

Evaluation of GMA Civil Registrar Online Transaction System

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Keywords: Civil Registrar, Online Transaction System, Functionality, Public Service.

Abstract: This study developed an application for Online Transactions in the General Mariano Alvarez, Cavite Civil Registrar. This application has features that allow users to access the Emergency Hotlines, Announcements, Information about the Civil registrar, and booking of appointments. The GMA Civil Registrar Online Transaction System can help facilitate the obtaining of certificates such as Birth, Marriage, Death, and CENOMAR (Certificate of No Marriage Record), and set an appointment for other services. The evaluators of the system are the IT experts, IT students, Municipal Civil Registrar Office (MCRO) staff, and walk-in clients of General Mariano Alvarez (GMA), Cavite. The research instrument used is based on ISO 25010 evaluation tools for application software. This study utilized the convenience sampling technique in selecting evaluators; the weighted mean and t-test are the statistical treatments used for this study. Based on the evaluation, the system got a verbal interpretation of "Strongly Acceptable" for its Functionality, Efficiency, Maintainability, Reliability, and Portability. Meanwhile, the profile of the evaluators as to gender and profession is found not significant, while gender is found significant to the maintainability of the application. It is suggested that the online payment system may be included for future enhancement.

1 INTRODUCTION

The growth in the mobile phone industry and mobile applications has been one of the important technological innovations in computing in this generation. These innovations support different aspects of daily living. The fast-paced advancement of computing devices known as the "digital era" has revolutionized a variety of applications and integration to different sectors, from communication, entertainment, education, security, business operations, and government services. This "digital era" has become indispensable equipment that gives the end-users more efficient, effective, reliable, and accessible services for a wide range of applications.

There is a need to be more empirical research on local e-governments. Based on evaluation and to operationalize the e-Government focus of the Philippine Digital Strategy, the E-Government Masterplan (EGMP) acknowledged the important role that ICT plays in fostering open and transparent government and the delivery of sufficient public services (Department of Information and Communication Technology, 2014). Implementation of e-government in the country has been in the planned of the government, thus [27] in their study,

they investigate the adoption of e-government in the country, However, in developing countries like the Philippines, citizens face significant challenges in adopting e-government because of differences in socio-demographics, ICT access, Internet usage habits, and service awareness. The incorporation of E-government services is a vital lever for growth in the Philippines [17]. These innovative initiatives have been taken to improve public service delivery. Government services could be enhanced through e-government. The national e-government projects in the Philippines are still moving forward [2].

Various Civil Registry Document (birth certificates, marriage certificates, certificates of no marriage, death certificates, etc.) acquisition methods. They suggested an immediate, electronic, paperless, and more expedient alternative to the current procedures for obtaining Civil Registry Documents [28]. Moreover, physical distance and transportation challenges can hinder access to these essential services. Thus, these traditional methods, opted to involve in-person visits and lengthy paperwork and manual procedures, are likely to cause errors, delays, and inconvenience. The innovative solutions of this rapid technological evolution change the traditional delivery of services, including

government services. However Municipality of government agencies faced challenges in adopting digital solutions and innovations for their services, this leads to inefficiency of transaction, long waiting time and bureaucratic hurdles for the people [3], to achieve high performance and manage their business effectively and without time-consuming procedures, organizations frequently face challenges, such as the need to stay up to date with technological advancements. Civil registries, which are essential for various legal and administrative purposes, face challenges and issues. The limited accessibility of civil registry services, especially for individuals residing in remote areas or those with mobility impairments. Additionally, a lack of an online platform for requesting and obtaining vital documents.

The development of the GMA Civil Registrar Online Transaction System represents a significant leap toward modernizing public services.

1.1 Theoretical Framework

Guided by [16] theoretical framework, which emphasizes the relationship between citizens' needs and their engagement with government services, this research explores the application's ability to meet user demands efficiently. It addresses problems in need of innovative solutions that leverage technology to streamline government processes and improve citizen experience, making them faster, more reliable, and accessible. Mobile applications, in particular, offer to address the challenges faced by citizens when accessing essential civil registry services. By digitizing the request and issuance of documents such as obtaining certificates for birth, marriage, death, and CENOMAR, as well as booking appointments for other related services, these applications can significantly reduce wait times, minimize paperwork, and enhance transparency an application user to conduct transactions from the comfort of their homes.

1.2 Objectives of the Study

Designing, creating, and testing a mobile and online transaction system for the General Mariano Alvarez (GMA) Civil Registrar is the main goal of this study. By utilizing the benefits of information and communication technology (ICT), such as greater accessibility, higher efficiency, increased dependability, and shortened transaction times, this method seeks to modernize service delivery and overcome the drawbacks of conventional in-person procedures. Specifically, it aimed to (1) determine the

profile of the respondents; (2) assess the respondents' evaluation based on ISO 25010 variables; and (3) determine the significant difference in the assessments of the respondents.

2 METHODOLOGY

This study used the descriptive developmental research, a developmental method, described as the methodical investigation of developing, manufacturing, and evaluating educational processes, goods, and programs that must satisfy the standards for efficacy and internal consistency. The purpose of the system was to design an online transaction system, through a mobile application for the Municipality of GMA Civil Registrar, that facilitates and addresses the challenges by digitizing all services of the office.

In the development of the application, an agile methodology approach was used; this approach to software development interleaves program planning, requirement analysis, design, development, testing, and deployment [6]. Every organization has incorporated agile software development into its everyday operations and modified its project development methodology [25]. It "evolved from the personal experiences and collective wisdom of consultants" rather than being created.



Figure 1: Model for agile software development.

Figure 1 illustrates the agile model, it includes planning, requirement analysis, design, development testing and deployment phase. Planning phase includes the careful analysis needed for this study. Requirement analysis is performed to ensure all the system and software requirements are aligned with the needs of the end-user. For getting relevant information, first the researcher requests permission from the GMA Civil Registrar office to conduct data gathering, and data are gathered within one one-

month time frame. The researcher collected data and demographic profiles (age, gender, and profession) from Walk-in Clients and Municipal Civil Registry Office (MCRO) Staff using an interview and survey questionnaire employing a convenience sampling technique, and a purposive sampling technique for IT Experts as evaluators of the system.

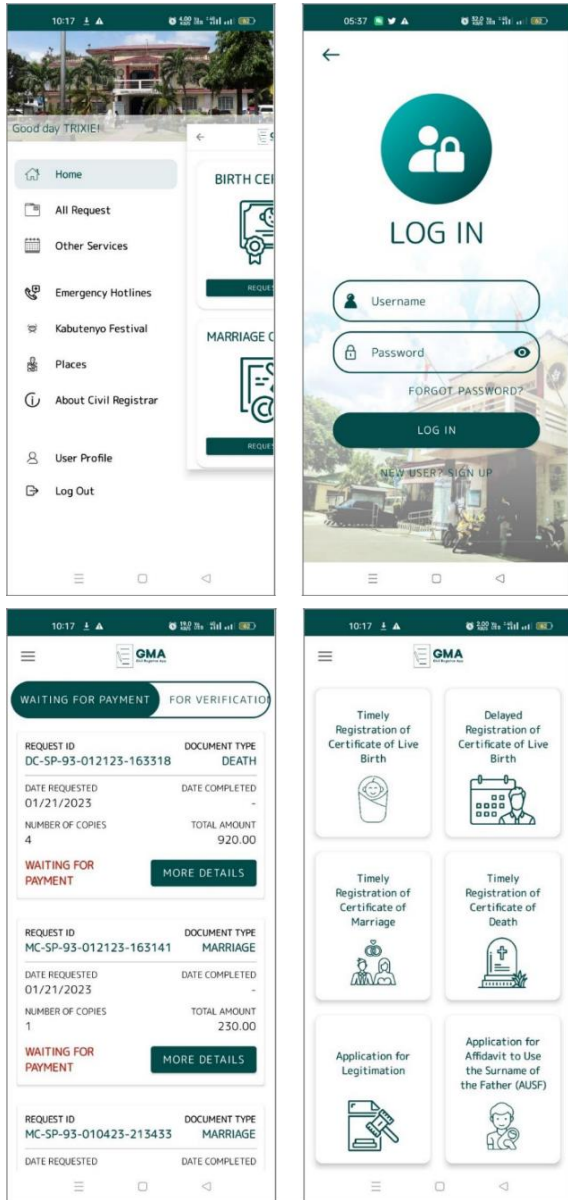


Figure 2: User interface of the mobile application for the online transaction system of the GMA Civil Registrar.

Figure 2 illustrates the sample user interface for mobile based application of the system, user need to

register an account before it can see all the services provide by the civil registrar. The user can manage and see the status of every transaction.

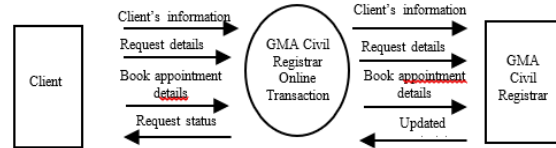


Figure 3: Context diagram of the GMA Civil Registrar Online Transaction System.

The design phase shows how the plan is to be taken into action according to the analysis phase. Figure 3 shows the context diagram of how the system works with the interaction of the user.

As show in the Figure 4 the user interface for administrator of the system. It indicates the admin dashboard and all the access of the system where the all management of transaction takes place.

The development phase is where the plans and design are executed through a series of programming and codes, these include the use of Java programming, HTML, XML for layout and resource files, and Firebase for the database. One of the critical parts of the process in the testing phase, the study employs system testing and integration testing for each module of the system. During deployment phases, the system will undergo a pre-launch of the system, and will undergo constant maintenance of the system. This part ensures that there is constant feedback from the user.

This study evaluates the application for its functionality, reliability, usability, efficiency, maintainability, and portability, these criteria are according to ISO 25010. ISO 25020 is an international standard that defines a framework for evaluating the quality of software and systems, providing a more thorough overview of the elements required to ensure software quality and deliver a positive experience to the consumer. It provides a structured way to define, measure, and evaluate software quality based on the above-mentioned criteria [26]. ISO 25010 is a reputable and well-established software quality management system that evaluates a software product's quality, which doesn't have to depend on gut feeling or personal preference [29]. Table 1 shows the 5-point Likert scale used for the assessment using ISO 25010.



Figure 4: User interface of the web-based application for the online transaction system of the GMA Civil Registrar.

Table 1: 5-Likert Scale for assessment of the portal based on ISO 25010.

Rating	Scale	Verbal Interpretation
5.00	4.20 – 5.00	Excellent
4.00	3.40 – 4.19	Very Good
3.00	2.60 – 3.38	Good
2.00	1.80 – 2.59	Fair
1.00	1.00 – 1.79	Poor

For treating the data, frequency, percentage, rank, and weighted mean are used, and a t-test to determine the difference in the assessment of the system among the respondents in terms of the above-mentioned variables.

3 RESULTS AND DISCUSSION

Table 2 shows the summary profile of the evaluators. There were 51 or 65 percent of evaluators age group is 21 to 25 years old; 14 or 18 percent of evaluators age are under of 31 years old and above; while 13 or 17 percent of the evaluators are under the group of 26 to 30 years old. Male respondents comprised 46 or 59 percent of the evaluators, while 32 or 41 percent are females. There were 50 IT students, 85 clients, 11 IT experts, and 15 MCRO staff.

Table 3 shows the summary of assessment of the evaluators on the mobile application, where Portability has with computed mean of 4.67; As to Functionality and Maintainability with a computed mean of 4.64; Usability computed mean of 4.62;

Reliability computed mean of 4.58, and Efficiency, with computed mean of 4.56 and all are Strongly Acceptable for its interpretation.

Table 2: Summary profile of the respondents.

Profile	Frequency	
Gender	Male	32
	Female	46
Age	21-25 years old	51
	26-30 years old	13
	Above 31 years old	14
Profession	IT Experts	11
	IT Students	50
	MCRO Staffs	15
	Clients	85

Table 3: Summary of assessment on the application based on ISO 25010.

Rating	Mean	Verbal Interpretation	Rank
Functionality	4.64	Strongly Acceptable	2.5
Reliability	4.58	Strongly Acceptable	5
Usability	4.62	Strongly Acceptable	4
Efficiency	4.56	Strongly Acceptable	6
Maintainability	4.64	Strongly Acceptable	2.5
Portability	4.67	Strongly Acceptable	1
Grand Mean	4.62	Strongly Acceptable	

The assessment illustrated that the mobile application has a high level of acceptability from the end-users. E-government platform offers features that may provide customers with what they want, ranging

from making online services more accessible to connecting with other agencies [5]. This will aid in the development of "citizen-centric" services that prioritize improving access and providing critical services on a single platform.

When categorized by age, Table 4 displays the variations in the respondents' application evaluations. The computed p-values of 0.963, 0.775, 0.625, 0.682, 0.214, and 0.822 corroborate the data, which indicates that there was no significant difference between the evaluators' judgments of functionality, dependability, usability, efficiency, maintainability, and portability. Consequently, all of the null hypotheses were accepted.

When categorized by gender, Table 5 displays the variations in the respondents' application evaluations. Based on computed p-values of 0.599, 0.791, 0.880, 0.505, and 0.459, the data showed no significant difference between respondents' evaluations of the application's functionality, reliability, usability, efficiency, and portability. The null hypotheses were thus approved. In the meantime, the null hypothesis was rejected since the maintainability p-value was 0.044, which is below the significance level of 0.05.

As a result, respondents' evaluations of the application's maintainability varied significantly.

Research suggests that gender plays a significant role in the maintainability and sustainability of technological systems, [13] the Hegemonic and heterogeneous gender-technology connections can be created through the mobilization of gendered knowledge and activity by technicians during the installation and maintenance of renewable energy technologies.

This finding is consistent with earlier research indicating that software maintenance practices are influenced by organizational and cognitive factors, such as genderization in software development. Gender dynamics influence the software development lifecycle, which could result in variations in how teams approach and maintain maintainability [20]. In a similar vein, [19] male and female developers use different approaches to program comprehension—males rely more on attention-switching, while females typically examine code entities more closely. These discrepancies support the current study's finding that maintainability is greatly impacted and imply that gender-related cognitive methods may play a role in disparities in maintenance outcomes.

Table 4: Variations in the respondents' evaluations when categorized by age.

Variables	p-value	Null Hypothesis	Interpretation
Functionality	0.963	Accepted	Not significant
Reliability	0.775	Accepted	Not significant
Usability	0.625	Accepted	Not significant
Efficiency	0.682	Accepted	Not significant
Maintainability	0.214	Accepted	Not significant
Portability	0.822	Accepted	Not significant

Table 5: Variations in the respondents' evaluations when categorized by gender.

Variables	p-value	Null Hypothesis	Interpretation
Functionality	0.599	Accepted	Not significant
Reliability	0.791	Accepted	Not significant
Usability	0.880	Accepted	Not significant
Efficiency	0.505	Accepted	Not significant
Maintainability	0.044	Rejected	Significant
Portability	0.459	Accepted	Not significant

Table 6: Variations in the respondents' evaluations when categorized by profession.

Variables	p-value	Null Hypothesis	Interpretation
Functionality	0.772	Accepted	Not significant
Reliability	0.319	Accepted	Not significant
Usability	0.895	Accepted	Not significant
Efficiency	0.941	Accepted	Not significant
Maintainability	0.219	Accepted	Not significant
Portability	0.903	Accepted	Not significant

When categorized by occupation, Table 6 displays the variations in the respondents' application evaluations. Based on computed p-values of 0.772, 0.319, 0.895, 0.941, 0.219, and 0.903, the data showed that respondents' evaluations of the application's functionality, dependability, usability, efficiency, maintainability, and portability did not differ significantly. Consequently, the null hypotheses were approved.

4 CONCLUSIONS

The majority of the assessors were male IT students between the ages of 21 and 25, the researchers deduced from the data they had collected. GMA Civil Registrar Online Transaction System obtained high rating for all criteria. While there were no significant differences in functionality, reliability, usability, efficiency, and portability across gender, age, or profession, there was a significant difference in maintainability ratings between male and female respondents. Although customers generally embraced the system, it is advised to make maintenance and efficiency enhancements to further maximize performance.

These benefits make the system more user-friendly, responsive to citizen needs, and adaptable for local government units (LGUs) looking to improve public service delivery. In contrast to previous studies on e-government and civil registry systems, which frequently concentrate on web-only platforms or limited service coverage, this research integrates both mobile and web access and offers multiple service features in a single application (emergency hotlines, announcements, information dissemination, appointment booking, and certificate requests).

5 RECOMMENDATIONS

Results reveal that when respondents are categorized by gender, their assessments of the variable maintainability differ significantly. The system recommends improvements that focus on refining the mobile application's maintainability features to ensure consistency and address the challenges faced by the clients. Even though there are no significant differences in the respondents' assessment when grouped by age and profession, the researchers highly recommend having a continuous evaluation and

updates to maintain the strong acceptability of the application on the above-mentioned variables.

Additionally, to improve the accessibility of the system, it is recommended to have an IOS version to facilitate the expansion of the platform devices. The lack of an integrated online payment channel is one of the stated drawbacks and recommended for future development. Moreover, it is highly recommended to provide MCRO staff training sessions on the use of the mobile application to maximize its benefits, which will ensure the usability and satisfaction among the end-users. Furthermore, an integration with other E-government services to the mobile application for providing more comprehensive services, if applicable.

REFERENCES

- [1] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179–211, 1991.
- [2] S. A. Khalid and R. Q. Lavelles, "Maturity assessment of local e-government websites in the Philippines," *Procedia Computer Science*, vol. 161, pp. 99–106, 2019, doi: 10.1016/j.procs.2019.11.104.
- [3] F. M. Abdullah, A. A. Mohammed, A. M. Maatuk, and E. K. Elberkawi, "Application of electronic management system in governmental institutions," in *Proc. Association for Computing Machinery*, 2019, pp. 1–5, doi: 10.1145/3368691.3368710.
- [4] J. Bajar, *E-Government in the Philippines: An Assessment*, 2020, doi: 10.13140/RG.2.2.27627.36643.
- [5] F. Balahadia, W. Molino, J. Bawica, I. Juanatas, H. D. Balmeo, and M. Ballera, "E-participation: Community involvement level related to different services of local government unit officials," *International Journal of Computing Sciences Research*, vol. 1, no. 2, pp. 10–20, 2017, doi: 10.25147/ijcsr.2017.001.1.07.
- [6] F. Bencito, R. Gem, C. Dabu, and C. Santiago, "Development and evaluation of Study-Buddy Pairing Application for Android," *Journal of Environmental Science Computer Science and Engineering & Technology*, vol. 9, no. 2, 2020, doi: 10.24214/jecet.b.9.2.23037.
- [7] R. P. Bringula, F. Oliva, M. A. D. Vale, D. J. T. De La Serna, and J. A. Napolis, "Towards the development of e-Barangay mobile application," in *Proc. 10th Int. Conf. on E-Education, E-Business, E-Management and E-Learning (IC4E '19)*, 2019, pp. 352–356, doi: 10.1145/3306500.3313979.
- [8] J. Brown, "The impact of technology on gender roles and stereotypes," Julie Helping Hands Foundation, 2023. [Online]. Available: <https://jhfoundationng.org/the-impact-of-technology-on-gender-roles-and-stereotypes/>.

- [9] A. F. Castillo, C. J. Diokno-Sicat, and R. B. Maddawin, *Philippine Local Government Public Expenditure Review: A Survey of National Government Local Government Support Programs*. Philippine Institute for Development Studies, 2020.
- [10] E. P. Capistrano, *Determining e-Government Trust: An Information Systems Success Model Approach to the Philippines' Government Service Insurance System (GSIS), the Social Security System (SSS), and the Bureau of Internal Revenue (BIR)*, pp. 57–78, 2020.
- [11] J. G. Celeste and M. V. Caelian, "Civil registration awareness, compliance, purpose, and challenges among municipal residents in the Philippines," *Philippine Social Science Journal*, vol. 4, no. 2, pp. 104–114, 2021, doi: 10.52006/main.v4i2.332.
- [12] S. K. N. Danquah, J. Shi, and W. Dong, "A novel blockchain method for urban digitization governance in birth registration field: A case study," *International Journal of Environmental Research and Public Health*, vol. 19, no. 15, Art. 9309, 2022, doi: 10.3390/ijerph19159309.
- [13] M. De Wilde, "'A heat pump needs a bit of care': On maintainability and repairing gender–technology relations," *Science, Technology & Human Values*, vol. 46, no. 6, pp. 1261–1285, 2020, doi: 10.1177/0162243920978301.
- [14] J. Domingo, K. A. Cabello, G. A. Rufino, L. Hilario, M. J. Villanueva-Jerez, and C. J. Sarmiento, "A framework in developing a citizen-centered smart city mobile application as a platform for digital participation in Iloilo City," *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, vol. XLVI-4/W6-2021, pp. 153–160, 2021, doi: 10.5194/isprs-archives-xxvi-4-w6-2021-153-2021.
- [15] K. P. Gupta, P. Bhaskar, and S. Singh, "Prioritization of factors influencing employee adoption of e-government using the analytic hierarchy process," *Journal of Systems and Information Technology*, vol. 19, no. 1–2, pp. 116–137, 2017, doi: 10.1108/JSIT-04-2017-0028.
- [16] S. Jones, R. Hackney, and Z. Irani, "Towards e-government transformation: Conceptualising citizen engagement," *Transforming Government: People, Process and Policy*, vol. 1, pp. 145–152, 2007, doi: 10.1108/17506160710751977.
- [17] S. A. Khalid and R. Q. Lavalles, "Maturity assessment of local e-government websites in the Philippines," *Procedia Computer Science*, vol. 161, pp. 99–106, 2019, doi: 10.1016/j.procs.2019.11.104.
- [18] F. A. Magno, "E-Government and Philippine development," *Journal of Asia-Pacific Studies*, Waseda University, 2018.
- [19] Z. S. T. Moghaddam, "On the influence of representation type and gender on recognition tasks of program comprehension," 2015. [Online]. Available: <https://www.semanticscholar.org/paper/On-the-Influence-of-Representation-Type-and-Gender-Moghaddam/bd436fe07468b94d5964b347c25ca6c1752273cb>.
- [20] V. Narasimhan, "Development life cycle," 2011. [Online]. Available: <https://www.semanticscholar.org/paper/DEVELOPMENT-LIFE-CYCLE-Narasimhan/d97755ad544e7dd00adc41ef5de3380b5fe5fa94>.
- [21] R. Pasco and S. Ona, *Enabling e-Government in the Philippines: Uncovering Gaps and Opportunities in Policy Development*, 2017.
- [22] C. T. Prakoso, "Digital government stage evaluation in population and civil registry office (DisdukCAPIL) of Kutai Kartanegara Regency," *Jurnal Borneo Administrator*, vol. 18, no. 1, pp. 79–94, 2022, doi: 10.24258/jba.v18i1.878.
- [23] S. Ragani, A. E. Rompis, and S. H. D. Adikancana, "Population and civil registration service of Bandar Lampung City's digital bureaucratic system in realizing an effective and efficient government," *Pancasila and Law Review*, vol. 2, no. 2, pp. 109–120, 2021, doi: 10.25041/plr.v2i2.2448.
- [24] C. Reddick and D. F. Norris, "E-participation in local governments," *Transforming Government: People, Process and Policy*, vol. 7, no. 4, pp. 453–476, 2013, doi: 10.1108/TG-02-2013-0008.
- [25] C. Schmidt, *Agile Software Development Teams, Progress in Information Systems*. Cham, Switzerland: Springer, 2015, doi: 10.1007/978-3-319-26057-0.
- [26] R. Souza, "ISO 25010 and software quality: An essential guide," 2024. [Online]. Available: <https://www.linkedin.com/pulse/iso-25010-software-quality-essential-guide-roberta-souza-ibnqe>.
- [27] A. U. Urbina and N. Abe, "Citizen-centric perspective on the adoption of e-government in the Philippines," vol. 15, no. 2, 2017.
- [28] L. E. A. Villena, R. C. Robielos, and W. Shiang, "Analysis on acquisition of Philippine civil registry documents and inclination towards paperless e-government," *IOP Conference Series: Materials Science and Engineering*, vol. 1072, no. 1, Art. 012058, 2021, doi: 10.1088/1757-899X/1072/1/012058.
- [29] A. Zavgorodniy, "ISO 25010: Enhancing our software quality management process," *HW.Tech*, 2025. [Online]. Available: <https://tech.helpware.com/blog/iso-25010-enhancing-our-software-quality-management-process>.