

Comparative Analysis of an Existing and Newly Designed E-Wallet Smartphone Application Among the Elderly in the Philippines

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ABSTRACT

Fintech solutions are becoming increasingly present in societies today as people accept related innovations into existence and use them daily, where various financial services have been digitalized and integrated into smartphones. From mobile banking to digital payment solutions, AI integration, and e-wallets, these are examples of famous fintech solutions commonly used worldwide today. Focusing on the latter, e-wallets are products of fintech that utilize smartphones to conduct various daily financial transactions. However, as innovations in ICT continue to evolve, there are still sectors among societies that generally need help to accept and use such modern digitalized solutions. This paper aims to analyze the usage and acceptance of e-wallet applications in the Philippines among senior citizens by comparing an existing application with an application designed by the proponents. The study measures the acceptance and usage of senior citizens on said e-wallet applications based on their visual interface and interaction through its Display, Security, Navigation, Process Efficiency, and Language. Non-parametric statistical analysis tools (Wilcoxon Signed-Rank Test and Kendall Rank Correlation) were used to interpret the gathered data from thirty-five senior citizens who utilize e-wallet applications and reside around the National Capital Region. The Kendall Rank Correlation revealed the degree of relationships between variables (showing relationships between Acceptance and Display, Navigation, Process Efficiency, and Language, and between Usage and Display, Navigation, and Process Efficiency). In contrast, our Wilcoxon Signed-Rank Test showed statistical preference over the newly designed e-wallet application over the market-existing e-wallet initially compared with. The need to address such issues enables communities, establishments, developers, and companies to become more financially and digitally inclusive, especially toward senior citizens. This study may provide valuable insights toward a more technologically welcoming environment.

Keywords: Senior citizens, E-wallets, Financial technology, Digital literacy, Financial literacy, Financial inclusion, Digital inclusion

INTRODUCTION

The rapid globalization and growth of innovations worldwide have resulted in evolutions, improvements, and modernization of science and technology, where financial sectors and services are not an exception to this movement. Financial institutions have adopted newer technologies and innovations enabling remote accessibility and optimization of processes, thus improving customer and business experiences. Li and Xu (2021) argue that fintech is rooted in developing innovations and technologies from within and other fields and industries such as blockchain, big data, machine learning, artificial intelligence, and digital economy. This has enabled numerous developments in fintech where entities such as banks, governments, consumers, retail companies, and service providers have adapted various technologies to aid their business operations.

According to the Corporate Finance Institute (2022), e-wallets are innovations under fintech referring to software, devices, and online services where consumers and businesses can transact digitally and electronically. With the increasing usage of such innovations, e-wallets have proven to be an efficient, effective, and secure payment solution that has been made available today, having a role in the increase of public transactions and the shift from cash to non-cash transactions (Soegoto and Tampubolon, 2020).

Fintech and E-wallets in the Philippines

In the Philippines, the strong and increasing presence of developments and capitalization in the country has helped create a robust environment for fintechs, deeming them helpful in addressing and providing solutions to various problems raised during the COVID-19 pandemic highlighting how the digitization of financial services and their adoption in the country have become valuable (Barral, Carlos and Quimba, 2021). Additionally, the digitization of banks in the country has allowed users to access and transact with their accounts, showing how mobile banking has become a go-to option, especially with contactless modes of payment becoming new business and social norms (Robinsons Bank, n.d.).

The presence and use of e-wallets in the Philippines, according to a report from Bain, Google, and Temasek (2021), has one of the highest trend surges in the Southeast Asian region as it continues to grow in popularity, being second only to Malaysia. A prominent e-wallet available in the Philippines, which shall be named “Application G” for the purpose of this study, has approximately 60 million active users (Statista, 2022), and is the application used as a point of reference for this study’s comparative analysis.

Senior Citizens, Fintech, and E-wallets

Although only some senior citizens need help managing and using newer technologies, many still need assistance approaching, accessing, and using them. It was determined how the current ICT trends have furthered a digital divide among some senior citizens (Mubarak and Suomi, 2022), and how there have been insufficient efforts to educate and make digital spaces and access inclusive for senior citizens (Lawley, 2022).

As people get older, they get more inclined with their routines and do things they are already accustomed to, proving how introducing newer solutions to seniors may be challenging. A news article from Digital News Asia (2022) states that one-third (1/3) of senior citizens in the Southeast Asian region experience high anxiety about using e-payment schemes, seeing that they still prefer in-person payment options and services (Berger and Kali, 2019). There remains a gap and need for digital and financial inclusivity for senior citizens, especially using digital payment options such as e-wallets.

To address said issues, this study's main objective is to compare an existing e-wallet smartphone application (Application G) against a newly designed application developed by the researchers for the purpose of this study (which is named "PTaka") and evaluate them against a set of variables that may affect their acceptance and usage of said technologies. Additionally, this study aims to determine if the identified factors played a significant role in accepting and using e-wallets among Filipino senior citizens.

METHODOLOGY AND DATA COLLECTION

The study utilized a quantitative approach using non-parametric statistical tools testing tools for statistical analysis of results, specifically the Kendall Rank Correlation and Wilcoxon Signed-Rank Test. Surveys and interviews were conducted to gather numerical and descriptive data from senior citizens across the National Capital Region, inquiring about their perceptions of the existing and newly designed e-wallet applications.

Comparing the acceptance and usage of senior citizens on the two e-wallets, the following variables were defined and utilized as factors considered throughout the comparative analysis:

Table 1. Summary of variables of the study (acceptance, usage, display, security, navigation, process efficiency, and language).

Key Variable	Description
Acceptance	A measure or degree to which a person intends to use a system (Adell, 2009).
Usage	A measure or level of a technology's inherent qualities that make it usable for the user (Zaina et al., 2022).
Display	The visual elements created as compact interaction controls and presentation of the user interface design (Lorenz and Oppermann, 2008).
Security	The level of vulnerability or susceptibility of a person's account to unauthorized access or hacking attempts (Chaimaa et al., 2020).
Navigation	Defined as how users move within and interact with websites and applications, specifically with their elements (Guercio, 2021).
Process Efficiency	Pertains to the user's ability to complete tasks or processes in a timely manner (Tajudeen et al., 2022).
Language	Covers the ability to understand and comprehend texts, actions, and processes done by the user based on the language being used in the user interface (Dodson et al., 2013).

Modes of Data Analysis

Non-parametric statistical tools were utilized to determine results based on comparing the two e-wallet applications (using the Wilcoxon Signed-Rank Test) and relationships between variables (using Kendall Rank Correlation). IBM SPSS Statistics was utilized as software for statistical analysis.

Wilcoxon Signed-Rank Test compares two related samples, which consider the difference in magnitude. It also uses more data from a set of scores, making it more powerful and precise than a simple sign test (Xia, 2020).

Kendall Rank Correlation, also known as Kendall Tau, is a correlation and regression test used for non-parametric data, determining the degree of association and similarity between identified variables by computing the difference between each association and subjecting their binary values to compute for a Pearson's correlation coefficient (Abdi, 2007). Meghanathan (2016) provides a range of correlation coefficients and levels of correlation. This table was utilized as a guide to provide the necessary analysis and conclusion for results after the execution of the Kendall Rank Correlation.

Table 2. Range of correlation coefficient values and their corresponding level of correlation (Meghanathan, 2016).

Range of Correlation Coefficient Values	Level of Correlation	Range of Correlation Coefficient Values	Level of Correlation
0.80 to 1.00	Very Strong Positive	-1.00 to -0.80	Very Strong Negative
to 0.79	Strong Positive	-0.79 to -0.60	Strong Negative
to 0.59	Moderate Positive	-0.59 to -0.40	Moderate Negative
to 0.39	Weak Positive	-0.39 to -0.20	Weak Negative
to 0.19	Very Weak Positive	-0.19 to -0.01	Very Weak Negative

Hypotheses

To serve as a guide for the Kendall Rank Correlation, the following hypotheses were the basis for determining the relationship between variables affecting the senior citizens' acceptance and usage of e-wallet applications.

Table 3. Hypotheses for the Kendall rank correlation.

Key Variable	Hypothesis
Display	Acceptance H0: Display does not significantly correlate with the Acceptance of senior citizens on e-wallet applications. H1: Display significantly correlates with the Acceptance of senior citizens on e-wallet applications.
	Usage H0: Display does not significantly correlate with the Usage of senior citizens on e-wallet applications. H1: Display significantly correlates with the Usage of senior citizens on e-wallet applications.
Security	Acceptance H0: Security does not significantly correlate with the Acceptance of senior citizens on e-wallet applications. H1: Security significantly correlates with the Acceptance of senior citizens on e-wallet applications.

(Continued)

Table 3. Continued

Key Variable	Hypothesis
Navigation	Usage H0: Security does not significantly correlate with the Usage of senior citizens on e-wallet applications. H1: Security significantly correlates with the Usage of senior citizens on e-wallet applications.
	Acceptance H0: Navigation does not significantly correlate with the Acceptance of senior citizens on e-wallet applications. H1: Navigation significantly correlates with the Acceptance of senior citizens on e-wallet applications.
	Usage H0: Navigation does not significantly correlate with the Usage of senior citizens on e-wallet applications. H1: Navigation significantly correlates with the Usage of senior citizens on e-wallet applications.
Process Efficiency	Acceptance H0: Process Efficiency does not significantly correlate with the Acceptance of senior citizens on e-wallet applications. H1: Process Efficiency significantly correlates with the Acceptance of senior citizens on e-wallet applications.
	Usage H0: Process Efficiency does not significantly correlate with the Usage of senior citizens on e-wallet applications. H1: Process Efficiency significantly correlates with the Usage of senior citizens on e-wallet applications.
Language	Acceptance H0: Language does not significantly correlate with the Acceptance of senior citizens on e-wallet applications. H1: Language significantly correlates with the Acceptance of senior citizens on e-wallet applications.
	Usage H0: Language does not significantly correlate with the Usage of senior citizens on e-wallet applications. H1: Language significantly correlates with the Usage of senior citizens on e-wallet applications.

Table 3 provides the hypotheses that guide the Wilcoxon Signed-Rank Test to determine the better e-wallet between the two applications by comparing their mean differences.

Table 4. Hypotheses for the Wilcoxon Signed-Rank test.

Key Variable	Hypothesis
Acceptance	H0: There is no Median difference in Acceptance between the existing e-wallet application and the newly designed e-wallet application. H1: There is a Median difference in Acceptance between the existing e-wallet application and the newly designed e-wallet application.
Usage	H0: There is no Median difference in Usage between the existing e-wallet application and the newly designed e-wallet application. H1: There is a Median difference in Usage between the existing e-wallet application and the newly designed e-wallet application.
Display	H0: There is no Median difference in Display between the existing e-wallet application and the newly designed e-wallet application. H1: There is a Median difference in Display between the existing e-wallet application and the newly designed e-wallet application.
Security	H0: There is no Median difference in Security between the existing e-wallet application and the newly designed e-wallet application.

(Continued)

Table 4. Continued

Key Variable	Hypothesis
Navigation	H1: There is a Median difference in Security between the existing e-wallet application and the newly designed e-wallet application. H0: There is no Median difference in Navigation between the existing e-wallet application and the newly designed e-wallet application.
Process Efficiency	H1: There is a Median difference in Navigation between the existing e-wallet application and the newly designed e-wallet application. H0: There is no Median difference in Process Efficiency between the existing e-wallet application and the newly designed e-wallet application.
Language	H1: There is a Median difference in Process Efficiency between the existing e-wallet application and the newly designed e-wallet application. H0: There is no Median difference in Language between the existing e-wallet application and the newly designed e-wallet application. H1: There is a Median difference in Language between the existing e-wallet application and the newly designed e-wallet application.

Sample Profile and Data Collection

The study conducted surveys and short interviews among Filipino senior citizens aged 60 and above, a common idea shared based on culture and legal definitions in the country, residing in the National Capital Region, Philippines. This study only included senior citizens utilizing Application G, specifically those who have used said application within the past three months, or from September to October of 2023.

The questions that were asked to determine values and results for each key variable can be found in Table 3. The same questions were asked to every respondent, differing only on which e-wallet application is being evaluated.

Table 5. Questions under each key variable.

Key Variables	Questions
Acceptance	I plan to use the e-wallet application in the long term. I opt to use the e-wallet for my daily financial activities.
Usage	I see myself using the e-wallet for my many different financial activities. I find it easy to use the e-wallet in my payment transaction. It is convenient for me to use the application when doing transactions
Display	I have confidence in using the e-wallet when I am making transactions. I can read the text in the icons of the e-wallet application. I can distinctly differentiate each icon in the application. The text shown in the application is perfectly readable and understandable.
Security	The e-wallet system guarantees me the secure transmission of my user information and e-money. I feel satisfied with the application's security through its design. I am not worried about storing my money on the application.
Navigation	I experience no delays in changing tabs inside the e-wallet application. I can easily find the functions I want to use inside the application. I can explore the features and functions of the application with clarity.

(Continued)

Table 5. Continued

Key Variables	Questions
Process Efficiency	I can easily follow the process of what I want to do in the application. I can understand what is happening as I conduct e-wallet transactions. I do not experience any problems when conducting transactions through the e-wallet.
Language	I can easily understand the e-wallet because it is in English. I prefer the e-wallet to have my native language setting. It would be easier to use the e-wallet if it is in the Filipino language.

RESULTS AND DISCUSSION

Statistical Analysis Results

Utilizing the gathered data from senior citizens based on their perceptions, insights, and experiences with e-wallets, said data was compared based on the seven different variables considered. The Wilcoxon Signed-Rank Test shows that the newly designed e-wallet application, PTaka, has a higher rank and rating than the existing e-wallet application, Application G, in almost all categories. Results are summarized in Table 4.

Table 6. Summary of results for Wilcoxon Signed-Rank test from SPSS.

Key Variable	Asymp. Sig. (2-tailed)	E-wallet Preference
Acceptance	0.061 Insignificant	PTaka
Usage	0.000	PTaka
Display	0.003	PTaka
Security	0.075 Insignificant	PTaka
Navigation	0.019	Tie
Process Efficiency	0.002	PTaka
Language	0.013	PTaka

Table 5 summarizes results for the Kendall Rank Correlation from IBM SPSS Statistics, where it was found that Display, Navigation, Process Efficiency, and Language have a significant correlation with Acceptance. On the other hand, Display, Navigation, and Process Efficiency have significant correlations with Usage.

Table 7. Summary of results for Kendall rank correlation from SPSS.

	Acceptance			Usage		
	Correlation Coefficient	Sig. (2-tailed)	Level of Correlation	Correlation Coefficient	Sig. (2-tailed)	Level of Correlation
Display	0.397	0.000	Weak Positive Correlation	0.425	0.000	Moderate Positive Correlation
Security	-0.041	0.687 Insignificant	Very Weak Negative Correlation	0.193	0.063 Insignificant	Very Weak Positive Correlation

(Continued)

Table 7. Continued

	Acceptance			Usage		
	Correlation Coefficient	Sig. (2-tailed)	Level of Correlation	Correlation Coefficient	Sig. (2-tailed)	Level of Correlation
Navigation	0.215	0.037	Weak Positive Correlation	0.307	0.003	Weak Positive Correlation
Process Efficiency	0.302	0.003	Weak Positive Correlation	0.340	0.001	Weak Positive Correlation
Language	0.221	0.024	Weak Positive Correlation	0.124	0.213	Very Weak Positive Correlation
					Insignificant	

DISCUSSION OF FINDINGS

It is evident that senior citizens have high regard for Application G due to its usefulness and various features; however, most have issues and complaints due to complications in use, hard-to-read texts and displays, and overwhelming design. Comparing the two e-wallets, it was found that senior citizens are more inclined toward the newly designed e-wallet, PTaka, regarding Acceptance, Usage, Display, Security, Process Efficiency, and Language. Although Navigation has more responses favoring PTaka over Application G, there are more senior citizens who displayed no changes in their responses, thus indicating a tie in terms of comparison. Despite this, however, almost all variables show favorable responses from senior citizens towards PTaka, meaning that said e-wallet is better than its point of comparison, Application G, while considering the determined variables.

Based on the given IBM SPSS results, the correlation coefficients provide a correlation level between variables. It was determined that there is a weak positive correlation between Display, Navigation, Process Efficiency, and Language with Acceptance. Meanwhile, Display has a moderate positive correlation, Navigation and Process Efficiency has a weak positive correlation, and Security and Language have a very weak negative correlation with Usage.

However, accepting the null hypotheses for the Wilcoxon Signed Rank Tests and the Kendall Rank Correlations may not automatically mean that one e-wallet is not better than the other, or that there is weak to no correlation between measured variables. Refraining from rejecting the null hypothesis (or accepting it) may also imply insufficient data or evidence to conclude such a result (Frost, n.d.). This may be the case for which is the better between the two e-wallets in terms of Acceptance and Security, and for the correlation between Acceptance and Security, Usage and Security, and Usage and Language.

CONCLUSION

Most digital technologies and innovations being invented and used today can provide helpful solutions that address problems concerning convenience, connectivity, and continuity, and financial technology (fintech) is one concrete example. E-wallets, a fintech innovation for paying digitally, allow people

(customers, businesses, and other entities) to transact financially using mobile devices such as smartphones. Despite the positives of such solutions, not all sectors of society can adapt to them. There are still those who experience digital exclusivity and, thus, financial exclusivity, and most senior citizens face issues in accepting and using these technologies. By comparing an existing e-wallet application in the Philippines, Application G, to a newly developed e-wallet, PTaka, and determining correlations of variables with the acceptance and usage of senior citizens, the study determined which factors are essential to consider and which affect senior citizen acceptance and usage of e-wallets in the country. When considering the development of such applications, these e-wallets must be simplistic in user interface design and processes. PTaka, the newly designed e-wallet, has simplistic designs and reduced basic features, which played a role in having better Usage, Display, Navigation, Process Efficiency, and Language than the existing application, Application G, among senior citizens. Determined correlations between Display, Navigation, Process Efficiency, and Language play a role in Acceptance; Display, Navigation, and Process Efficiency play a role in senior citizen Usage. In general, these insights carry hope for the positive and impactful inclusion of senior citizens by accepting and using such technologies.

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