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Short Paper*

e-Governance: A Critical Review of e-Government Systems Features and Frameworks for Success

John Paul B. Palma
Graduate Studies, University of the East, Philippines
palma.johnpaul@ue.edu.ph
(corresponding author)

Lindberg S. Avila
Graduate Studies, University of the East, Philippines
avila.lindberg@ue.edu.ph
(corresponding author)

Maria Angelika J. Mag-iba
Graduate Studies, University of the East, Philippines
magiba.mariaangelika@ue.edu.ph

Lorenza D. Buman-eg
Graduate Studies, University of the East, Philippines
bumaneg.lorenza@ue.edu.ph

Edwin E. Nacpil Jr.
Graduate Studies, University of the East, Philippines
nacpil.edwinjr@ue.edu.ph

Dave Joshua A. Dayrit
Graduate Studies, University of the East, Philippines
dayrit.davejoshua@ue.edu.ph

Nelson C. Rodelas
Graduate Studies, University of the East, Philippines
nelson.rodelas@ue.edu.ph
(corresponding author)

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*****Special Issue on International Research Conference on Computer Engineering and Technology Education 2023 (IRCCETE 2023). Guest Associate Editors:* **Dr. Nelson C. Rodelas, PCpE** (*Computer Engineering Department, College of Engineering, University of the East-Caloocan City; nelson.rodelas@ue.edu.ph*) and **Engr. Ana Antoniette C. Illahi**, PCpE *(Asst. Professor & Vice Chair, Department of Computer and Electronics Engineering, Gokongwei College of Engineering, De La Salle University, Taft Ave., Manila; ana.illahi@dlsu.edu.ph*).

Abstract

Purpose – To determine the key features, key performance indicators and framework for successfully implementing an e-governance system.

Method – Exploratory research was made to understand better the opportunities and challenges in implementing an e-governance system. Six highly urbanized cities (HUC) were compared: Manila, Taguig, Pasay, Makati, Quezon, and Davao. To categorize, the three blocks of eGovernment services were utilized in grouping the process and features in the system: Government to Citizens (G2C), Government to Business (G2B), and Government to Government (G2G). These services were grouped according to each e-government block to determine commonalities and unique features.

Results – In this study, the researchers identified four communication channels used by each city such as web portal, social media, mobile application, and web application. In addition, the common e-services for each block are: In the G2C category, the researchers have the real property tax, local civil registry, and community announcements e-services. In G2B, the researchers have occupational/health permits, business permit licensing, and business tax as the commonly offered e-services.

Conclusion – This study identifies the types of e-government services and shows how the main components of the application can be categorized. In implementing an e-government system, it is highly recommended to start with the common G2C and G2B services. It is also essential to use multiple channels such as web portals, social media, mobile apps, and web apps to reach the different personas of the communities and to communicate government activities faster.

Recommendations – To further this study, the researchers recommend empirical research using persona-based journey maps to establish the link of the KPIs mentioned in this study.

Practical Implications – This research can be used by cities and municipalities still in the early adoption phase of e-governance systems. The standard e-government services can serve as a baseline for developing mobile and web applications to serve citizens and businesses better.

Keywords – e-governance, digital transformation, citizen experience, government services, digital government

INTRODUCTION

Digital transformation has been a buzzword for many years. Many businesses today were able to adopt a different digital strategy to remain competitive and relevant. However, not all companies are very successful with their digital transformation. According to Harvard Business Review (Tabrizi et al., 2023), 70 percent of all digital transformations in 2019 did not reach their goal, with an estimated $900 billion going to waste.

The same challenges are being experienced by our government today, especially in implementing digital technologies for public services. However, the COVID-19 pandemic made digital transformation the new normal (Elsersy et al., 2021). The government had to play its part in providing clear, up-to-date information to the public, health workers, and local authorities while reducing the spread of fake news and lowering the risk of potential cybersecurity and data privacy issues (Farrell et al., 2020). A review done by the United Nations Department of Economic and Social Affairs (UN DESA) shows that among 193 UN Member States' national portals, the researchers have 188 countries (97.5%) that were able to set up a dedicated COVID-19 portal for information sharing and monitoring in a span of 50 days (Department of Economic and Social Affairs, 2020).

The digitalization of public services will significantly rely on the application of digital technologies that maximize gains for all citizens through more receptive, high-quality, and reasonably priced services crafted to meet specific needs and viewpoints (Schroeder et al., 2021). Concerning the quantity and caliber of public services, governments face growing opportunities and rising citizen demands (Mali, 2020). Thus, our study focused on understanding the basic framework for implementing an e-government system.

- Compare our local government applications and the e-services they offer.
- Discuss the opportunities and challenges of e-governance from previous studies.
- Identify the KPIs they can use for the e-government systems.
- Define the application building blocks for implementation.

Implementing an e-government system involves establishing a digital infrastructure that allows for the delivery of government services and information to citizens through electronic means. The basic framework includes developing policies, laws, and regulations for the use of technology in government, creating secure and reliable systems for data storage and communication, ensuring accessibility and usability for all users, and building capacity among government employees to effectively use and manage the system. Additionally, it involves engaging with stakeholders, such as citizens, businesses, and other government agencies, to ensure their needs and expectations are met.

LITERATURE REVIEW

Maturity Assessment of Local E-Government Websites in the Philippines

The United Nations Four-Stage Model was chosen for this research paper to assess 150 local government websites in the Philippines (Khalid & Lavilles, 2019). These maturity stages include emerging information services, enhanced information services, transactional information services, and connected information services. Ranking the emerging information services as Stage 1 or the earliest phase and connected information services as Stage 4 or the most mature.

The researchers used a two-step approach in assessing the e-government websites: guided assessment and semi-structured interviews (Babb, 2021).

The researchers determined that out of 150 sample e-government websites, 49 were inaccessible, and the remaining 101 were analyzed carefully. The municipalities were classified into six, of which the 1st class is the most developed and the 6th class the least. The cities were also grouped into highly urbanized, independent components and component cities (Rood, 2019).

According to the findings, 54 of the 112 municipal websites were classified as Stage 1 (Emerging), the remaining 20 as Stage 2 (Enhanced), and 38 as having no website. For the city evaluations, 13 of the example websites are from Stage 2, 14 are from Stage 1, and 11 do not have government websites. The findings also found that no websites had attained Stage 3 (Transactional) or Stage 4 (Connected) maturity.

The findings had two implications: first, all accessible local e-government websites were still in the early stages of development; and second, numerous towns and cities do not yet have independent websites.

This study demonstrates that transitioning to e-government necessitates adequately established and protected websites prior to full adoption, as online processing has related to several hazards. However, when this project is completed later, it will benefit the country and its residents through smoother and speedier processing.

The Market Environment Innovation of General Trias City

The research assesses the degree of knowledge and preparation of the selected firms in the City of General Trias, Cavite, to participate in the Smart City Project. It is a market and business environment innovation method that focuses on aligning economic and market resources with accessible technology for increased efficiency and effectiveness. To assess enterprise awareness and preparedness, the researchers employ a descriptive-correlational study approach. The poll results suggest that businesses are aware of and ready to adopt the Smart City Project; yet some are terrified of the project's projected hurdles. It also demonstrated a substantial association between respondents' awareness and preparation for implementation, activities, procedures, and ideas (Alarca, et. al., 2022).

Towards the Development of E-barangay Mobile Application

The study was carried out to identify the elements of a mobile application designed to assist local government functions in Quezon City, Philippines (Bringula et al., 2019). With software development and theoretical contributions to the field of e-government, the goal of this research is to create a mobile application that can suit the demands and preferences of its users.

A survey with locals as participants and a face-to-face interview with three informants were utilized as techniques. The findings suggest that participants had access to technology, a high degree of computer expertise, a lower level of involvement in the local community program, and an average impression that local officials may still enhance their information dissemination tactics. Furthermore, the researchers feel that these aspects are important and should be considered when developing mobile applications for other local populations in the Philippines.

Based on the interviews, the community has four essential services: filing complaints, requesting documents, suggestions for improvements, and information dissemination. We, the researchers, believe that these essential features help determine the minimum viable product (MVP) in developing a mobile application for e-governance systems kick-off.

E-Government for Developing Countries: Opportunities and Challenges

Ndou (2004) defined four components of eGovernment: government to citizens (G2C), government to business (G2B), government to government (G2G), and government to

employees (G2E) (G2E). This research highlighted the following e-Government opportunities:

1. Cost savings and increased efficiency
2. Service delivery quality to businesses and customers
3. Accountability, transparency, and anti-corruption
4. Increase the government's capabilities
5. Creating a network and a community
6. Improve the decision-making process
7. Encourage the use of ICT in different areas of society.

The e-Government challenges identified in this research are:

1. Infrastructure for ICT (e-readiness, computer literacy, telecommunication equipment)
2. Policy considerations (legislation)
3. Development of human capital and lifelong learning (skills, capabilities, education, learning)
4. Management of Change (culture, resistance to change)
5. Partnership and cooperation (public/private collaboration, community and network development)
6. Strategy (vision, purpose) (vision, mission)
7. Position of leadership (motivate, involve, influence, support)

The case analysis provides an essential tip for eGovernment initiatives' successful design and implementation—first, the criticality of e-readiness assessment. Second, awareness of the public and private organizations. Third, being agile in the development and delivery of solutions. Fourth, encourage strong collaboration between government agencies and departments. Fifth, invest in human evolution. Sixth, have a pragmatic approach by having a clear vision and goal. And last, clear knowledge management practices and transparent change management processes.

Gartner: Develop Impactful KPIs with Citizen Experience Metrics to Show the Business Value of Digital Government

Gartner emphasized the importance of having goals that favor impact instead of activities that could serve as a reference in making meaningful KPIs over time (Gartner_Inc, 2022). They have observed that citizen experience (CX) initiatives and projects not linked to investment in experience and business outcomes often face program termination. They have recognized the business value of IT as a government's strategic partner. However, several government reports show that IT is not aligned with the business outcomes and citizen experience, which undermines its value (Alfirević et al., 2018).

Gartner (2022) recommends the following actions to our government CIOs leading the digital transformation and innovation:

- Link the value of digital government initiatives to citizen expectations by engaging with internal CX specialists to leverage citizen or constituent journey maps. The maps will be utilized in developing a baseline for compelling, mission relevant KPIs for all digital government projects and products because each persona represents both analog and digital users.
- Automate the collection of CX metrics to supplement systems and applications KPIs. Examples of these CX tools are voice-of-citizen (VOC) and sentiment analysis solutions.
- Establish KPIs that reflect business units' goals and organizational priorities. Work with CX and the business unit team to combine individual people, process, and technology metrics that measure the impact of CX and digital government initiatives.

They also showcase the "Digital Maturity Model – Key Metrics Domain," as seen in Figure 1.

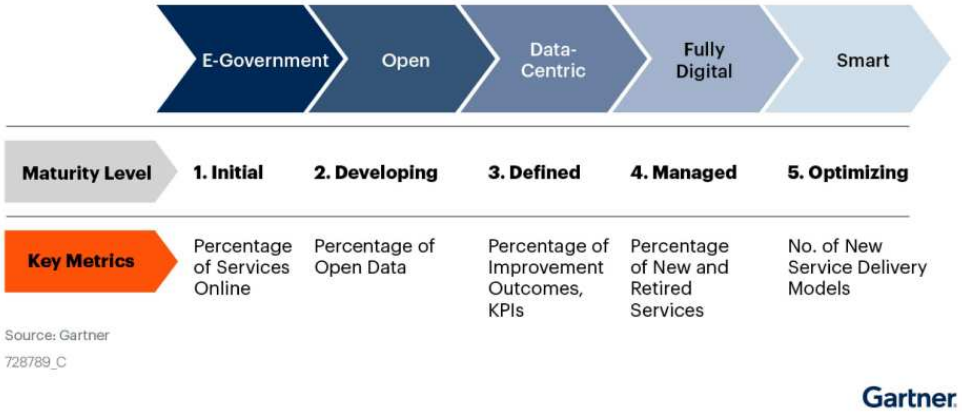

Figure 1. Gartner: Digital Maturity Model – Key Metrics Domain

What the researchers deem necessary in this study are the examples of digital government metrics related to citizen/constituent experience that can serve as our reference. The metric was grouped based on its impact on the people, process, and technology categories. The suggested metrics for people are citizen/constituent satisfaction, Net Promoter Score (NPS), citizen/constituent level of effort, visitor intent, employee satisfaction rate, and employee error rate. For process, it includes channel switch rate, online transaction conversion rate, and time to completion. And for technology, page load time, service availability, and channel availability.

METHODOLOGY

They conducted exploratory research to understand better the opportunities and challenges in implementing an e-governance system (Hanks, 2017). They compared the eGovernment systems of six highly urbanized cities (HUC): Manila, Taguig, Pasay, Makati, Quezon, and Davao (Alampay, 2013) . To categorize, the researchers utilized the three

blocks of eGovernment services in grouping the process and features in the system: Government to Citizens (G2C), Government to Business (G2B), and Government to Government (G2G). The researchers discarded the Government Employee (G2E) services because of a lack of evidence from the resources they used for all the cities identified in this study.

RESULTS AND DISCUSSIONS

In this research, the researchers identified the communication channels used by each city and categorized them into four which are:

- Web Portal – Publicly available websites. Access credential is not mandatory to navigate through the web pages (Rood, 2019).
- Social Media – Social media presence such as Facebook, YouTube, and Twitter (Bringula et al., 2019).
- Mobile Application – Applications downloadable through Android Play Store or Apple App Store (Rood, 2019).
- Web Application – Access credentials required to access government services (Rood, 2019).

Table 1. HUC – Communication Channels

	Manila	Taguig	Pasay	Makati	Quezon	Davao
Web Portal	/	/	/	/	/	/
Social Media	/	/	/	/	/	/
Mobile	/	/	/		/	/
Web Application	/	/	/	/	/	/

Table 1 shows the communication channels of highly urbanized cities. When it comes to digital maturity, Davao is a first-class, highly urbanized city. It is the third most populous city after Manila and Quezon City. Davao is still in the initial phase focusing on increasing the number of services online. Makati, surprisingly, is also in the initial phase of digital maturity despite being known as the financial center of the Philippines. Even though they don't have a mobile app, Makati still provides unique G2C monetary assistance for their citizens, like "Ayuda Makati, Blucard Seniors, P5k Maka-Tulong" for economic relief and community services.

Table 2. HUC – Government to Citizens Services

	Manila	Taguig	Pasay	Makati	Quezon	Davao

Real Property Tax	/	/	/	/	/	
Local Civil Registry	/				/	/
Covid-19 Vaccination	/	/	/	/	/	/
Covid-19 Contact Tracing	/	/	/	/	/	/
Notice of Violations	/					
E-Bills Payment	/		/			
E-Commerce	/		/			
Announcements and Updates	/	/	/	/	/	/
Community Tax Certificate	/					
Monitory Assistance				/	/	

Table 2 shows the government-to-citizens services of HUCs. Manila's digital maturity is still developing phase as it continuously grows its digital service portfolios. They have opened e-commerce and e-services such as medical, rental, shopping deliveries, and social amelioration. Aside from this, you can also check Manila Zoo booking in their portal. Most of the HUCs do not have digital transformation on the notice of violations, e-bill payments, community tax certificate and monetary assistance.

Table 3. HUC – Government to Business Services

	Manila	**Taguig**	**Pasay**	**Makati**	**Quezon**	**Davao**
Occupational/Health Permits	/		/		/	/
Business Permit Licensing	/		/		/	/
Business Tax	/	/		/	/	
E-Bills: Private Billers, SSS, Etc.	/					
Monetary Assistance					/	

Table 3 shows the government-to-business services. It is evident on the table that most of the HUC does not have digital transformation when it comes to e-bills. They are still using a manual process. Most of the HUCs do not have monetary assistance services. The city of Taguig, Pasay, and Quezon City are also still in the developing phase in terms of digital maturity. These three cities enabled chatbots in their web and mobile apps for faster response. For the featured services, Taguig offers online movie subscriptions for their senior citizens, while Pasay provides cheap homes, rentals, and mass housing

advisories. And Quezon City, you can book an appointment in the public library, get updates on the QC scholarship programs, or apply for the QCitizen ID online.

Table 4. HUC – Government to Government Services

	Manila	Taguig	Pasay	Makati	Quezon	Davao
SSS, Pag-Ibig, &Philhealth Services	/					
Emergency Response			/			
Barangay Risk Assessment		/				

Table 4 shows the government-to-government services of HUCs. It is evident that highly urbanized cities are not focused on their digital transformation when it comes to government-to-government services. Only Manila city has its own digital services in SSS, Pag-Ibig and Philhealth. Pasay City has only digital emergency response and only Taguig City has its digital barangay risk assessment.

CONCLUSIONS AND RECOMMENDATIONS

This study identifies the e-government service categories and how the researchers can group the application's key features. If an LGU would like to implement an e-government system, it is highly recommended to start with the common G2C and G2B services. It is also essential to use multiple channels such as web portals, social media, mobile Apps, and web apps to reach the different personas of the communities and to communicate government activities and announcements faster. For example, LGUs are using Facebook and Twitter to update the community about work and class suspensions during bad weather conditions. The variety of communication channels will guarantee high citizen adoption, especially for novices in this digital era.

Our recommendations based on the e-governance systems the researchers reviewed for the list of common e-services are (Table 5):

Table 5. Recommended E-Governance System

Government to Citizens (G2C)	Government to Businesses (G2B)	Government to Government (G2G)
• Real Property Tax • Local Civil Registry • Community Tax Certificates • Announcements and Updates • Notice of Violations • COVID-19 Vaccination and Contact Tracing • Monetary Assistance	• Occupational/Health Permits • Business Permit Licensing • Business Tax	• Interface with SSS, Pag-ibig & Philhealth • Emergency Response • Barangay Risk Assessment (Flood and Disaster Mitigation)

Although the researchers have yet to link the existing KPIs to the systems in this study, we have understood the relevance of having them for continuous service improvements (CSI). The saying goes, "You can't improve what you don't measure." Therefore, the researchers recommend doing qualitative research to further the study to understand the metrics used as a benchmark in improving the citizen experience.

In addition, the persona-based journey maps are highly recommended to understand the concerns and services that can be prioritized in the early stage of development of the said e-government applications.

The implementation of e-government in the Philippines has made significant strides in recent years, although challenges remain. The government has recognized the potential of technology to enhance public service delivery, increase transparency and accountability, and promote citizen engagement. As a result, several initiatives have been launched, such as the e-Procurement System, the Integrated Tax System, and the Electronic Business Permit and Licensing System.

One of the main challenges facing the implementation of e-government in the Philippines is the lack of adequate infrastructure and connectivity in some areas, particularly in rural and remote areas. This hinders the access and adoption of e-government services, limiting the potential benefits to citizens in these areas.

Another challenge is the need for capacity-building and skills development among government employees to effectively use and manage e-government systems. Additionally, the need for ensuring data privacy and security, as well as addressing issues of digital divide and accessibility, must be addressed.

Despite these challenges, the implementation of e-government in the Philippines has shown promise in enhancing public service delivery and citizen engagement. As technology continues to advance, the government must continue to invest in infrastructure, capacity-building, and stakeholder engagement to ensure the success of e-government initiatives.

DECLARATIONS

Conflict of Interest

The authors hereby declare that have no personal or financial interest that could potentially influence or bias the author's actions or decisions in relation to the matter under consideration. Additionally, the authors confirm that they have disclosed all relevant information regarding any potential conflicts of interest.

Informed Consent

Although not applicable, the requirements for obtaining the datasets have been registered through FOI, and furthermore, the datasets are categorized as public data.

Ethics Approval

This study did not involve any human or animal subjects, therefore, the statement 'not applicable' applies.

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Authors' Biography

Dr. Nelson C. Rodelas is a graduate of Doctor of Information Technology and Master of Science in Engineering majoring in Computer Engineering. He is now one of the regular faculty members of the Computer Engineering Department at the University of the East Caloocan.

Mr. John Paul B. Palma is a graduate of Bachelor of Science in Electronics and Communications Engineering at University of St. La Salle Bacolod. He is now working in the IT department and currently pursuing his master's degree in Information Technology at University of the East Manila.

Mr. Lindberg Sevilla Avila is an IT specialist whose qualifications include a degree in Electronic and Communications Engineering from Pamantasan ng Lungsod ng Maynila. Currently pursuing a graduate studies degree in Master of Arts in Information Technology in University of Manila.

Ms. Maria Angelika J. Mag-iba is currently pursuing her Master's degree in Information Technology at the University of the East-Manila. She is a graduate of Bachelor of Science in Accounting Technology in Pasig Catholic College. She is now working as a Product Owner in an IT company.

Mr. Edwin E. Nacpil Jr. is a graduate of Bachelor of science in Computer Engineering at Colegio de San Lorenzo. He is now a fulltime faculty member of the ICT Department at the STI Munoz EDSA and studying his Master's degree in Information Technology at University of the East Manila.

Lorenza D. Buman-eg is a graduate of Bachelor of Science in Information Technology at Central Colleges of the Philippines in Quezon City. She is now working as a Fire Officer 1 in Bureau of Fire Protection and currently pursuing her Masters Degree in Information Systems at University of the East Manila.

Dave Joshua A. Dayrit is a graduate of Bachelor of Science in Information Technology at University of the East - Manila. He is now working as a IT staff at RHC Builders Warehouse Malolos and studying his Master's degree in Information Technology at University of the East – Manila.