

Kriteria & Penilaian Implikasi e-Government

Budi Sutedjo

Untuk mendalami topik bahasan

- Lakukanlah studi jurnal sebagai berikut:
 - Suri, Pradeep & Sushil, Professor, “Measuring e-Government Performance”, ResearchGate,
https://www.researchgate.net/publication/307879063_Measuring_E-Governance_Performance
 - Assar, Said & Boughzala, Imed, 2016, “Evaluation Approaches to e-Government Application”, ResearchGate,
https://www.researchgate.net/publication/311647629_Evaluation_approaches_to_e-government_applications
 - Patsiora, Fotini, 2014, “Evaluating e-Government”, ResearchGate,
https://www.researchgate.net/publication/265140668_Evaluating_E-Government

Bahaslah ketiga artikel itu bersama dengan kelompok Anda

- Sebutkan variable (kriteria) pokok yang digunakan oleh masing-masing peneliti dalam mengukur keberhasilan implementasi dan implikasi sistem e-Government! Berilah warna kuning yang menunjukkan variabel yang sama dari dua peneliti dan warna hijau muda yang menunjukkan variabel yang sama dari ketiga peneliti!
- Jika ditemukan variabel yang berbeda, apakah variabel itu dapat digunakan untuk melengkapi kriteria yang telah disusun oleh peneliti tersebut? Berilah alasan yang mendukung pendapat Anda.

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Measuring E-Governance Performance

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Chapter 2

Measuring E-Governance Performance

2.1 Introduction

The potential of e-governance for improving internal efficiency and strengthening of interfaces with citizens is well recognized by governments across the globe. Its effective realization, however, demands overcoming of several challenges. These challenges generally relate to system and technology, processes, organizational issues, legal issues, security, citizen relationship management, inter-departmental collaboration and integration, building public-private partnerships, change management, etc. Of late, there has been a growing concern among several governments about low levels of acceptance of the e-governance services despite huge investments being made world-wide. On the other hand, while a large number of projects are finding it difficult to meet their intended purpose, the few successful projects amply demonstrate the benefits accruing to different stakeholders through effective use of ICT. The discouraging results pose a challenge to probe deeper into the performance aspects of these projects from the viewpoints of key stakeholders.

Most of the published literature on e-governance performance is based on qualitative analysis of specific contexts. Though, in the recent past, studies supported with empirical analysis are being regularly reported in e-governance literature, e-governance performance measures based on perspectives of key stakeholders belonging to different projects are generally lacking. In this chapter, we propose a construct and apply it for analysing e-governance performance from the viewpoints of government employees and end users in the context of the identified projects.

2.2 Key Stakeholders and Value from E-Governance

E-governance projects are generally characterized by involvement of a number of actors both internal and external to the owner organization. According to Freeman (1984, pp. 24–27, 52–55), it is important to account for key stakeholders while

pursuing for organizational objectives. Though there are many stakeholders associated with large e-governance projects, the prominent ones include employees in government organizations and the service users of government services which have been the focus of many scholarly studies (Axelsson et al. 2013). The government employees can be further broadly categorized into key decision makers and the line managers. Actors in the former category are responsible for planning and are usually the driving forces behind projects. The line managers generally act as implementers. For example, e-governance stakeholders are classified as providers and recipients of services (Gouscos et al. 2007). It has been suggested that service offerings through e-governance ought to generate additional value and benefits to stakeholders should be measureable. E-governance projects, therefore, need to be studied from the view point of benefits accruing to key stakeholders. Based on insights developed by analysing strategic gaps in an ongoing national level AGMARKNET project (Suri 2005), we have categorized stakeholders as planners, implementers and beneficiaries for further analysis.

It is observed that the key strategic objectives of e-governance projects in both developed and developing countries are linked to improving governance. Of late, scholars as well as the policy documents of international agencies like the World Bank and UNDP have been emphasizing on leveraging e-governance for bringing reforms in government system. It has been emphasized that focus of e-governance projects should be on efficient and transparent service delivery, enabling citizens' right to information, facilitating their participation in governance, etc. This approach to e-governance is adopted by many projects around the world (Sahraoui 2007). For example, in the Indian context, the erstwhile Planning Commission (Now NITI Aayog) and the Administrative Reforms Commission view e-governance as the means to attain attributes of good governance, viz. transparency, efficiency, responsiveness, cost effectiveness and accountability through application of technology (Planning Commission 2007a, b, p. 231; Planning Commission 2013, pp. 294–295; ARC 2008, pp. 60, 176). In order to arrive at a suitable measure for assessing performance of e-governance in the background of this study, it is necessary to develop an understanding about e-governance contribution and e-governance assessment.

2.3 Contributions of E-Governance

Benefits of e-governance in terms of easy accessibility to authentic and comprehensive service, saving of time and cost, enhanced transparency, better interactivity, improved responsiveness, better monitoring and control, decision-making, etc. have been discussed in many studies. Some of these are summarized in Table 2.1.

We refer to some of these articles subsequently while defining the performance variables.

Table 2.1 E-governance contributions

Author	Contributions
Tsohou (2014)	Enables public administrations to offer an increased portfolio of public services to citizens, businesses or other public agencies in an efficient and cost-effective manner
Suri (2014)	Can play a catalytic role in improving government service delivery at the grassroots by plugging gaps in the related processes
Lindgren (2013)	Improves citizens' opportunities to interact with government authorities; increases government authorities' efficiency by reducing the number of manual routines; increases democracy through greater governmental transparency
Planning Commission (2013)	Facilitates attaining attributes of good governance, viz. transparency, efficiency, responsiveness, cost effectiveness and accountability
Wang and Chen (2012)	An effective means to transform government functions, improve administrative efficiency and promote the openness of government affairs and meliorate public service
Valdes et al. (2011)	Improves the efficiency of service delivery through interconnected networks, encourages citizen participation; increases the transparency of administrative processes
UN (2008, xii)	Can significantly contribute to process of government transformation towards a leaner, more cost-effective government; can facilitate communication and improve the coordination of authorities at different tiers of government; and can enhance the speed and efficiency of operations by streamlining processes, lowering costs, improving research capabilities and improving documentation and record keeping
Luna-Reyes et al. (2007)	Collaborative e-Government contributes in the form of technical, organizational and political benefits
Harris (2007)	Prime focus of Government of India for e-governance is for greater efficiency, transparency, accessibility, accountability and reduction in procedural complexities that breed corruption
Evans and Yen (2006)	Facilitates information support to decision makers enabling them serve citizens in a more timely, cost-efficient and cost-effective manner; facilitates better coordination among different layers of government as well as government and beneficiaries
Grant and Chau (2005)	Develops and delivers high quality, seamless and integrated public services; enables effective constituent relationship management; and supports the economic and social development goals of citizens, businesses, and civil society at local, state, national and international levels
Jaeger (2005)	Promotes public participation in government
Tan et al. (2005)	Improves transparency, accountability, public participation
Zwahr et al. (2005)	Creatively destroys conventional governance institutions and transforms functioning
Bhatnagar (2004)	e-governance can have a direct impact on (a) reducing the number of intermediaries that citizens need to interact with in order to get

(continued)

Table 2.1 (continued)

Author	Contributions
	a government service; (b) improving government ability to monitor and (c) disclosing information about government processes and public budget spending to citizens
	Provides citizens and governmental agencies with a convenient, cost-efficient and cost-effective way to access required government information and public services
OECD (2003)	E-Government improves efficiency and services, helps in achieving specific outcomes, can be a major contributor to reform enables greater engagement with citizens and helps building trust between government and citizens
CDT (2002)	E-Government provides greater access to government information; promotes civic engagement by enabling the public to interact with government officials; makes government more accountable by making its operations more transparent and thus reducing the opportunities for corruption; and provides development opportunities, especially benefiting rural and traditionally underserved communities
Heeks (2001)	Three main contributions of e-governance: (a) improving government processes (<i>e-administration</i> : cutting process costs, managing process performance, making strategic connections in government, creating empowerment); (b) connecting citizens (<i>e-citizens or e-services</i> : talking to citizens, listening to citizens, improving public services); and (c) building external interactions (<i>e-society</i> : working better with business, developing communities, building partnerships)
Maio et al. (2000)	Constant improvement of service delivery, participation of constituents and improved governance
World Bank (www.worldbank.org/egov)	Serves different ends such as better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management
UNESCO (www.unesco.org)	Improving information and service delivery, encouraging citizen participation in the decision-making process and making governance more accountable, transparent and effective

2.4 Assessment of E-Governance

The evolving concept of assessing e-governance initiatives is attracting scholars from diverse disciplines. The purpose of some of the initial assessment frameworks was limited to developing an understanding at a broader level. For example, Layne and Lee (2001) proposed a four-stage framework in which levels of maturity were viewed as ‘Catalogue’, ‘Transaction’, ‘Vertical Integration’ and ‘Horizontal Integration’. This framework has been adopted or closely resembles many other staged models for e-governance implementation (Yildiz 2007), for example, UN

E-government Survey categorizes the stages as 'Emerging', 'Enhanced', 'Transactional' and 'Connected' (UN 2014). Grant and Chau (2005) proposed a generic framework to represent e-governance vision and implementation that would be applicable across different governments. The framework includes strategic focus areas (SFAs) mapped to one or more key functional areas (KFAs). While conceptual frameworks such as these serve the purpose of assessing e-governance services at a broader level, further instruments are required to analyse specific systems. Andersen and Henriksen (2005) have argued that the majority of e-government studies have not focused on outcomes.

The traditional financial appraisal measures such as 'Return on Investment', 'Internal Rate of Return', 'Net Present Value' and 'Payback' are relatively easy to define in a manufacturing environment but can be misleading when applied to study outcomes in e-governance context. These measures do not support the accomplishment of socio-economic and socio-political goals that generally characterize e-governance projects. To address this limitation, it has been proposed to use an outcome-based approach by considering hard as well as soft measures such as value sharing, capabilities, interactions and orientations (Gupta and Jana 2003; eGEP 2006; Lawson-Body et al. 2008; Esteves and Joseph 2008; Andersen et al. 2010). For example, the conceptual framework proposed by Esteves and Joseph (2008) is based on three dimensions, viz. *maturity levels* (innovative leaders, visionary followers, steady achievers, platform builders), *stakeholders* (citizens, employees, businesses, governments, IS/IT personnel, special interest groups) and *assessment levels* (technological, strategic, organizational, operational, services, economic).

However, most of these assessment frameworks are either yet to be tested in real-life situations or are relevant for only such few projects which have reached e-governance maturity (Karunasena and Deng 2012). A few more empirical studies are based on single case study involving a narrow group of citizens who use Internet for structured applications such as paying taxes (Wang and Liao 2008; Saha et al. 2012).

In Indian context, a few relevant research studies have emphasized on taking into account the governance aspects in performance measures (Mitra and Gupta 2008), pre-defining effectiveness parameters of e-governance programmes and cautiously managing factors of change for giving real benefits to stakeholders (Kumar 2009), managing continuity and change forces and linking it to strategic outcomes for better value creation through e-governance (Nasim and Sushil 2010) and analysing e-governance performance from multi-perspectives (Suri and Sushil 2011).

In order to showcase exemplary e-governance initiatives, the Department of Administrative Reforms and Public Grievances initiated an award scheme in the year 2009 (www.darpg.gov.in, last accessed on 24.12.2015). The projects awarded during 2015 are shown in Box 2.1.

Box 2.1(Source: www.darpg.gov.in)

The projects awarded by DARPG in 2015 are under the following categories:

Category I—Excellence in Government Process Re-engineering

Category II—Outstanding Performance in Citizen-Centric Service

Category III—Innovative Use of Technology in e-Governance

Category IV—Incremental Innovations in existing Projects

Category V—Best District Level Initiative in Citizen-Centric Service Delivery through ICT

Category VI—Innovative use of GIS Technology in e-Governance

Category VII—Innovative use of Mobile Technology in e-Governance

Category IX—Innovative use of ICT by Central Government PSUs

Category X—Innovative Use of ICT by State Government PSUs/Cooperatives/Federations/Societies

Category XI—Outstanding e-Governance Initiative by Academic and Research Institutions

Category XII—Use of ICT for Development by Non-Government Institutions

National Awards for E-Governance

Category	Project name	Organization
I.	TDS Reconciliation Analysis and Correction Enabling System (TRACES)	Directorate of Income Tax
	e-Initiatives in Commercial Taxes	Finance Department, Government of West Bengal
II.	Passport Seva Project	Ministry of External Affairs, Govt. of India
	Kanyashree Prakalpa Portal Kanyashree online	Department of Women Development and Social Welfare, Govt. of West Bengal
III.	Suraksha Setu-Safe City Surat	Office of the Commissioner of Police, Surat, Gujarat
	Force Deployment Software	Office of Chief Electorate Officer, Bihar and National Informatics' Centre, Bihar
IV.	AGRISNET-Farm Crop Management System (FCMS)	Department of Agriculture, Govt. of Tamil Nadu
	e-Procurement	Industries Department, Industries Commissionerate, Gujarat

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(continued)

Category	Project name	Organization
V.	Effective Vehicles Database Management to Trace the owners of Unclaimed Vehicles Lying in Police Stations	Mandya District Police, Home Department, Karnataka
	e-Panchayat	District Reasi, Jammu and Kashmir
VI.	Geographic Information System Project	Chhattisgarh infotech and biotech Promotion Society (CHIPS), Dept. of Information Technology, Chhattisgarh
	Application of Remote Sensing and GIS Technology in Sericulture Development	Central Silk Board, Ministry of Textiles, Government of India, Bangalore, Karnataka
VII.	State Highway Development Projects	Karnataka Public Works, Ports & Inland Water Transport Department
	SMS Based Failed Distribution Transformer Information and Management System	Madhya Pradesh Kshetra Vidyut Vitaran Co. Ltd. (Govt. of MP Undertaking)
VIII.	SAMVIDA	Rural Development Department, Govt. of Bihar & National Informatics' Centre, Bihar
	e-Governance Training and Certification	Government of Maharashtra
IX.	SAMPARK	Information Technology and Services Dept., Bharat Heavy Electricals Limited (BHEL), Bhopal, Madhya Pradesh
X.	ANMOL	State Child Protection Committee, Bhopal, Madhya Pradesh
	Quarry Management System (QMS)	Tamil Nadu Minerals Limited, Tamil Nadu
XI.	e-Jaalakam	Department of Economics, St. Teresa's College, Kerala
XII.	TCS Financial Inclusion Project	Tata Consultancy Services
	Kushal	A CREDAI Pune Metro Initiative

Source www.darpg.gov.in

For the purpose of this study, it was considered appropriate to rely upon the detailed evaluation reports of a few well-recognized e-governance projects such as AKSHYA, BHOOMI, Computer-Aided Administration of Registration Department (CARD), e-Procurement Exchange, e-Seva, Fast Reliable Instant Efficient Network for Disbursement of Services (FRIENDS), GYANDOOT, Karnataka Valuation and e-Registration (KAVERI), Lokvani, Nagarpalika. The evaluation reports throw light on significance of bringing reforms through e-governance and also highlighted by the commission setup to bring administrative reforms (ARC 2008). A summary is presented in Appendix A. Though the current status of these projects may be

different, the aforesaid studies conducted in the past provide valuable insights on performance aspects in terms of governance reform-related benefits. Performance of the evaluated projects is considered satisfactory as these projects have focused on easy accessibility to services, saving of cost and time while seeking services, extending authentic and transparent services by following an integrated approach, facilitating interactions and decision-making, better tracking of service requests and complaints, etc. These studies, however, have not attempted a comparative performance analysis from the perspectives of providers and recipient of services.

2.5 Conceptualization of Performance Variables

The proposed construct for measuring e-governance performance is based on knowledge developed about deliverables of six agriculture-related projects identified for the study. It is kept into view to consider only those aspects which are relevant to planners, implementers and beneficiaries belonging to the selected projects. The conceptualized performance macro-variable with its constituting micro-variables is explained below:

2.5.1 Macro-variable

This variable is conceptualized to capture realization of benefits expected from a project. In each of the selected projects, the benefits are expected to accrue in terms of efficiency, transparency, interactivity and decision support which are described here.

2.5.2 Micro-variables

The conceptualized micro-variables are described as follows:

Efficiency The IT-enabled government processes are expected to simplify procedures, execute faster, minimize use of papers and save costs while communicating with government. The enhanced efficiency is captured through this variable.

Transparency The variable encompasses transparency aspect of a service. An e-governance service is expected to bring transparency in government-controlled operations. A government service has to be trustworthy, thorough, unbiased and accessible without any difficulty to end users.

Interactivity An e-governance service targeting citizens is expected to facilitate interactions at various levels, i.e. within constituting units of a government

department, with other departments associated with the service and with recipient of the service. The variable is conceptualized to capture such interactions.

Decision support Digitization of services and online transactions contribute to better decision-making, monitoring and control at the level of officials as well as beneficiaries, which is captured through this variable. For example, a farmer who has online access to commodity prices/arrivals information and storage facilities can monitor prevailing prices, store his produce or select a market for selling his produce when conditions are favourable. This micro-variable reflects better decision support in terms of improved planning and decision-making

Mapping of these variables with reviewed literature and project evaluation reports is presented in Table 2.2.

The performance constructs have been subjected to factor and reliability analysis and found to be satisfying the validation criteria. The validated performance constructs have been used for further analysis.

2.6 Generalized Multi-perspective Performance Analysis

Tables 2.3 and 2.4 present an F-test-based comparative analysis of performance perceived by the three actor groups considered for the study. The three means are found to be statistically different with the macro-level relationships revealed as (Suri and Sushil 2012).

$$\begin{aligned} \text{PerformanceMean(Planners)} &> \text{PerformanceMean(Implementers)} \\ &> \text{PerformanceMean(Beneficiaries)}. \end{aligned}$$

Similar tests are applied to compare the perceptions of the three groups about performance in terms of micro-variables. Further, the four constituting variables are subjected to similar test. The micro-level analysis reveals that

- In terms of efficiency and transparency, e-governance has contributed more at the level of planners followed by implementers and beneficiaries in that order.
- In terms of interactivity, e-governance has contributed more at the level of planners when compared with implementers and beneficiaries. The interactivity-related benefits are perceived to be same at the levels of implementers and beneficiaries.
- In terms of decision support, the planners and implementers are drawing more benefits from e-governance as compared to the beneficiaries.

The observed average performances for beneficiaries, implementers and planners are found to be 0.5, 0.6 and 0.7, respectively, which is indicative of gaps at various levels (Figs. 2.1 and 2.2).

Table 2.2 Variables conceptualized for assessing performance of e-governance project

Performance aspect	Micro aspects	Author (Year)	Projects (Appendix A)
Efficiency	Fast execution of core process/improved Service Delivery	UNESCO, Lindgren (2013), Scott et al. (2011), Andersen et al. (2010), Mofleh et al. (2009), Esteves and Joseph (2008), UN (2008), Planning Commission (2013), Evans and Yen (2006), Bannister (2002), Heeks (2001), Maio et al. (2000)	AKSHYA, BHOOMI, CARD, e-Procurement Exchange, e-Seva, GYANDOOT, Lokvani, Nagarpalika
	Simplification of procedures	UNESCO, Karunasena and Deng (2012), Mofleh et al. (2009), UN (2008), Harris (2007), Bannister (2002), Maio et al. (2000)	e-Procurement Exchange, BHOOMI, CARD, e-Seva, FRIENDS, KAVERI, Nagarpalika
	Reduced paper work	Karunasena and Deng (2012), UN (2008), Planning Commission (2007ab), Altameem et al. (2006), Evans and Yen (2006), Heeks (2001)	e-Procurement Exchange, e-Seva, GYANDOOT, KAVERI, Nagarpalika
	Reduced communication cost	UN (2008), Planning Commission (2013), Evans and Yen (2006), Vassilakis et al. (2004), Heeks (2001)	e-Procurement Exchange, e-Seva FRIENDS, GYANDOOT, KAVERI
Transparency	Reliable information delivery	Karunasena and Deng (2012), Andersen et al. (2010), OECD (2003), Bannister (2002)	BHOOMI, CARD, KAVERI, Nagarpalika
	Comprehensive information delivery	Karunasena and Deng (2012), Bhanagar (2004)	AKSHYA, KAVERI
	Easy access to information	World Bank, Alawneh et al. (2013), Karunasena and Deng (2012), Scott et al. (2011), Esteves and Joseph (2008), Harris (2007), Danziger and Andersen (2002), Bannister (2002)	BHOOMI, CARD
	Fairness	UNESCO, Harris (2007), Planning Commission (2007a, b), Tan et al. (2005), OECD (2003), Bannister (2002)	e-Procurement Exchange, e-Seva, FRIENDS

(continued)

Table 2.2 (continued)

Performance aspect	Micro aspects	Author (Year)	Projects (Appendix A)
Interactivity	Improved interaction (with internal actors, actors belonging to other related organizations, beneficiaries and government as per the respondent category)	UNESCO, Word Bank, Lindgren (2013), Karunasena and Deng (2012), Valdes et al. (2011), Gauld et al. (2010), Andersen et al. (2010), Mofleh et al. (2009), Esteves and Joseph (2008), UN (2008), Evans and Yen (2006), Jaeger (2005), Tan et al. (2005), Bhatnagar (2004), OECD (2003), Bannister (2002), Heeks (2001), Maio et al. (2000)	CARD, e-Procurement Exchange, FRIENDS, Lokvani
Decision support	Improved planning and decision-making	UNESCO, Andersen et al. (2010), Evans and Yen (2006), Bannister (2002)	BHOOMI, e-Procurement Exchange, GYANDOOT, KAVERI, Nagarpalika
	Better Monitoring and control	Andersen et al. (2010), Bhatnagar (2004)	BHOOMI, e-Procurement Exchange, KAVERI, Lokvani, Nagarpalika

Adapted from (Suri and Sushil 2012)

Table 2.3 One-way ANOVA (Performance X Actor Group)

PERF						
	Sum of squares	df	Mean square	F	Sig.	
Between groups	1.233	2	0.616	17.121	.000	
Within groups	10.045	279	0.036			
Total	11.278	281				

Table 2.4 Post hoc tests (Performance X Actor Group)

Multiple comparisons						
Dependent variable: PERF						
LSD						
(I) Group	(J) Group	Mean difference (I-J)	Std. error	Sig.	95 % confidence interval	
					Lower bound	Upper bound
Planner	Implementer	0.0993 ^a	0.03656	0.007	0.0273	0.1713
	Beneficiary	0.1914 ^a	0.03548	0.000	0.1216	0.2613
Implementer	Planner	-0.0993 ^a	0.03656	0.007	-0.1713	-0.0273
	Beneficiary	0.0921 ^a	0.02440	0.000	0.0441	0.1402
Beneficiary	Planner	-0.1914 ^a	0.03548	0.000	-0.2613	-0.1216
	Implementer	-0.0921 ^a	0.02440	0.000	-0.1402	-0.0441

^aThe mean difference is significant at the 0.05 level

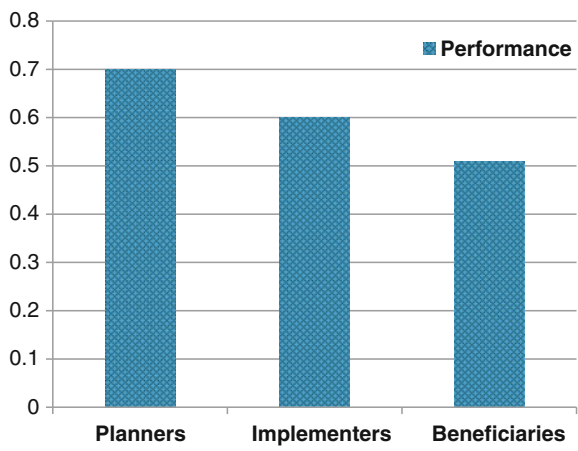


Fig. 2.1 Perceived e-governance performance (Macro-level)

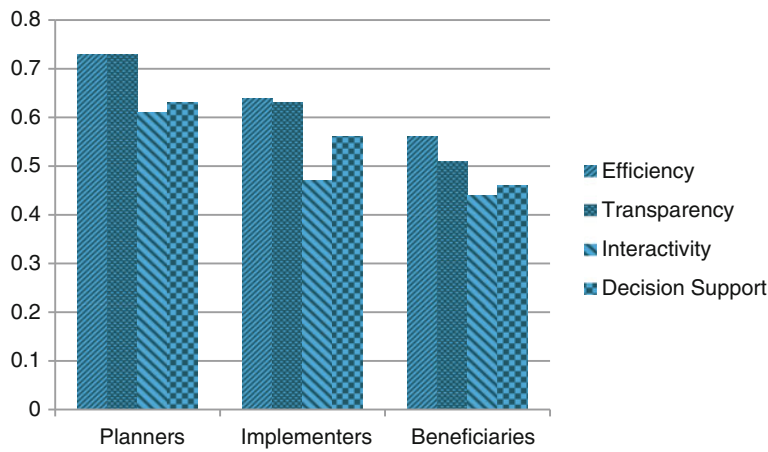


Fig. 2.2 Perceived e-governance performance (Micro-level)

The gaps in perceptions about e-governance performance clearly reflect better adoption of ICT facilities at the level of planners when compared with implementers. This suggests for strengthening infrastructure at the operational level and encouraging the officials involved in implementation to regularly upgrade their skills. Further, the services do not seem to be reaching the beneficiaries to the desired extent. The beneficiaries need to be sensitized about e-governance services with a focused approach. Access to services needs to be smoothened by creating multiple delivery channels suiting to the background and needs of the beneficiaries.

2.7 Concluding Remarks

The potential of e-governance for reforming governance system needs to be leveraged by various government organizations, particularly those belonging to the developing world. Keeping in view the past trend of dismal performance of e-governance projects, it is important to devise instruments to measure performance of projects which can be used by the practitioners for reviewing projects from this perspective. This chapter has brought out a performance measure which has been applied to analyse performance from the viewpoints of key actors types identified for the study. It has been found that there are perception gaps among providers and recipient of e-governance services. The next chapter would present a synthesized strategic framework for improving e-governance performance, followed by its implementation considerations. The framework is based on a synthesis of qualitative and quantitative analyses performed as part of the study.

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Chapter XX: Evaluation approaches to e-government applications

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Abstract

This paper goes back to the origins of e-government concept and its definition, characteristics and related issues. Then, putting the accent of IS evaluation stream, this paper provides a description of assessment approaches concerning e-government applications. Building on Prat *et al.* (2015) taxonomy of IS artifacts' evaluation, this paper explores e-government evaluation as it appears in recent publications in a leading journal in the field. The goal is to explore the specificities, if any, of e-government evaluation. This could be seen as a starting point for further research in this area.

1.1 E-government: from online service to government transformation

Electronic government (e-government in short) was introduced in the late 1990s. E-Government is habitually associated with policy choices and refers to the use of information and communication technologies (ICT) to transform relations with citizens and businesses, and to optimize the internal and external functioning of public sector organizations. ICT 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. E-government implementation efforts often started with basic information provisioning and evolved towards more integrated and joined up service offerings. One of the key issues in e-government is public service improvement. The public services offered are highly bureaucratic and siloed where the citizens have no choice of service provider, whereas e-government enables the creation of integrated online service delivery with one single point of interaction (Assar *et al.* 2010).

Literature related to ICT and government goes back to the 1970 (Grönlund and Horan, 2005) even if the first use of ICT in the public sector was during the US presidential campaign in 1954. The origin of the term e-government is correlated with the rise of e-commerce and e-business. Indeed, the first sense of e-government covers the adoption of different e-business applications in the public services sphere - such as online transactions, CRM, electronic marketplaces, e-auction, e-procurement and intranets/extranets (Grönlund and Horan, 2005).

All around the world, significant efforts and progress are made in online public service delivery (Assar *et al.* 2010; Boughzala *et al.* 2015). According to the UNPACS series of e-Government surveys¹, all countries around the world are continuously putting in place e-government initiatives and ICT applications for their citizens and companies to streamline governance systems and further enhance public sector efficiencies. Indeed, citizens and businesses are benefiting from better access to information and improved interactions with governments. Furthermore, governments and public organizations have undergone considerable transformations through ICT (as a strong enabler for change) or because of the rapid ICT development pressure and the context-awareness of Internet users. E-government initiatives were often accompanied by structural and process reorganizations and public agencies reform (Torres *et al.* 2005; Jansen and Lovdal, 2009). This is often denoted as the transformational phase of e-government. This phase involves re-engineering and e-enabling back office processes and information systems to enable more joined-up and citizen-centric e-government services. This phase focuses on cost savings and service improvement through back-office process and IS/IT change (Weerakkody and Dhillon, 2008). This requires a change of institution structures and various social, organizational and technological challenges at both governmental and individual citizen level (Gascó, 2003). It is the transformation of government to provide efficient, convenient and transparent services to the citizens and businesses through ICT. Multiple models have been proposed to describe e-government development stages; the model in Fig.1 is a synthesis of these models.

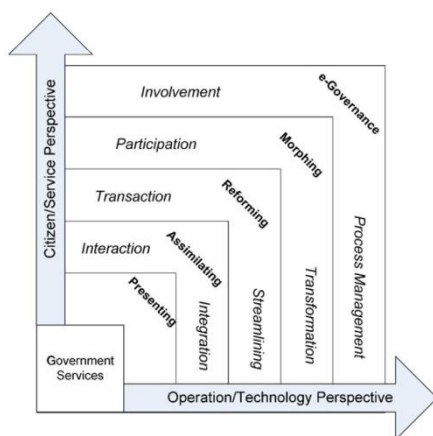


FIG. 1 – A reference frame for e-Government stage models [Source: (Lee 2010), p. 229].

1.2 Evaluation in the context of e-Government

E-Government systems differ from commercial information systems (IS) in that they frequently encompass strategic goals that go beyond efficiency and effectiveness, and include political and social goals such as trust in government, social inclusion, community regeneration, community well-being and sustainability (Grimsley and Meehan 2007). Accordingly, the evaluation of e-government applications is an essential issue and raises specific challenges. The dominant approaches to evaluation-led e-government design and management tend to mirror those of the private sector, focusing predominantly on the

¹ The UNPACS (UN Public Administration Country Studies) has compiled survey data since 2002 about e-Government development, available online at <https://publicadministration.un.org/egovkb/>, [Accessed 07/07/2016].

functional alignment with requirements and economic performance measures such as cost reduction, profit, return on investment and so on.

While such functional and economic measures are clearly important in the context of e-Government, they do not naturally support the attainment of the broader socioeconomic and socio-political goals that characterize so many e-Government projects.

For example, the United Nations UNPACS aforementioned reports rank e-government development in member states according to a quantitative composite index of e-readiness based initially on website assessment, telecommunication infrastructure, and human resource endowment (UN, 2005; UN, 2008; UN, 2010). In its 2010 edition, significant changes to the survey instrument were introduced, focusing more on how governments are using websites and Web portals to deliver public services and expand opportunities for citizens to participate in decision-making (UN, 2010). In the 2012 and 2014 editions, the UNPACS reports make an explicit focus on e-participation as an important indicator of e-government development. These apparent evolutions of e-government assessment indicators raise the following question: are there any specificities when e-government endeavors are evaluated, and if so, what are these specific features?

To explore this issue, we call upon a recent publication in which evaluation approaches are systematically characterized and classified. In Prat *et al.* 2015, the authors have conducted a systematic review of the literature to establish a holistic vision of information systems artifacts evaluation. The review targets exclusively papers published in the eight journals of the AIS basket. A total of 121 articles were selected and discussed. Using an iterative and incremental approach, the authors build a general taxonomy of IS artifact evaluation. An essential element of the analysis is the recognition of two meta-characteristics (i.e. facets, dimensions) for any assessment effort: the “what” and the “how”. The “what” pertains to the objects of evaluation, (aka *evaluands*) and the criteria for evaluating these objects. The “how” pertains to the manner, i.e. the scientific approach and the underlying process, by which the evaluation is conducted. The “how” meta-characteristic unfolds into five group of criteria, i.e. evaluation technique (e.g. observational, experimental), form of evaluation (e.g. quantitative, qualitative), secondary participants (e.g. students, practitioners), level of evaluation (e.g. abstract artifact, instantiation), and relativity of evaluation (e.g. relative, absolute). Concerning the “what” dimension, it unfolds into five main topics: goal, environment, structure, activity, and evolution. The full hierarchy of criteria is presented in Figure 2. An evaluation method is a unique combination of characteristics pertaining to the “what” and “why” dimensions. Accordingly, the authors identify seven most common evaluation styles: (1) demonstration, (2) simulation- and metric-based benchmarking of artifacts, (3) practice-based evaluation of effectiveness, (4) simulation- and metric-based absolute evaluation of artifacts, (5) practice-based evaluation of usefulness or ease of use, (6) laboratory, student-based evaluation of usefulness, and (7) algorithmic complexity analysis.

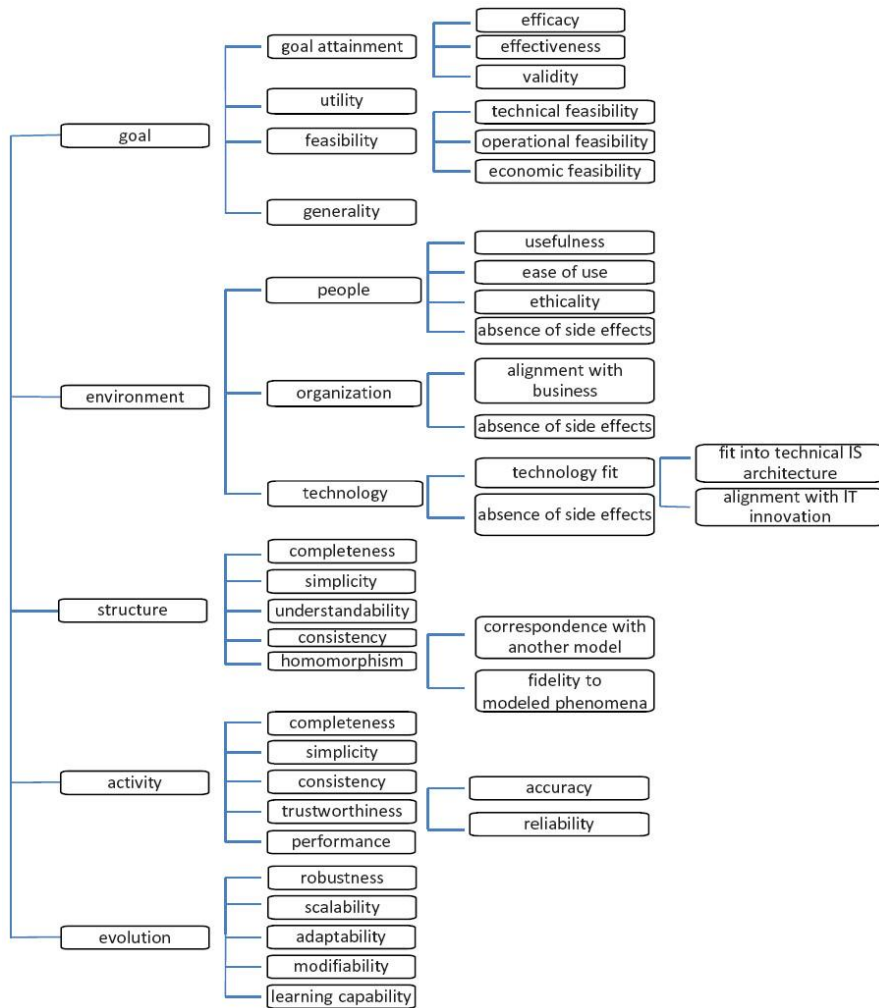


FIG. 2 – Taxonomy of evaluation criteria
 [Source: Prat *et al.* 2015, p. 258].

For the purpose of this study, we will focus on the “what” dimension. As mentioned above, e-government projects, in particular those pertaining to the G2C and G2B category, provide online services to citizens and companies on a much larger scale than any enterprise information systems. Moreover, the success of e-government is linked to other public management issues such as system interoperability, government reforms, and democratic practices enhancement. Thus, we intend to explore how e-government endeavors are evaluated and confront the findings with the Prat *et al.* taxonomy with a particular focus on the “what” dimension.

1.3 Exploring e-government evaluation

To explore e-government evaluation, we investigate how evaluation is conducted and discussed in the e-government literature. For this purpose, we select a small set of papers

that present significant evaluation endeavors from a well-known e-government publication, i.e. the *Government Information Quarterly* journal. In the first step, we selected all papers published in GIQ containing the term “evaluation” in their title; the result is a set of 15 articles. In the second step, we selected those papers that were published recently (2013-2015) and that seemed particularly relevant and representative of evaluation in e-government research. The results are four articles; their references appear in Appendix 1.

Each paper was first analyzed by the authors in relation to the question “how e-government is evaluated”. We seek to identify the variables that are measured and their theoretical background or justification (if any). Second, the outcome of the analysis is subsequently confronted with the evaluation taxonomy (cf. Fig. 1) to estimate the extent to which the identified variables fit with the taxonomy above. These results appear in Table 1.

1.4 Discussion

Through this small sample of papers, it can be seen that in early days of e-government prevailed a strong tendency to measure e-government development according to a “benchmarking vision”. The researcher in the e-government field impose a much precise definition which is rooted in IS evaluation theory, and that focuses on actual usage and end-user adoption. Thus, usability becomes an essential variable for measuring e-government success. Moreover, as usability determines usage and adoption, the success of e-government systems depends on how citizens perceive their value and how end-user usage translates into efficiency and effectiveness (Scott *et al.*, 2016). This is in line with the distinction that Misuraca *et al.* (2013) make between output and outcome, the latter being the final goal of e-government development.

1.5 Conclusion

Evaluation is an essential aspect in any artifact development, and in the case of e-government, it has tremendous importance as it is the basis for public policy definition and budget allocation. In this paper, we have discussed and explored e-government evaluation through the lens of a small sample of recent publications in a leading journal. While e-government evaluation was historically restrained to supplier-side measurements with a benchmarking focus, recent research is pointing towards of end-user usage and the importance of usability that, ultimately, determines efficiency and effectiveness. Moreover, the measurement items that are mentioned in the studied sample can be identified in the IS artifacts evaluation taxonomy from Prat *et al.* (2015). We note indeed that e-government impact is directly related to the “Goal attainment” item in the taxonomy.

TAB 1 – *Analysis and commentaries on the selected papers.*

Paper	Analysis	Commentary
Misuraca et al. (2013)	Building on the authors' extensive experience in e-government evaluation, e.g. Codagnone and Undheim (2008), the paper criticizes the general tendency to measure e-government development in terms of supply-side benchmarking, i.e. quantitative measures of infrastructure availability (e.g. broadband internet), service provision (e.g. online passport delivery), and financial results (i.e. cost reduction). They focus instead on <i>causal relationships</i> between infrastructure, service delivery and the extent to which they are used, adopted and have an effect on public service efficiency. Thus, they define a framework that distinguishes <i>output</i> (i.e. supplier side) from <i>outcomes and impacts</i> (i.e. public service qualitative enhancement).	The idea behind the authors' framework can be easily linked to the <i>Goal /Goal attainment</i> and <i>Environment/People/Usefulness</i> criteria categories in the evaluation taxonomy (cf. Fig. 1). Indeed, e-government development has to be correlated with public service enhancement, end-user adoption, and governmental efficiency improvement.
de Róiste (2013).	Using a similar point of view, the author criticizes benchmarking-based approaches to e-government evaluation and proposes to measure <i>usability</i> of online public service. Relying on computer-science literature for its definition, usability is measured with a user survey.	Although it isn't explicitly mentioned, usability can be associated with the <i>Structure</i> category and the criteria's <i>Simplicity</i> and <i>Understandability</i> (cf. Fig. 1).
Venkatesh et al. (2014)	Similarly, this paper considers that usability is an essential attribute of an online public service. Website usability is defined as " <i>the extent to which a website can be used by citizens to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified e-government service context</i> " (p. 670). Applied on the healthcare.gov website, they found that usability strongly predicted website citizen satisfaction and the intention to use it.	Even if the usability concept is considered in a similar fashion as in the previous paper (de Róiste, 2013) and, thus, associates with the <i>Structure</i> category, it is considered here as a determinant of user <i>satisfaction</i> . Satisfaction is to be categorized in the <i>People</i> category (cf. Fig. 1).
Sivarajah et al. (2015)	This paper focuses on Web 2.0 technologies. Building on the literature, the authors define a framework for Web 2.0 assessment comprising an <i>evaluation</i> facet articulated in three dimensions: <i>benefices, costs</i> and <i>risks</i> , and an <i>impact</i> facet articulated in three other aspects: <i>organizational, technological</i> , and <i>social</i> . The framework is used in an interview-based evaluation of Web 2.0 initiatives in a local government in the UK.	The framework is complex, and its variables span multiple items from the taxonomy. Focusing on the <i>impact</i> facet, the variables can be associated with many categories e.g. <i>Goal/utility, Goal /Goal attainment</i> , and <i>Environment/People/Usefulness</i> .

1.6 Appendix 1: Papers selected for review (*Government Information Quarterly*, 2013-2016)

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SIVARAJAH, U., IRANI, Z., WEERAKKODY, V., 2015. Evaluating the use and impact of Web 2.0 technologies in local government. *Government Information Quarterly*, 32(4), 473–487.

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SCOTT, M., DELONE, W., GOLDEN, W., 2015. Measuring eGovernment success: a public value approach. *European Journal of IS (EJIS)*, 25(3), 187–208.

TORRES, L., PINA, V., ROYO, S., 2005. E-government and the transformation of public administrations in EU countries: Beyond NPM or just a second wave of reforms? *Online Information Review*, 29(5), 531-553.

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Chapter 1

Evaluating E-Government

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ABSTRACT

Over the past few years, e-government growth has resulted in the development of many state and local e-government initiatives in both developing and industrialised countries. In most cases, e-government programs incorporate the implementation and operation of Web portals and Websites, putting information online, transforming processes to Web-based transactions, interacting with citizens and companies. While e-government Websites are evolving, evaluation and effectiveness assessments are emerging processes in order to optimise digital services and enhance the engagement of citizens and companies to government administrative processes for their own benefit. So far, many different measures of governmental Website effectiveness have been developed to address strategic, marketing, and design issues. This chapter aims to provide an insight on the theory and application of evaluation and effectiveness approaches with regards to Web portals and Websites implemented to operate under central or local government authorities. Both quantitative and qualitative aspects are analysed, addressing operational and functional tactics.

INTRODUCTION

E-Government is the use of Information and Communication Technology (ICT) and particularly Internet-based and web-based telecommunication practices to facilitate connections within and between the authorities and agencies of the Public Sector and also deliver government critical information and digital services to both citizens and companies. Various e-Government business models have been implemented and matured to enhance the efficiency of public sector organisational processes by supporting transactions between the employees in government agencies and also

transactions with private individuals, businesses and other stakeholders in the e-government environment.

So far, e-government web sites remain the main critical information resource and service delivery medium. Because of the diversity and range of e-government web sites, a typology of them is required to address issues with regards to business models' analysis, strategic design, management and evolution. With most e-government projects in the maturity phase of their life cycle, effectiveness assessment is becoming vital for the optimisation of their performance. Particularly in the e-government area, evaluation and effective-

ness measures of public sector web portals and sites are both quantitative and qualitative. While quantitative measures examine the level of adoption and impact of the web sites in question with the use of e-metrics and user-satisfaction indices, qualitative measures have a different dual purpose: firstly, to investigate and assess the government web sites performance in terms of functionality and usability and secondly to identify information and system qualitative factors in evaluating e-services delivered by the web sites in question.

The European Commission of the European Union and the U.S.A E-Government Resource Centre have provided guidelines and standards for effective federal, state and local government web sites addressing analysis, design and evaluation issues. However, in many cases governmental web portals and sites have failed to meet their objectives. In this context, the implementation of evaluation frameworks is vital as it will contribute to the identification of the key performance factors and indicators for better and further e-government development.

It is a common belief among academics and practitioners that e-government is now growing in a fast manner. Government web sites are transforming, from basic online presence providing mainly information and a medium level of interactivity to fully transactional channels. Meanwhile, Web 2.0 government has strengthened the relationship between governments and the citizens or companies. For public and government administration authorities that have already stepped in the digital era proving information, communication and services through the operation web portals and web sites, web site evaluation should be a continuous process to achieve efficiency of their performance.

DEFINING E-GOVERNMENT

What is E-Government

The e-government idea was introduced by a former U.S vice president and includes two concepts: firstly the governments' obligation to provide a link to citizens for getting services from various government agencies in an automatic way and secondly the governments' need to reduce cost and improve performance with the use of information and communication networks among its authorities (Almarabeh & AbuAli, 2010). Despite its short history (e-government emerged in the late 90's), the e-government concept has been well defined by academics and researchers. Different definitions of e-government focus on different elements and dimensions of government or governance emphasizing on its strategic role. However, in most definitions, the use of Information and Communication Technology (ICT) is described as the key enabler for all e-government projects.

It is clear, that each definition describes the environment formed in that particular period of time by the advances and applications of ICT and the e-government initiatives in progress. Table 1 includes definitions to capture the evolution of e-government over the past ten years.

Bannister's (2007) definition of e-government as the "delivery of government services over the internet in general and the Web in particular" describes best the e-government evolution with most e-government projects implementing and supporting web-based applications through the development and exploitation of public portals and web sites. As ICT advances, e-government portals and web sites are becoming more complex in architecture and structure supporting multiple business models.

Table 1. E-government definitions

Year	Definition	Author
2000	E-government is the continuous optimization of service delivery, constituency participation and governance by transforming internal and external relationships through technology, the Internet and new media.	Gartner Group (Baum & Di Maio)
2001	A government's use of technology, such as the Internet, to aid the delivery of information and services to citizens, employees, business partners, other agencies and other government entities.	Layne & Lee
2004	The use of ICT in public administrations combined with organisational change and new skills in order to improve public services, democratic processes and strengthen support to the public policies.	European Information Society
2004	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.	World Bank
2007	electronic Government' (or in short 'e-Government') essentially refers to 'The utilization of Information Technology (IT), Information and Communication Technologies (ICTs), and other web-based telecommunication technologies to improve and/or enhance on the efficiency and effectiveness of service delivery in the public sector.	Jeong
2011	E-government refers to the use of information and communication technologies (ICT) - such as Wide Area Networks, the Internet, and mobile computing - by government agencies.	The United Nations

E-Government Business and Service Delivery Models

The scientific field of e-government is almost 20 years old with official governmental web sites first appearing in the mid 1990's (Coursey & Norris, 2008). However, several business models were formed and analysed in literature. An e-government business model identifies the key stakeholders in the e-government environment and their interrelationships and specifies the key business processes that represent the integration of governmental information and services.

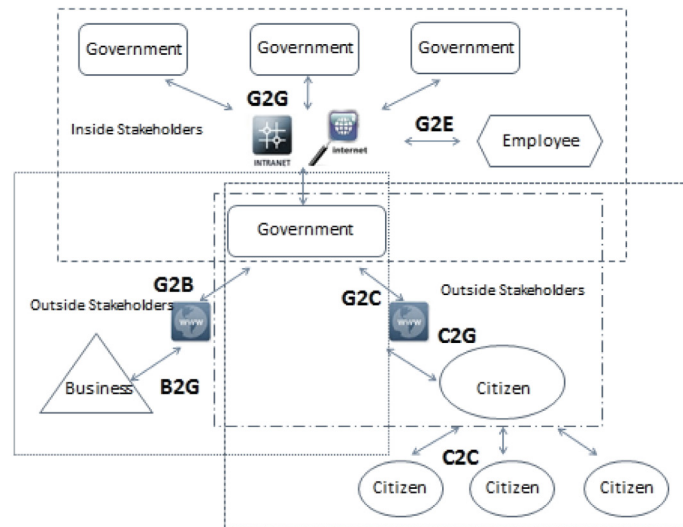
Figure 1 presents the main business models of e-government with regards to outside and inside the government stakeholders based on the academic literature (Holmes, 2001; Fang, 2002; Beyon - Davies, 2007; Palvia & Shalma, 2007; Albarabeh et al, 2010):

- G2G (Government to Government) refers to ICT applications (information systems, intranets, data & communication networks, Internet services) providing a common communication and information exchange

base to accomplish and optimise coordination and cooperation between local, departmental and national authorities

- G2E (Government to Employee) is the employment of basically information and other back office systems to support the main stakeholder of internal governmental body, the employee
- G2B (Government to Business) describes all online interactions and transactions between the government agencies and private sector companies. Two of its main forms are e-procurement and auctioning of government oversupplies
- B2G (Business to Government) refers to public sector businesses selling services and products to government agencies with the use of Internet and ICTs
- G2C (Government to Citizen) remains the business model of most e-government initiatives in which the government provides online access to information and digital services to its main outside stakeholders (the citizen)

Figure1. E-government business models



- C2G (Citizen to Government) refers to the two –way communication activities which allows citizens to interact online with their government requesting answers and solutions or providing feedback with regards to the government agencies' performance
- C2C (Citizen to Citizen) describes a future perspective of e-government with citizens interacting with each other forming an on-line community to address governmental issues

In recent times, web based software platforms such as public portals, web sites and digital services remain a common place for the implementation of e-government policies with outside stakeholders. The establishment of local, regional and national web sites is the main outlet to integrate G2B and G2C activities. Companies and citizens interacting with government web sites have convenient access to textual and multimedia information and digital services outside of office hours avoiding long waits in queues to have a face to face meeting with civil servants (Fairweather & Rogerson, 2006). In addition, C2C interactions as a result of

the e-government evolution require more advanced web based applications to enable the citizens' e-participation and therefore support consultative and participatory activities (Reddick, 2011).

E-Government and E-Commerce: Similarities and Differences

E-commerce and e-government are subsets of e-business adopting technological innovations to transform their internal and external relations for their own and their stakeholders benefit. E-commerce proceeds e-government and this is why early e-government initiatives have adopted concepts, technologies and processes already applied online in the private sector. Therefore, the comparison between e-government and e-commerce could be considered justified and constructive uncovering the deficiencies and benefits of the two concepts correlation in theory and practice.

Similar to e-commerce companies that use ICT to conduct business with other companies (B2B), engage customers (B2C) and support the work of their employees (B2E), organisations with e-government activities enable the optimisation of

interagency coordination and cooperation (G2G), improve communication and transactions with citizens (G2C) or organizations (G2B) and provide public servants with the appropriate technical tools to increase their productivity (G2E) (Fang, 2002; Scholl et al, 2010) (Figure2).

It is evident that e-government business models have been influenced by commercial business models on the Internet as they share the same social and technological environment (Carter & Belanger, 2004). However, the drivers and priorities of e-government affected by its political concept formed different to commercial online relationships (Warkentin, 2002).

Comparative analyses between e-commerce and e-government outlets are limited in literature review. Table 2 summarises differences and similarities of the two concepts identified in previous research (Jorgenson & Cable, 2002; AL-Shehry et al, 2006; Stahl, 2008; Scholl et al, 2009).

On the other hand, many state that a comparison between e-commerce and e-government web sites is irrelevant since payment transaction is the main interaction format of commercial web-sites. In addition, the political nature of e-government policies is also an important distinguishing factor between commercial and government web sites (Warkentin et al, 2002). In this context, Morgeson III and Mithas (2009) per-

formed a comparative analysis between e-government and e-business web sites (the main objective of these sites is the dissemination of information similar to e-government web sites). Outcomes of their research support the idea that e-government can learn from the private sector but should take under consideration the differences of their target group's needs and expectations.

E-Government Web Sites Typology

So far, in the area of e-government there is not an accepted government web site classification or typology. This is due to the diversity in scope and range of the implemented e-government projects. However, a categorisation of government portals and web sites is necessary in order to understand their strategic and organisational objectives.

Two criteria are used to classify current e-government web sites (Figure 3):

- Level of e-government: based on this criterion, government web sites could be local, state/provincial, regional, national or international (Albarabeh and Abuali, 2010).
- Level of growth (maturity)/service development: A lot of growth and maturity models were implemented to conceptualise the steps or stages of the government

Figure 2. E-Commerce and e-government business models

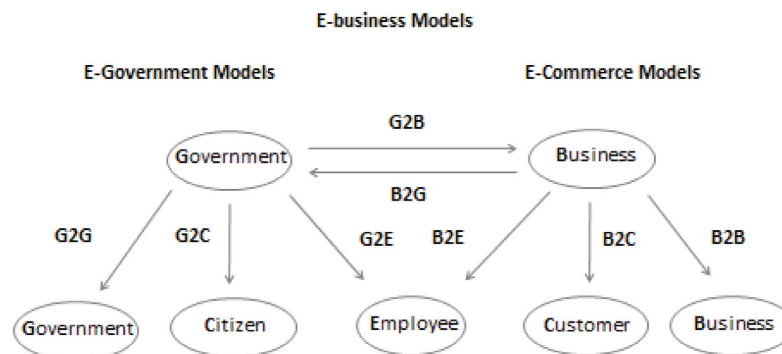
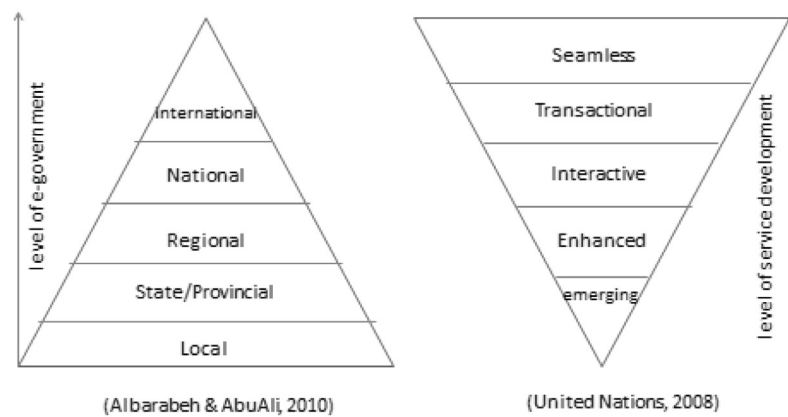


Table 2. Similarities and differences between e-commerce and e-government

Elements of Comparison	E-Commerce	E-Government	Similar	Different
Motivation	Make profit	Maximise social utility, create e-participation		<i>a</i>
	Cost reduction of service delivery	Cost reduction of service delivery	<i>a</i>	
	Automation of internal processes	Automation of internal processes	<i>a</i>	
Objectives	Sale of products and services	Optimisation of service quality to citizens		<i>a</i>
	Information provision	Information provision	<i>a</i>	
	Online Customer service	Online services to citizens		<i>a</i>
Priority	Safe & secure transactions	Minimise digital divide		<i>a</i>
Technology	Internet, Web Based Platforms, Back Office Systems	Internet, Web based platforms, back office systems	<i>a</i>	
Decision Making Authority	Centralised	Dispersion of authority		<i>a</i>
Target Group	customers, potential customers	Any Citizen		<i>a</i>
Legislation	Freedom	laws and regulations restrictions and complexity		<i>a</i>
Services	Primarily transactional	Primarily informational		<i>a</i>

Figure 3. E-government websites typology



web sites implementation. One of the first classification of e-government development, commonly referred to in many relative studies was introduced by Layne and Lee (2001), identifying four stages of development, 1) cataloguing (information on site are presented in a catalogue mode, 2) transaction (site uses database systems to

enable transactions, 3) vertical integration (local systems are linked to higher lever ones) 4) horizontal integration (an interconnection between systems across sever government agencies is accomplished). In the same context, the United Nations (2002) identified five classes of government web sites based on the service devel-

opment 1)emerging (simple online presence), 2)enhanced (information on the web site becomes more dynamic) 3) interactive (the web site enable two-way interactive communication through the web site) 4) transactional (several transactions are conducted) 4) seamless (the site provides fully integrated digital services).

Based on the above classification, a local site (i.e. a Municipality's web site) could be a transactional web site, whereas a national site (i.e. a Ministry's portal) could be an enhanced site because of the differences in the organisational objectives or the differences in the technological requirements with regards to the services provided by the government authorities.

EVALUATING E-GOVERNMENT WEB SITES

Web site evaluation refers to the assessment of a web site's performance towards specific criteria. The importance of e-government web sites' evaluation due to the vast investments of countries and agencies and the raised requirements and expectations of citizens for better online services, resulted in a variety of models, methods and practices. With e-government web sites including a wide range of materials from simple information publications to databases and digital services available online, the evaluation of governmental Internet performance has become a complex and demanding process, yet vital (Gupta & Jana, 2003).

Despite the importance of the evaluation procedure and the attention given by academics and practitioners, the evaluation of e-government initiatives is considered to be immature with reference to management and development tools (Alshawhi et al, 2007). In addition, because of the diversity in design and implementation of the e-government web-based projects (Middleton, 2007), it is difficult to summarise the different

perspectives and methodologies developed by academics and practitioners with regards to their measurement and assessment.

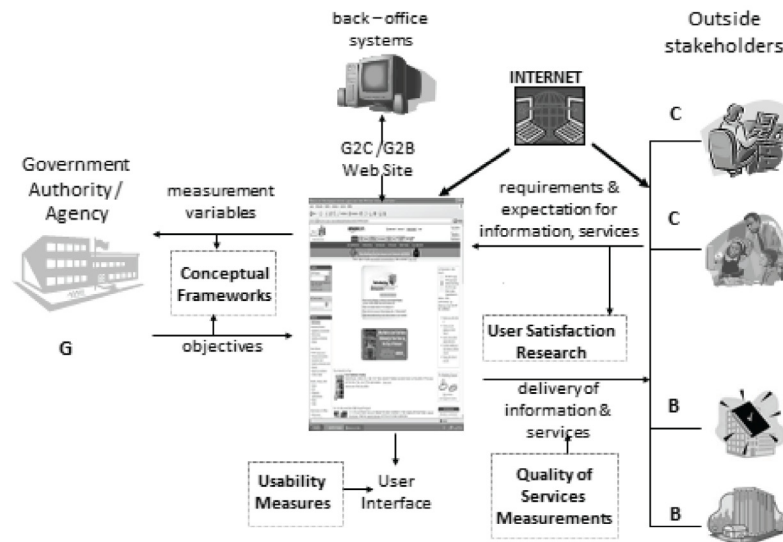
This sections attempts to categorise both quantitative and qualitative methodologies of governmental web sites' evaluation. The concept of G2C and G2B web sites as web-based information systems is adopted in order to present the different dimensions and aspects of their evaluation. Figure 4, illustrates the identified approaches of e-government web sites' evaluation towards the basic elements and aspects of an integrated web-based information system delivering information and services to both business and citizens. In that context, governmental web site evaluation and effectiveness measurements attempt to investigate and assess its performance towards the strategic and organisation objectives of the government authority or agency operating the web site and the end users' needs and requirements using the web site, in that case the outside stakeholders (citizens and business interacting with the web site).

Specifically based on a literature review, the following approaches and methodologies were identified:

- Conceptual evaluation frameworks' implementation which identify the effectiveness variables towards the web site's objectives.
- Usability measurements to examine the user interface effectiveness.
- E-services' qualitative measurements to assess the web site's performance towards the delivery of digital services.
- User-satisfaction models to measure up the overall positive or negative web site's impact to its end users.

The evaluation measurement of e-government web sites will provide meaningful feedback to improve design, content and management features. The selection of the appropriate evaluation methods could create a scientific basis for governmental administration decisions (Luo & Shi, 2010). Both

Figure 4. Evaluation approaches of e-government web sites



subjective perceptions of the end users and web site consumers and measures based on objective criteria are necessary to complete an overall analysis of the web site's performance (Morgeson III & Mithas, 2009).

Conceptual Evaluation Frameworks

Conceptual frameworks in web site evaluation research identify the quality factors and their interrelationships in order to investigate their importance in terms of efficiency and effectiveness. With Regards to e-government, several evaluation frameworks have been implemented and tested by academics.

Table 3 presents some of the related research presenting the criteria examined and the methodologies used for their implementation or empirical testing.

An analysis of the conceptual evaluation frameworks reveals that there is no identification or consistency with regards to their theoretical approach or the methodologies of assessment. Each evaluation framework focuses on different aspects and elements of e-government web sites' development and operation.

An early attempt to address the e-government evaluation in terms of citizens' adoption by Carter and Belanger (2004) was based on constructs established in the area B2C e-commerce like Technology Acceptance Model (TAM) and Diffusion of Innovation Theory (DOI), but also introduced the perception of trustworthiness to encompass the trust to Government dimension.

It is evident that many e-government evaluation studies are influenced by research in the area of Information Systems (IS) conceptualising e-government web sites as integrated information systems delivering services to different stakeholders in a complicated social and technical context. This approach led to the study and analysis of qualitative factors closely related to the IS theory like information, system and service quality (Wang et al, 2008) and the analysis of qualitative variables to address the social and financial aspects of the e-government environment (Alshawi, 2007).

Other approaches focus on the specific characteristics of the web site as the main medium to deliver information and services to citizens. Wang et al (2005) incorporated to their evaluation framework web site features based on the main citizens' activities on government web sites,

Table 3. Conceptual evaluation frameworks for e-government web sites

Authors	Concept	Evaluation Criteria	Methodologies
Carter and Belanger, 2004	Provide a framework from the integration of constructs from the technology acceptance model (TAM), diffusions of innovation theory (DOI) and Web trust model to investigate the adoption of e-government initiatives by the citizens.	<ul style="list-style-type: none"> • DOI (compatibility, relative advantage, image, complexity.) • TAM (perceived ease of use, perceived usefulness.) • Trustworthiness (trust of Internet, trust of Government.) 	Data collected from users.
Wang et al, 2005	Web site evaluation is based on the transaction between the individual & the web site.	Three clusters of variables: <ul style="list-style-type: none"> • Site characteristic. • Task characteristics. • Individual characteristics. 	Case Study (web site development.)
Eschenfelder & Miller, 2005	Openness of e-government portals should be evaluated in a social-technical context.	<ul style="list-style-type: none"> • Internal website/information characteristics. • Elements to capture the social and political context of the information. • Assumptions about the roles of citizens and government information. 	Comparative Case study of U.S state web sites.
Melitski et al, 2005	Provide an evaluation framework to be applied national and international e-government web sites.	<ul style="list-style-type: none"> • Security & privacy. • Usability. • Content. • Services. • Citizen participation. 	Applied to several e-government web sites.
Alshawi et al, 2007	Identify evaluating factors that influence citizens' utilisation of e-government web sites.	<ul style="list-style-type: none"> • Technical issues (performance, accessibility.) • Economical issues (cost saving.) • Social issues (openness, trust, perceived ease of use and perceived usefulness. 	Literature analysis
Liu et al, 2008	Provide Key Performance Indicators for different e-government stakeholders.	Value Categories: <ul style="list-style-type: none"> • Strategic. • Operational. • Social. • Financial. 	Comparative analysis of previous public value frameworks and Case Study.
Wang and Liao, 2008	An adaption of an IS success model in the e-government context.	<ul style="list-style-type: none"> • Information quality. • System quality. • Service quality. • Use. • User satisfaction. • Perceived net benefit. 	Data collected from users.

while Eschenfelder and Miller (2005) introduced objective and subjective measures of the web site and its information to assess the openness of government web sites and portals. In the same concept, Melitski et al (2005) proposed factors that influence the quality of government web sites approach in a five-step framework addressing usability, security, content, services and citizens participation issues.

Liu et al, (Liu, Derzsi, Raus & Kipp, 2008) were the first to provide Key Performance Area and Key Performance Indicators for government projects. Their work based on a comparative analysis of previous value framework was empirical tested and provided four value categories to assess the success of governmental web sites with reference to their strategic role and objectives addressing financial and social implications of their environment.

On the whole, despite the limited and in some ways unclear conceptual e-government evaluation research, the proposed frameworks introduced several key variables focusing on different aspects and perspectives, providing guidance for the development of both qualitative and quantitative evaluation indices.

Usability Measures

Web usability measures examine how useful, user-friendly and accessible is a web site with respect to the needs and expectations of its target audience. Simple, clear and consistent web site design enables users to perform their tasks and activities effortlessly during their navigation (Cappel & Juan, 2007). Nielsen (2000) created the acronym HOME (High quality – Often updated – Minimum Download time – Ease of use) to introduce the basic principles of usability that enhances the loyalty of a web site's users. Also, the International ISO/IEC standard 9241-11 identifies three main attributes to define usability:

- Effectiveness
- Efficiency
- Satisfaction

These attributes are further analysed to create specific usability metrics. Different approaches led to different sub criteria. Usability metrics are quality components that assess the site's effectiveness and efficiency in terms of information transparency, interactivity, design layout, aesthetics, accessibility, transactions (Casalo et al, 2005).

Kappel et al (Kappel, Proll, Reiche & Retschitzegger) categorize usability measures in two classes:

- User-based methods (i.e. user testing) are based in the involvement and participation of end users in the evaluation process.
- Expert methods (i.e. heuristics evaluation) which require the experience of experts.

Usability measures apply to both commercial and government web portals and sites and in most cases combine both classes of measures (Wood, 2003). Specifically, for e-government projects, usability evaluation is of great significance due to the heterogeneous Internet skills and the nature and the variety of the information and the digital services delivered through the web site (Huang & Brooks, 2011). Good usability enhances user satisfaction and improves users' trust in e-government (Youngblood & Mackiewicz, 2012).

There are several usability evaluation measures of e-government web sites and portals. Different approaches identify and examine different usability attributes and criteria. The following table presents related usability studies (Table 4).

In most usability measures, the main evaluation criteria are further analysed to specific guidelines with the use of usability heuristics which are either used by experts to perform an overall investigation of the web site or transformed to tasks or typical scenarios executed by end-users (user testing) (Huang, 2003; Huang & Brooks, 2011; Youngblood & Mackiewicz, 2012).

A significant subarea of usability measures is accessibility (Brajnik, 2000) which "means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web" (World Wide Web Consortium). Especially for government web sites, accessibility is a quality component that should be considered as a requirement by ethics or in some countries by law and not an option like in commercial web sites. For government organisations operating web sites it is essential to provide equal opportunities to all citizens obtaining information. Therefore, a lot of research in e-government evaluation has been focused on the accessibility aspect applying specific guidelines produced by the World Wide Web Consortium (W3C) (Huang, 2003; Abanumy, 2005; Baowaly et al, 2012). WCAG 1.0 is an internationally accepted standard including a set of 14 guidelines. Accessibility evaluations are conducted with the

Table 4. Usability studies for e-government web sites

Authors	Criteria / Guidelines	Evaluation object	methodology
Katre & Gupta, 2011	<ul style="list-style-type: none"> • Accessibility • Navigation • Visual Design • Information Content • Branding • Interactivity • Ownership 	State Government Web Portals	Expert method
Asiimwe & Lim, 2010	<ul style="list-style-type: none"> • Design Layout • Navigation • Legal Policies 	Ministries' Web sites	Expert method
Soufi & Maguire, 2007	<ul style="list-style-type: none"> • Information Architecture • Page Layout • Design • Accessibility 	Local Government Web sites	User based method
Baker, 2009	<ul style="list-style-type: none"> • Information Architecture • User Help • Legitimacy • Navigation • Accessibility accommodations • Online services 		Content analysis

help of expert evaluators, the participation of humans with disabilities or the use of specific software tools and automated systems (Abanumy, 2005; Youngblood & Mackiewicz, 2012).

Scott (2005) identifies usability as one of the basic components that enhance the quality and ease of use of government web sites. Usability measures should be a continuous process in order to identify mistakes in design and improve user interface. Site's usability could influence the adoption and engagement of citizens to government web sites and services. Government organisation operating web sites should invest time and money to improve their usefulness and quality.

Quality Evaluation of E-Government Digital Services

E-services in government web sites can be defined as the electronic delivery of information and services. Specifically, services through government web sites describe the provision of information, interactive communication and transactions Ser-

vice quality has been well researched in the private sector and several models have been implemented to address the issue of service quality measurement. Research in the public sector has been clearly affected by the conceptual approaches in the private sector, but the "multiplicity" of the objectives and drivers of e-government organisations requires the investigation of different dimensions (Buckley, 2003).

Based on literature review, qualitative measures of e-government services can be categorised in two classes:

- The investigation of various qualitative variables that influence the efficiency and effectiveness of the provided services in terms of information, communication and transaction.
- The development of customer satisfaction models which measure the perceived quality of services towards the users' expectations.

E-Services Quality Evaluation

E-government services evaluation is based on the identification and testing of quality variables. Kašubienė and Vanagas (2007) classified the various quality criteria for e-services systems into three groups in order to point out the impact of related research in the private sector to the e-government area:

- Criteria related to web sites (i.e. use, content, structure, complexity.)
- Criteria related to features of traditional services (i.e. reliability, credibility, access, ease of use, security.)
- Mixed criteria systems (i.e. web interaction, web interface, aesthetics.)

Also, with respect to e-government, they also divided e-service quality into information quality and process quality taking into account the different stages of e-government systems' maturity. On the whole, models in this class focuses on three core quality features information quality, process quality and service quality based on the main activities of citizens within the government web sites which is obtaining information, interact and proceed to transactions.

Research in this area led to the implementation of several frameworks with reference to models already introduced in the e-commerce area. Parasuraman (1988, 1991) theoretical model SERVQUAL on traditional services was a great contribution to the development of e-government service quality models. In this context, Viscusi (2009) introduced eGovQual which incorporates organisational, technical, social and juridical perspectives to address issues like the diversity of the e-government stakeholders. Wang and Liao (2008) proposed an IS success model in the e-government context identifying information quality, system quality, service quality, use, user satisfaction and perceived net benefit as significant quality dimensions.

Papadomichelaki et al (2006) propose four key quality dimensions for e-government service quality evaluation:

- The service key area to assess the web sites ability to deliver services accurately, consistently and in time and facilitate interaction between the sites' stakeholders.
- The content key area which involves quality dimensions relative to information and presentation aspects.
- The system key area which includes quality variables availability, accessibility, system integrity, performance, reliability, interoperability, regulatory and security.
- The organisation key area to address organisational perspectives.

E-service quality in e-government has recently begun to receive increasing attention because of the significant progress made in the development and implementation of digital services in government portal and web sites. The huge amounts invested in e-government projects and the uniqueness of the services provided by local, regional and national government web sites by citizens raises the importance of the theoretical grounding and the empirical research of e-government service quality.

User Satisfaction Models

User satisfaction Index methodologies attempt to quantify qualitative variables. Specifically, quality dimensions of satisfaction are identified, weighted with regards to their impact on the overall satisfaction and produce a final result – index. Data from users are required to select the variables and investigate their relationship to the overall consumer satisfaction. User satisfaction models are cause-and-effect models which enable to predict the effects of web sites' changes and enhancements to the overall satisfaction (Papa-

domichelaki, 2006) and project future behaviour based on satisfaction.

Such methodologies are commonly and widely used in the e-commerce area. In the e-government research field, user/citizen satisfaction indices have been developed and used in comparative analyses and benchmarking researches to measure the impact of e-government web sites. According to Halaris et al (2007) customer satisfaction index ‘is affected both from perceived by citizens quality and from their expectations about the service’.

The American Satisfaction Index (ACSI) is a leading and well established customer satisfaction model to evaluate both traditional and online services. It was developed by the National Quality Research Centre and has served as basis for the development of customer satisfaction index models in other countries. It is composed of six factors: perceived quality, customer expectations, perceived value, overall customer satisfaction, customer complaints, and customer loyalty. More than 90 U.S. government web sites are evaluated and rated quarterly by the ACSI. Results of each survey are announced to the public including information on the top rated e-government web sites, an overall satisfaction rate with e-government services, suggestions on priorities to improve government web sites and comparative analysis between satisfaction for the private and public sector. The European Consumer Satisfaction Index (EUSI) is another variation of the ACSI than can be applied to companies in several industries and public organisations as well.

Halaris et al (2007) identifies the following principles/criteria of customer satisfaction models:

- Service reliability
- Personalisation
- Navigation/accessibility
- Information/content
- Customer service

Customer satisfaction index could be a significant evaluation tool for countries to assess the efficiency and effectiveness of the implemented e-government web sites and portal. Improvements on measurement methodologies are necessary (Abdelgawad and Snaprud, 2011). The quantitative satisfaction metrics provide insight on the citizens’ perceptions towards specific quality dimensions of government e-services and identifies usability, functional or organisational problems and suggest improvements in this area. In an ideal world each government would implement a national customer satisfaction model to address the special characteristics of e-government services consumers.

DESIGN AND EVALUATION GUIDELINES AND STANDARDS BY THE U.S.A GOVERNMENT, THE EUROPEAN UNION AND THE UNITED NATIONS ORGANISATION

Due to the advanced progress and significance of e-government, evaluation procedures take place in national and international level. Several assessment models were implemented to enhance current e-government initiatives and provide design guidelines for future e-government projects.

E-government Act of 2002 was the first attempt to provide an e-government framework at a national level by the government of the U.S.A. Its objective was “to enhance the management and promotion of electronic Government services and processes by establishing a Federal Chief Information Officer within the Office of Management and Budget, and by establishing a broad framework of measures that require using Internet-based information technology to enhance citizen access to Government information and services, and for other purposes” (U.S. Government Printing Office). Under this act federal agencies were obligated to utilise Internet in order to provide

access to information and services to the public. In addition, standards were established to organise, preserve government information and make it accessible to citizens through federal web portals. E-government Act of 2002, remains a prototype of an e-government framework and was used as a basis for other similar models by other countries or international organisations.

The United Nations (<http://unpan3.un.org>) introduced a comparative e-government evaluation framework to support sustainable e-government development and also monitor the progress of current e-government initiatives. The United Nations annual global survey report presents “a systematic evaluation of the use and potential of ICT to transform the public sector by enhancing efficiency, effectiveness, transparency, accountability, access to public services and citizen participation in the all Member States of the United Nations, and at all levels of development” (The United Nations, 2013). The main features reviewed by The United Nations survey are information dissemination/outreach, access/usability, service delivery capability, citizen participation/interconnectedness. Some of the evaluation indices adopted in The United Nations assessment model measure e-government readiness, e-service delivery, telecommunication infrastructure index, e-participation indices. The United Nations vision for e-government is Connected Governance which will enhance public administration efficiency and public service delivery.

Similarly, the European Union and specifically the European Commission investigates the progress of e-government initiatives in the European Countries. Multiple surveys with the use of benchmarking methodologies are conducted to provide an insight on the development and use of ICT for interacting with public administrations in the European Union. Currently, the i2010 framework which follows previous action plans of the European Union (e-Europe 2003 and e-Europe 2005) sets three political priorities for e-government:

- To facilitate citizens and businesses mobility in the single market.
- Create a legitimate eUnion and gaining high trust.
- Reduce administrative costs for citizens and business.

Some of the indices introduced by this new framework are developments of broadband, advanced services, security, impact and investment in ICT research (Fitsilis et al, 2010). The European Union announced already the new European e-government action plan 2011-2015 (ec.europa.eu). The objective of this new action plan is to provide guidelines for more flexible, open and cooperative e-government services and at the same time increase the use of e-government services by 50% on households and 80% on businesses by the year 2015.

Over the last years, the United Nations and the European Commission evaluation frameworks provide suggestions for improvements in designing web-based government services and present case studies of successful e-government strategies.

CONCLUSION

E-government progresses vastly in many countries. Web portals and web sites remain the main and most significant component of e-government construction. Enormous amounts of money are invested for their implementation by local, regional and national agencies and authorities. In most cases, governmental web sites integrate G2C and G2B policies. With their development being a continuous process, evaluation measurements are vital for their optimisation in delivering critical information and unique services. A thorough literature review identified several measurement approaches focusing on different dimensions and features of the government web sites design and functionality. Based on the concept that a government web site is an integrated web-based

information system, with citizens and enterprises being its end-users, evaluation measurements are categorised in four classes: 1) conceptual evaluation frameworks, 2) usability measurements, 3) e-services' quality measurements and 4) customer satisfaction models.

So far, the empirical testing of the several e-government evaluation models revealed a gap between theory and practice. In most cases, government web sites are in their early maturity phases (simple online presence or interactive web sites) or having major usability and accessibility problems. Improvements are required to meet the raised expectations of citizens and businesses.

Little attention has been given by governments on the evaluation stage of a web sites life cycle. However, a lot of surveys conducted in an international or supranational level by the United Nations and the European Union, provide guidance and suggestions for better services design and web-based system's implementation.

E-government is now facing a new era. Web 2.0 provides new opportunities for governments (Chua et al, 2012) and will cause a profound change on the delivery of information and services. Governments should be devoted to utilise and measure effective use of Internet enabled technologies. A thorough investigation and evaluation of an e-government web site should be considered an investment to achieve efficiency and effectiveness.

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KEY TERMS AND DEFINITIONS

E-Government: The use of Information and Communication Technology (ICT) and particularly Internet-based and Web-based telecommunication practices to facilitate connections within the authorities and also deliver digital services to citizens and companies.

E-Government Business Models: Identify the key stakeholders in the e-government environment and their interrelationships and specify the key business processes that represent the integration of governmental information and services.

E-Government Web Site Evaluation: Is the assessment of a governmental web site towards specific criteria.

E-Government Web Site Typology: A categorisation of governmental portals and web sites based on the level of e-government and their level of growth (maturity)/service development.

E-Services Quality Evaluation: Is the identification and testing of quality variables for e-services systems.

Usability Measures: Examine how useful, user-friendly and accessible is a governmental web site with respect to the needs and expectations of its target audience.

User Satisfaction Models: Are cause-effect models which enable the prediction of effects to governmental web sites' changes to the overall citizen satisfaction.