Government systems which provide various transaction services between government and the business community including dissemination of policies, memos, rule and regulations (Layne & Lee, 2001).
- Government-to-Employee (G2E) is the type of e-Government systems which provides specialized services that covers only government employees such as provision of human resources training and development (Layne & Lee 2001).
- Government-to-Government (G2G) is another type of e-Government systems which are used at two levels: domestic level and at the international level (Sharma & Gupta 2004).

#### **4.3 The challenges in the development of e-Government systems**

The development of e-Government systems in South Africa has raised a number of challenges which can be defined as chaotic and unmanageable (McClure 2000). Chaotic means total lack of order or simply disorganized and unmanageable meaning difficult to keep under control or within limits. Some challenges of e-Government systems include providing access to needed information, ensuring privacy and security, changing technology and maintenance and measuring customer satisfaction (Farelo & Morris 2006). From the data collected during the interviews so far some of these challenges include incomplete and ambiguous user requirements and inadequate time and budget constraints. The next section discusses the research method used in this study.

### **5. Research methodology**

This study used the interpretive approach and hence a qualitative research methodology for studying the development of e-Government systems was followed. Information was sourced from three case studies and data was collected using interviews. Project managers and system developers were interviewed and the data collected was analyzed using specialized analytical software called ATLAS ti.

### **6. Preliminary framework results**

Table 1 shows the preliminary framework where characteristics of e-government systems matched to the various SDMs that can be used to capture or develop such a feature in the system. For example, if the e-government system requires the development of UC1-Electronic service delivery system that enables people to apply and receive passports or birth certificates, SDMs such as STRADIS, IE, XP, RUP, ETHICS and SSM can be used. On the other hand, systems that allow user participation (UC6) may not be developed using IE and RUP as a SDM.

Table 1 also suggests that for any type of systems that only delivers electronic services (UC1) and is partly an electronic workflow system (UC2), STRADIS is the suitable SDM. For systems that are processes oriented projects (PT1) that also involves number crunching (PT3) and are very big (PT5), IE is the appropriate SDM to be used but if such project is very small, XP is the suitable SDM to be adapted.

### **7. Conclusion and future work**

This paper presented a framework that can be used in assisting project managers and system developers to select a suitable SDM to use in the development of e-Government systems with regard to the characteristics of such systems. Future work looks at collecting more data to verify this framework.

**Table 1:** Preliminary results

<b>Unique characteristics of e-government</b>	<b>Systems Development Methodologies (SDMs)</b>					
	<b>STRADIS</b>	<b>IE</b>	<b>XP</b>	<b>RUP</b>	<b>ETHICS</b>	<b>SSM</b>
UC1: Electronic Service delivery	Y	Y	Y	Y	Y	Y
UC2: Electronic Workflow	P	Y	Y	Y	Y	Y
UC3: Electronic productivity	N	Y	Y	Y	Y	Y
UC4: Electronic access to government information	N	Y	Y	Y	Y	Y
UC5: Convenience and Satisfaction	N	Y	Y	Y	Y	Y
UC6: Participation	N	P	Y	P	Y	Y
UC7: Integration and Efficiency	N	Y	Y	Y	Y	Y
Project Type	Any	PT1, PT3,PT5	PT1, PT3, PT6	PT2,PT4, PT5	PT1,PT4,PT5	PT1,PT4
Scale	<b>1.5/7</b>	<b>6.5/7</b>	<b>7/7</b>	<b>6.5/7</b>	<b>7/7</b>	<b>7/7</b>

Key	Description
Y (70%-100%)	means Yes
P (40%-69%)	means Partially
N (0%-39%)	means No
PT1	Project type 1 which is Processing systems
PT2	Project type 2 which is web based application systems
PT3	Project type 3 which is for number crunching systems
PT4	Project type 4 for Web site design
PT5	Project type 5 which is for big project
PT6	Project type 6 which is for small project

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# **BIG Work in Progress: Big Data Public Private Forum and Public Sector**

**Ricard Munné**

**Atos Spain S.A., Barcelona, Spain**

[ricard.munne@atosresearch.eu](mailto:ricard.munne@atosresearch.eu)

**Abstract:** Big Data is considered a strategic topic by the European Commission, which can contribute to increase European competitiveness, providing tools with high added value in the context of Future Internet applications and services, and within the framework of the Europe 2020 strategy, launched by the EC to exit the crisis and prepare the EU economy for the next challenges. Building an industrial community around Big Data in Europe is the priority of this project, together with setting up the required collaboration and dissemination infrastructure to link technology suppliers, integrators and leading user organizations. BIG is working towards the definition and implementation of a clear strategy that tackles the necessary efforts in terms of research and innovation, providing a major boost for technology adoption and supporting actions from the European Commission in the successful implementation of the Big Data economy. As part of this strategy, the outcomes of this project will be used as inputs for Horizon 2020 and sustained beyond the project duration. The use of Big Data technologies applied to different markets is already showing a great impact by improving processes performance, and therefore, impacting the global productivity. BIG has selected a wide spectrum of domains based on several business and opportunity criteria. One of these domains is the Public Sector, as one of those with more potential benefits from the use of Big Data technologies. At this point, a first draft of Sector's requisites has been produced with the requirements for the potential use of Big Data technologies. The final version of these requisites will be integrated in the roadmap that will be produced in a later stage.

**Keywords:** coordination action, big data, public sector, data management and usage, roadmap, public private forum

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## **1. Introduction**

Big Data Public Private Forum (BIG) is a Coordination action co-funded by the European Union under the Seventh Framework Programme (FP7/2007-2013). The consortium is composed by 11 partners from industry, research institutes and non-profit organizations. BIG is a two-year long project that started in September 2012.

The European Commission launched in March 2010 the Europe 2020 Strategy to exit the crisis and prepare the EU economy for the next challenges in terms of productivity, economy and social cohesion, to name a few. Intelligent Information Management in general and Big Data in particular is considered to be a strategic topic that can contribute to increase European competitiveness, providing tools that will be translated into high added value in the context of Future Internet applications and services. Moreover, materializing opportunities in these domains requires a holistic approach, where technical activities work jointly with business, regulatory and policy aspects.

The volume of data being digitally stored and exchanged is growing exponentially. We are on the verge of an era where every device is online, ubiquitous sensors generate continuous streams of data, very high bandwidth data conduits expand to transport high definition media, and information complexity allows the development of Internet services such as search engines, social media sites, and many other similar data-consuming sites.

Here, innovative technology offers alternatives to solve the inherent problems that appear when working with huge amounts of data, providing new ways to reuse and extract value from information. Three main dimensions characterize Big Data: huge variety of data formats, often time-sensitive and large.

Data have become a new factor of production, such as hard assets and human capital. As such, having the right technological basis and organizational structure to exploit data is essential. While US-based companies like Yahoo or Google are widely recognized for their works in Big Data, very few research organizations, including SMEs, are known for their work in that field in Europe, still without enough industrial support to become competitive in front of giants like the aforementioned ones.

While limitations of current technologies can be presented as problems, Europe has a huge opportunity derived from Intelligent Information Management in general and Big Data in particular. Big Data offers

tremendous untapped potential value for many sectors, but no specific intelligent-large-data-handling/brokering industrial sector exists. Furthermore, from an industrial adoption point of view, Europe is lagging behind US in Big Data technologies. A clear strategy to align supply and demand is needed as a way of increasing competitiveness of European industries.

## 2. BIG objectives

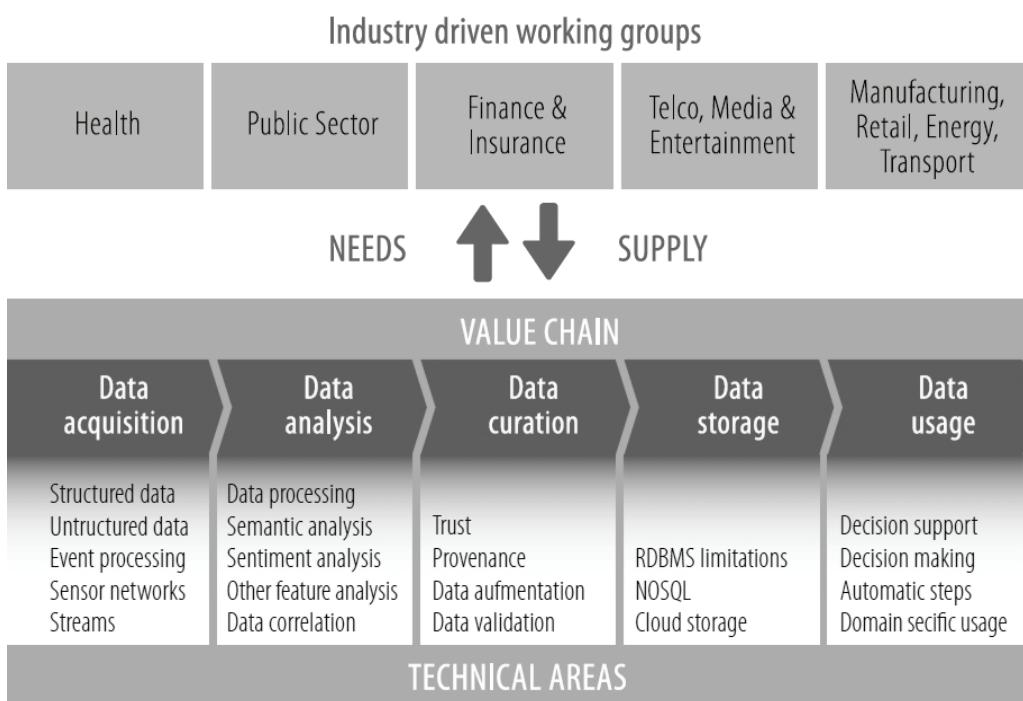
Building an Industrial community around Big Data in Europe is the priority of this project, together with setting up the required collaboration and dissemination infrastructure to link technology suppliers, integrators and leading user organizations. BIG is working towards the definition and implementation of a strategy that includes research and innovation, but also, technology adoption.

The following list provides a more specific formulation of BIG objectives:

- Setting up an industrially-led initiative around Big Data to contribute to EU competitiveness and position it in Horizon 2020.
- Elaborate an integrated roadmap that takes into consideration technical, business and policy aspects, focusing not only on pure technical issues, but also establishing priorities based on expected impact.
- Ensure that technical research areas selected by the project cover the needs detailed by the industry in different application domains.
- Promote the adoption of earlier waves of big data technology.
- Define and promote actions dealing with policy and regulation, including aspects such as data security, intellectual property, privacy, liability and data access.
- To carry out dissemination actions targeting different stakeholders and players in the value chain.

## 3. BIG approach

BIG is not only addressing technical aspects, it is considering the current state of the art of different sectors that could benefit from the use of Big Data technologies and will ensure that the requirements coming from industry, but also from public organizations, are taken into consideration. Foundational research technologies are being analysed and assessed in BIG, so the business and operational communities understand the potential of these technologies and are enabled to deploy appropriate strategies and applications for their benefit. To maximize the success of this initiative BIG has selected a balanced set of partners representing specialized Academia and Industry.



**Figure 1:** Structure of BIG approach

From the pure technological point of view, BIG has already identified some areas where further research should be promoted and coordinated. Even though many projects are working in areas of relevance to Big Data, they are not always referring to that explicitly. The technical analysis has been structured in the following areas, Data Acquisition, Data Analysis, Data Curation, Data Storage and Data Usage.

The use of Big Data technologies applied to different markets is already showing a great impact by improving processes performance and therefore impacting the global productivity. BIG has selected a wide spectrum of domains based on several criteria, including potential in terms of business, timeframe to reach that potential (balancing short and long term approaches), and availability of data in the different application sectors. Targeted sectors are Health Care, Public Sector, Finance & Insurance, Telco, Media & Entertainment and Manufacturing & Retail

#### **4. Public sector**

Public sector is increasingly aware of the potential value to be gained from Big Data. Governments generate and collect vast quantities of data through their everyday activities, such as managing pensions and allowances payments, tax collection, National Health System patient care, recording traffic data and issuing official documents. BIG is taking into account current socio-economic and technological trends, like boosting productivity in an environment with significant budgetary constraints, the increasing demand of medical and social services, and the standardization and interoperability as important requirements for public sector technologies and applications.

Some examples of potential benefits are:

- Open Government and Data sharing. The free-flow of information from organizations to citizens promotes greater trust and transparency between citizens and government, in line with open data initiatives. Pre-filling of information (based on the 'once only' principle) would be another benefit, with reduction of mistakes and speeding up processing time.
- Sentiment analysis. Information from both traditional and new social media (websites, blogs, twitter feeds...) can help policy makers to prioritize services and be aware of citizens' real interests and opinions.
- Citizen segmentation and personalization. Segmenting and tailoring government services to individuals can increase effectiveness, efficiency, and citizen satisfaction
- Economic analysis. Correlation of multiple sources of data will help government economists with more accurate financial forecasts.
- Tax agencies. Automated algorithms to analyse large datasets and integration of structured and unstructured data from social media and other sources will help them validate information or flag potential frauds.
- Threat detection and prevention. Track and analyse citizen activities to spot abnormal behavioural patterns.
- Cyber Security. Collect, organize and analyse vast amounts of data from government computer networks with sensitive data or critical services, to give cyber defenders greater ability to detect and counter malicious attacks.

#### **5. Progress so far and next steps**

BIG is analysing the situation in the public sector domain to provide a roadmap to guide the path from the AS-IS situation to the TO-BE situation, focusing on the most challenging aspects in the Public Sector (data availability and data sharing through governmental organizations, or even citizens and businesses). Appropriate dissemination activities are being provided based on the impact of successful initiatives.

At this point, a first draft of Sector's requisites has been produced with the requirements for the potential use of Big Data technologies. The final version of these requisites will be integrated in the roadmap that will be produced in a later stage. This roadmap will be discussed, shared and made public among all the interested stakeholders, and should cover a complete view of all the actions that should be performed in the coming years. Consensus and representation of all relevant players is guaranteed in our work. The integrated version

**Ricard Munné**

of the roadmap will highlight cross-sectorial issues; this will be accompanied by a series of sectorial roadmaps that will ease the deployment and adoption of Big Data within the different application domains.

The last step of our initiative is to set up a Big Data Public-Private Forum in the form of an industrially-led initiative around Big Data to contribute to EU competitiveness that goes beyond the project duration. Another critical achievement will be to provide input to Horizon 2020 and its work programme 2014, contributing to the work done by the European Commission to support research and innovation in this area.

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# What Kind of Cultural Citizenship? Dissent and Antagonism When Discussing Politics in an Online gay Community

Jakob Svensson

Karlstad University, Karlstad, Sweden

[jakob.svensson@kau.se](mailto:jakob.svensson@kau.se)

**Abstract:** Framed in ideas of cultural citizenship and acknowledging the importance of popular cultural sites for political participation, this short paper attends to a study of political discussions in the Swedish LGTB community *Qruiser*. The research is netnographic through online interviews, participant observations and content analyses. Preliminary results suggest an atmosphere that is geared rather towards conflict and dissent between participants than towards deliberation, opinion formation and consensus. This paper will therefore shortly discuss the results in light of Mouffe's (2005) normative lens of agonism and radical democracy.

**Keywords:** agonism, cultural citizenship, political participation, radical democracy, social media

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## 1. Introduction

This short paper is theoretically framed in ideas of cultural citizenship as developed by Hermes (2006). Non outspokenly political popular cultural sites, such as fan and net communities, may become sites for political participation (see for example Graham 2009; Svensson 2010; Andersson 2013). Thus, if aiming at understanding citizenship, it would be wrong to exclusively focus on realms of institutionalized politics.

The research project this paper is based on studies political discussions in the Swedish LGTB (Lesbian, Gay, Trans- and Bisexual) community *Qruiser*. The research is netnographic through online interviews, participant observations in, and content analyses of, political discussions on *Qruiser* forums and most popular political clubs during November 2012. Preliminary results suggest an atmosphere that is rather geared towards conflict and dissent between participants than deliberation, opinion formation and consensus. The expressive and conflictual political participation will therefore be discussed in light of Mouffe's (2005) normative lens of agonism and radical democracy.

## 2. A cultural theoretical perspective

A cultural theoretical perspective implies a focus on processes of meaning-making. Culture can be understood as a set of values and beliefs that inform and motivate our behaviour (Castells 2009: 36), helping us to understand our practices and providing them with meaning. Media and communication platforms are important for such meaning-making (Thompson 2001/1995).

Drawing on the sense-making participant, culture in Hermes' (2006) theorizing of cultural citizenship is connected to the blurring of public and private spheres, reminding us that citizenship is practiced in many different places. Popular culture offers images and symbols that evoke emotion that we use when negotiating civic identities (Dahlgren 2009: 137). It would thus be wrong to confine the political exclusively to the realm of institutionalized politics (Carpentier 2011: 39-40). As political communication researchers, we should also attend to popular culture when trying to understand contemporary citizenship, not the least to online sites in our digital and late modern age (see Svensson 2011). General research on online communities has shown that interaction changes because of the possibility of anonymity, automatic archiving and access to a range of different communities (Kozinets 2011: 100). Still, we know little about the extent and how internet users participate in nonpolitical online groups to discuss politics (Wojcieszak & Mutz 2009: 41). Therefore we need to study how and why popular cultural sites engage citizens in political discussions and how participants make their participation meaningful here.

There have been some studies of popular cultural sites from a political participatory perspective. Graham (2009) found more deliberative qualities in political discussions on docu-soap fan-pages in comparison to discussions on respected journals comment fields. Svensson (2010) studied discussions on ice-hockey fan-pages and found that social capital was produced here. Andersson (2013) studied political discussions in a youth community - based on music preferences and clothing style - and found that users were exposed to

opposing political views, something that socialized them into “politically confrontational team players” (my translation: politiskt konfrontativa medspelare).

At least 100 million participate regularly on online communities today (Kozinets 2011: 10). One of these communities is *Qruiser*, the biggest LGTB community in Sweden. *Qruiser* is primarily used for flirting, dating and maintaining friendships. But there are also possibilities for political discussions in so-called forums and clubs, even though clubs are mostly used to display preferences on the user's profile page rather than to discuss. Hence, there are many opportunities for *Qruiser* users to engage in political discussions with each other.

### **3. Political discussions on Qruiser**

The study of political discussions on *Qruiser* primarily took place during November 2012. November 1<sup>st</sup> the community had 109153 active members. According to member statistics 72 percent of these defined themselves as male and 72 percent defined themselves as gay, lesbian or bisexual. The majority of the members are between 20 and 40 years old with an average age of 33. 72 percent of the members are based in Sweden and only 17 percent defined themselves as in a relationship, underlining *Qruiser's* main purpose to find a date.

During November participant observations of political discussions were conducted. All discussion threads started from November 1<sup>st</sup> to 20<sup>th</sup> under the tag Politics, Society & the World (my translation: Politik, Samhälle & Världen) were followed and postings downloaded until November 25<sup>th</sup>. 76 different threads were started during this period by 31 different nicknames, containing 2853 postings. All thread starters and recurrent posters in these threads were invited to participate in online interviews. Not everyone agreed to participate. I currently conduct interviews with 30 different nicknames as well as reflective field notation documenting observations, feelings and experiences when I participated in discussions as well as during the analysis phase. The method is best described as netnographic (see Kozinets, 2011)

Resonating with Andersson's (2013) study, the political discussions were very confrontational, perhaps due to the opposing political views represented and perhaps also due to the possibilities of anonymity. In interviews participants talked about the discussions as a competition, not against team-players (as in Andersson's study) but against opponents. Hence, instead of seeking consensus, to understand each other, participants sought conflict. They actively tried to misinterpret each other's postings in order to attack, and use unflattering labels on each other. One illustrative example was when posting a question on how to understand the concept of anti-Semitism in a thread on the Israel/Palestine conflict. I was then labeled as leftist and anti-Jewish, questioning anti-Semitism (something I did not do in the posting). Among other things I was also accused of being particularly ignorant for an academic. This was a disturbing experience, something which made me dislike the general tone of the discussions as well as certain participants. In a way this experience made me understand the harsh tone, since I myself sometimes felt an urge to attack those participants I felt had treated me unfairly. A preliminary conclusion is thus that conflict was the defining character of the political discussions on *Qruiser*.

### **4. Discussion: Political discussions as agonistic or antagonistic?**

To understand these preliminary results, this paper makes use of the perspective of radical democracy as outlined by Laclau & Mouffe (1985) and Mouffe (2005). This perspective is contested especially by deliberative democrats (see for example Dryzek 2000). However the results above clearly show that deliberation was not at stake, but rather conflict. Conflict is a central concept in radical democracy and important for understanding political participation. A common understanding of political participation refers to engagement for the organization of human co-existence (see for example Dewey 1927; Arendt 1998/1958). Political participation from a radical democratic perspective thus has to do with conflicts over resources and between interests in the organization of society. According to Mouffe (2005), we should not be misled to believe that consensus on this division ever could be achieved. Furthermore, participation - being based in processes of identification - will always entail the identification of an *Other* in contrast to an *Us* (Laclau & Mouffe 1985: 136). However, by outlining a normative concept of *agonism* - in contrast to antagonism - Mouffe (2005) seeks to establish the *Other*, not as an enemy to be destroyed, but as an adversary to be acknowledged. In this way the perspective of radical democracy offers me a norm, an analytical category – agonism - to measure the preliminary findings against. The question then becomes if the *Other* was conceived of as enemy or an adversary?

In contrast to Andersson's (2013) study of a youth community - who concluded that political discussions were conflictual, yet agonistic and friendly - the discussions on *Qruiser* were rather antagonistic. The positioning of the *Other* was to a surprisingly large extent done using the discourse of left and right and then associating opinions from the extreme versions of these positions to the *Other*. By associating to the *Other* extremist characteristics and opinions, the *Other* could also be treated as someone not worthy of acknowledgement, so-called guilt by association. For example, if positioned as belonging to the left – you could also be accused of defending the regime in North Korea - and someone who defends the North Korean regime clearly cannot be taken seriously and should thus shut up. Similarly participants positioned belonging to the right often had to answer for the behaviour of neo-Nazi groups and so on.

The question I ask myself is thus what kind of cultural citizenship is thriving on *Qruiser*? While it is easy to become horrified by the conflictual and antagonistic character of the participation on *Qruiser's* forum for political discussions, preliminary interview results reveal a conception of the forum as a locus for training debate skills, a place where the absence of political correctness is liberating, providing an outlet for political frustration. In interviews participants have revealed that they are rather motivated to debate in general and to impress an imagined audience of lurkers, than to understand or learn from other participants and seek some kind of agreement on how to understand an issue. The interviewed participants seem to have a general political interest and their participation spans from letting off steam on *Qruiser* to more deliberative style participation in other more recognized political associations. Hence, we can not judge the sophistication of participants civic practices by only attending to their *Qruiser* forum discussions. And while many participants dismissed *Others* as not worthy of listening to, there was an imagined audience of lurkers that seemed to be important when participants made their practices meaningful in interviews. A preliminary conclusion then, while antagonistic and rude, the *Qruiser* forum also provided a training ground for debate skills and an outlet for political frustration, things that are also important for a vital democracy.

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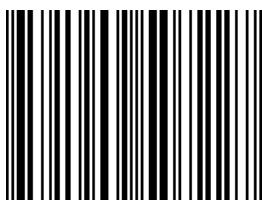
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