Post Pandemic Factors Influencing Continued Usage of E-payment in Higher Education Institution: Integrating Extended Technology Acceptance Model

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Abstract

This study aims to assess the factors influencing the continued usage of e-payment methods using the extended Technology Acceptance Model (TAM) in one of the Higher Education Institutions in Quezon City. The study utilized a quantitative technique, particularly an online survey, to gather data. The participants of the study have a total of 386 respondents. After the data collection, the study used the Statistical Package for the Social Sciences (SPSS) and Analysis of Movement Structure (AMOS) for data processing and construction of the Structural Equation Model (SEM). The model was used to determine the relationship between perceived usefulness, perceived ease of use, perceived security, perceived trust, behavioral intention to use, perceived satisfaction, responsiveness, reliability, and continued usage. The result shows that perceived security had a significant effect on perceived usefulness, responsiveness, reliability, and continued usage. Also, results showed that responsiveness had a positive influence on perceived usefulness. Moreover, perceived security, perceived usefulness, responsiveness, and reliability had a significant impact on the continued usage of e-payment methods among the students of a higher education institution.

Keywords
Technology Acceptance Model (TAM), Statistical Package for the Social Sciences (SPSS), Analysis of Movement Structure (AMOS), Structural Equation Model (SEM), Behavioral Intention

1. Introduction
Electronic Payment or E-payment has become a prevalent method for conducting transactions, an alternative way of payment when people do not have cash. Electronic payment and e-commerce were implemented during the COVID-19 pandemic, and until now, people have ratified the use of the system. According to Tun & Razak (2022), e-payment has created favorable conditions for industries to thrive, and one sector poised to become more significant is the e-wallet industry, driven by the increasing preference for contactless payments, swift expansion of the e-wallet market in Malaysia and its continued support for a cashless society. The younger generation and consumers are actively molding the e-payment and e-commerce landscape, exerting a significant influence on the way online products are marketed and how goods are consumed. This impact could encompass aspects like promoting environmentally friendly product choices, encouraging responsible consumption habits, and advancing the overall digitization of commerce within these nations (Yang et al., 2021). People have made e-payment methods a fundamental part of their lifestyles because of the exceptional convenience, variety of choices, enhanced financial access, robust security measures, and seamless integration into everyday activities like shopping, bill settlement, and financial planning. With ongoing technological advancements, e-payment methods will probably become even more firmly embedded in people's daily routines.

1.1 Objectives

The general objective of this study is to evaluate the factors influencing the continued usage of e-payment methods using the extended technology acceptance model in one of the Higher Education Institutions in Quezon City. Listed below are the specific objectives of the study:

1. To determine whether the perceived ease of use affects the usefulness of using e-payment.
2. To ascertain whether perceived trust has an impact on perceived security.
3. To identify how perceived ease of use, perceived usefulness, perceived security, and perceived trust affect behavioral intentions towards e-payment methods.
4. To establish if the intention of use impacts the continued usage of e-payment methods.
5. To assess whether reliability and responsiveness affect the users' perceived satisfaction.
6. To discern whether the Perceived Satisfaction impacts the continued usage of e-payment.

2. Literature Review

In the world of payments, the history of modern electronic payment instruments can be conditionally linked to the establishment of the London Clearing House in the United Kingdom in 1775 and its subsequent active use in the calculation of promissory notes, checks, and other payment documents on the basis of the clearing (Pozhydeava, 2020). Due to the growing popularity of online banking and shopping over the past few years, the electronic payment system has been expanding steadily. Electronic transfers are payments done electronically between consumers and retailers. Millions of individuals use the Internet every day to make numerous payments. These exchange elements are some form of electronic financial instrument. Over the past 20 years, electronic payment systems have garnered a lot of attention because of their vital role in contemporary Internet commerce (Hassan et al., 2020). Additionally, as information technology has developed, new avenues for the creation of innovative corporate strategies have become possible. In order to enhance banking performance, it has also transformed the banking sector by bringing in new business facets, inventing state-of-the-art services, and establishing electronic payment methods. The COVID-19 pandemic has brought to light the vital role that digital transformation plays in economies, as well as in society, and in promoting greater economic resilience. The epidemic had an impact on society and the economy and hastened the use of digital technologies in a number of sectors, including financial services (Bahia, 2022).

Today, a number of the most significant e-payment types have been developed in the actual world of e-business. E-payment systems are crucial tools that people and organizations utilize as a safe and practical method of making payments online (Nasr et al., 2020). It uses the internet to convey information, data, and money related to commercial payments. In essence, e-commerce enables the buying and selling of tangible products using online platforms, which simplifies payment for entrepreneurs and consumers who may purchase and sell anything, anywhere, at any time (Alzoubi, 2022). Customers can use an electronic payment system to pay for services. E-payments are now a necessity due to advancements in information technology. They are also known as online payment services and include bank transfers and e-wallets, which are replacing more conventional methods of electronic payment like debit and credit cards, direct bank deposits, and e-checks (Gaith, 2022). With the acceptance of e-banking, it is now simpler for businesses and consumers to send and receive payments without the burden of waiting and delaying around the globe. E-payment systems provide a number of benefits, including security, acceptability, perceived enjoyment, perceived speed, ease of payment, convenience, cost, anonymity, control, and traceability (Alhammadi and Tariq, 2020). Additionally, customers and small and medium-sized businesses have found it less complicated to execute transactions during the COVID-19 epidemic thanks to the adoption of e-payment services, which has helped to stop the disease from spreading (Kilay et al., 2022).

E-payment is one of the ground-breaking innovations brought about by technology in the financial services sector that significantly altered people's lives by making them more convenient and easier than before. Despite their explosive growth, e-payment systems are not flawless. Certain disadvantages are obvious, like the possibility of hacking risks, maintenance costs, and upgrading the system. These disadvantages prevent some individuals from utilizing e-payment systems (Najdawi et al., 2021). According to Panhwer et al. (2020), due to a lack of resources and even consumer lack of awareness, several countries have not been able to adequately implement it. Because of numerous operational challenges, the adoption of electronic payments is still very uncommon, even in emerging nations like Pakistan. Without a smartphone or tablet, e-payment apps like PromptPay, QR Code, or e-Wallet are unable to process payments. The majority of individuals must, therefore, always carry a backup in the form of cash or a debit or credit card. Some people lack knowledge of technology and are, therefore, reluctant to use a cashless system, preferring the

traditional methods of cash transactions (Yakean, 2020). One of the main obstacles to the adoption of e-money is the widespread security vulnerabilities that have been highlighted by electronic, online, and mobile payments. Credit card fraud is the area's biggest source of worry (Meuthia et al., 2020). Customers may face the risk of not being able to make payments because of inadequate infrastructure, of having their personal information exploited, of having fraud committed against them, and of other risks (Ameerbakhsh et al., 2021).

The technology acceptance model or TAM has been integrated into numerous studies, especially in exploring cognitive ergonomics. The model posits that there are two factors in determining users' technology acceptance. These factors are perceived usefulness and perceived ease of use (Davis, 1989). The model emphasizes the potential users' perceptions regarding a particular technology or system. Through the years, different studies have extended the model by adding other significant variables to improve the predictive power of TAM. Some integrated other theories or models to produce a more robust model, (Navarro et al.). This study particularly adds perceived trust and perceived security to examine whether these factors also impact users' behavioral intention and continued usage of e-payment methods. According to Zhang et al. (2019), perceived security plays a vital role in users' decisions about mobile payment services for long-term use. Users evaluate how safe a technology or system is and, at the same time, assess the effectiveness of the system's privacy measures. Another factor that plays a significant role in the adoption of payment systems among users is trust (Mondego and Gide, 2020). Users tend to adopt payment methods once the reputation and trustworthiness of the system have been established. This is why this study does not only focus on the perceived usefulness and perceived ease of use of e-payment methods.

3. Methodology

The study used a quantitative method to gather data. Quantitative research involves numerical data or other types of data that can be transformed into numbers (Sheard, 2018). According to Mehrad & Zangeneh (2019), quantitative research is a type of research in which the researcher primarily relies on post-positivist principles to advance knowledge. It includes elements like causal thinking, breaking down complex phenomena into specific variables, formulating hypotheses and questions, utilizing measurements and observations, and testing theories. For the sampling technique, the study initially used convenience sampling. Convenience sampling is a type of non-probability sampling technique wherein participants are selected based on availability and willingness to participate in the research. After getting an initial convenient sample, the study used snowball sampling to gather more participants. Snowball sampling relies on the referral of the initial participants. This is also known as the recruitment technique.

The respondents of the study were students from a Higher Education Institution in Quezon City. The total population of students from senior high school to graduate programs is 13,560. Using the Raosoft sample size calculator with a 95% confidence level, an alpha value of 0.05 set, and a 50% response distribution, the total sample size of the study is at least 374. Raosoft is a software tool employed for calculating the minimum required sample size in research or surveys. For further testing of the sample size adequacy, the study used the Kaiser-Meyer-Olkin Test (KMO Test). The KMO value should be 0.8 to 1.0 to consider the sample size adequate. For data processing, the study used Statistical Package for the Social Sciences (SPSS), particularly for reliability testing and factor analysis. Another tool used for the study is the Analysis of Movement Structure (AMOS). This is utilized for structural equation modeling.

4. Data Collection

The study exclusively focused on one of the higher education institutions in Cubao, Quezon City. The target respondents in this study were the students currently enrolled in the school year 2023-2024. A total of 386 respondents were gathered. The participation of the students in answering the questionnaire was crucial for the success of this study. Their input provided valuable insights into the usage and effectiveness of e-payment methods in school settings. By utilizing Google Forms, the study was able to reach a wide range of participants and gather diverse perspectives on this topic. The snowball sampling method was utilized as it allowed for a convenient and efficient way. The data collected during this period is analyzed using statistical techniques to identify the impact among student users of e-payment methods. The study then concludes through the interpretation and provision of the results of recommendations.

5. Results and Discussion

Table 1. Summary of Demographics

Characteristics	Value	Frequency	Percentage%
	15-17 years old	19	4.92%
	18-20 years old	135	34.97%
Age	21-23 years old	214	55.44%
	24-26 years old	15	3.89%
	27-29 years old	2	0.52%
	30 years old and above	1	0.26%
	1st year level	9	2.3%
	2nd year level	60	15.5%
	3rd year level	180	46.6%
Year level	4th year level	101	26.2%
	5th year level	9	2.3%
	Grade 11	14	3.6%
	Grade 12	11	2.8%
	Graduate Programs	2	0.5%
	Senior High	25	6.5%
	College of Engineering and Architecture	290	75.1%
	College of Computer Studies	42	10.9%
Area of study	College of Business Education	10	2.6%
	College of Education	12	3.1%
	College of Arts	5	1.3%
	Master's Degrees	2	0.5%
	Doctorate Degrees	0	0.0%
	Professional Science Master's Degrees	0	0.0%
	Gcash	317	82.1%
Method of Payment	Maya	11	2.8%
	Online Banking Application	36	9.3%

	Debit or Credit Card	22	5.7%
	1-5 times	227	58.8%
Interaction time using	6-10 times	86	22.3%
e-payment per month	11-15 times	25	6.5%
	16-20 times	9	2.3%
	21 above	24	6.2%
	Tuition Fee	144	37.3%
	Canteen	124	32.1%
Area often	Library	6	1.6%
E-payment used	Uniforms	25	6.5%
	Organization related activities (e.g. membership fee, org shirt)	229	59.3%
	Other documents that are payable (e.g. Good Moral, Form 137, removal of inc.)	79	20.5%
	All of the above	44	11.4%

Table 1 shows the summary of results for the demographic profile, such as age of respondents, year level, area of study, method of payment, interaction time using e-payment methods per month, and area where e-payment methods are often used. In examining the demographic and financial behaviors of the surveyed individuals, it becomes apparent that the majority of respondents fall within the typical college age range of 18-23 years old, with a concentration in the 21-23 age group, constituting 55.44% of the total. Interestingly, a small percentage (4.92%) comprises students below the age of 18, showcasing a diverse age distribution. Regarding academic progression, the data reflects a majority of students in their 3rd year, constituting 46.6% of the respondents. This is followed by 2nd year students at 15.5%, indicating a progressive academic representation. However, there is also a presence of students in other academic years, ranging from 1st year to 5th year, as well as those in Grade 11 and Grade 12. On the other hand, in academic division, the College of Engineering and Architecture emerges as the most populated, about 75.1% of the respondents. This is indicative of a strong representation from a specific academic field. The College of Computer Studies and Senior High exhibit moderate proportions at 10.9% and 6.5%, respectively. Postgraduate programs such as Master's Degrees, Doctorate Degrees, and Professional Science Master's Degrees show minimal representation. Shifting focus to financial transactions, digital payment methods, particularly Gcash, reign supreme among the surveyed individuals, with 82.1% preferring this mode of payment. Online Banking Application and Debit/Credit Card are also utilized, though to a lesser extent at 9.3% and 5.7%, respectively. This highlights a significant reliance on digital financial tools within this demographic. Examining the frequency of e-payment usage, a majority of respondents (58.8%) engage in e-payment methods 1-5 times per month, signifying a regular yet not overwhelming usage pattern. A substantial portion (22.3%) exhibits a higher frequency, utilizing e-payment 6-10 times per month. Comparatively fewer respondents use e-payment 11 times or more per month, with percentages ranging from 2.3% to 6.2%. In terms of areas of the areas where e-payment is often employed, organization-related activities (59.3%) and tuition fees (37.3%) emerge as primary areas. This suggests that students often utilize digital payment methods for student organizations, memberships, and academic expenses. Additionally, expenses related to the canteen, uniforms, and other payable documents also contribute, though to a lesser extent.

5.1 Reliability Testing

According to Bujang et al. (2018), cronbach's alpha is a metric used for evaluating the internal consistency between several items or ratings. The general rule of thumb for Cronbach's alpha to be acceptable is 0.70. This implies the reliability of the items.

Table 2 shows the reliability testing results using Cronbach's Alpha. This is used to evaluate the consistency of factors related to the continued usage of e-payment methods. All variables have greater than 0.7 Cronbach Alpha value, which means all are considered acceptable and reliable.

Table 2. Cronbach's Alpha

Latent Variables	Items	Cronbach's α	Cut-off	Remarks
Perceived Usefulness	PU1-PU9	0.943	≥0.7	Acceptable
Continued Usage	CU1-CU11	0.936	≥0.7	Acceptable
Perceived Security	PS1-PS7	0.886	≥0.7	Acceptable
Reliability	REL1-REL4	0.776	≥0.7	Acceptable
Responsiveness	RES1-RES3	0.727	≥0.7	Acceptable

5.2 Structural Equation Model

Structural equation model is a multidimensional statistical analysis procedure that studies structural relationships. This process requires two processes namely factor analysis and multiple regression analysis.
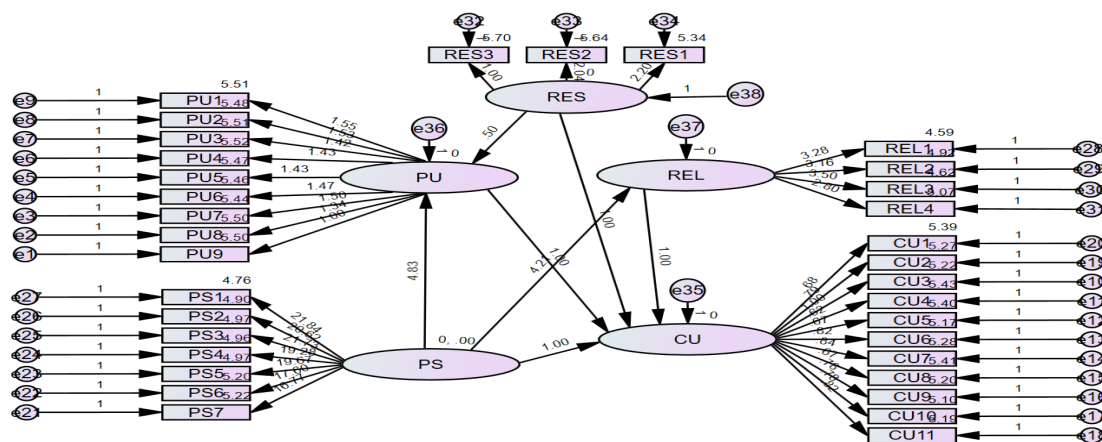

Figure 1. Hypothesis Model

Figure 1 presents the model after executing the mentioned procedures, presenting an organized set of questions that provides a detailed perspective on the effects of each item present. It illustrates the diagram's hypothetical model. The PS or perceived security has the most effect on all of the other variables and greatly affects the continued usage of the e-payments; as well as the perceived usefulness, reliability, responsiveness also contributes to the continued usage.

Table 3. Model Fit Indices - Hypothesis Model

Model Fit	Value	Cut-off	References	Remarks
Chi-Square/df	2.587	<5	Marsh and Hocevar (1985)	Acceptable
TLI (NNFI)	0.881	≥0.9	Mia et al. (2020)	Failed
CFI	0.892	≥0.9	Mia et al. (2020)	Failed
NFI	0.844	≥0.8		Accepted
RMSEA	0.064	<0.10	Mia et al. (2020)	Acceptable

Table 3 shows the model fit indices of the hypothesis model. It shows that the hypothesis model is not acceptable based on TLI, CFI, NFI, and RMSEA. These values are used by prior studies to assess model fit.
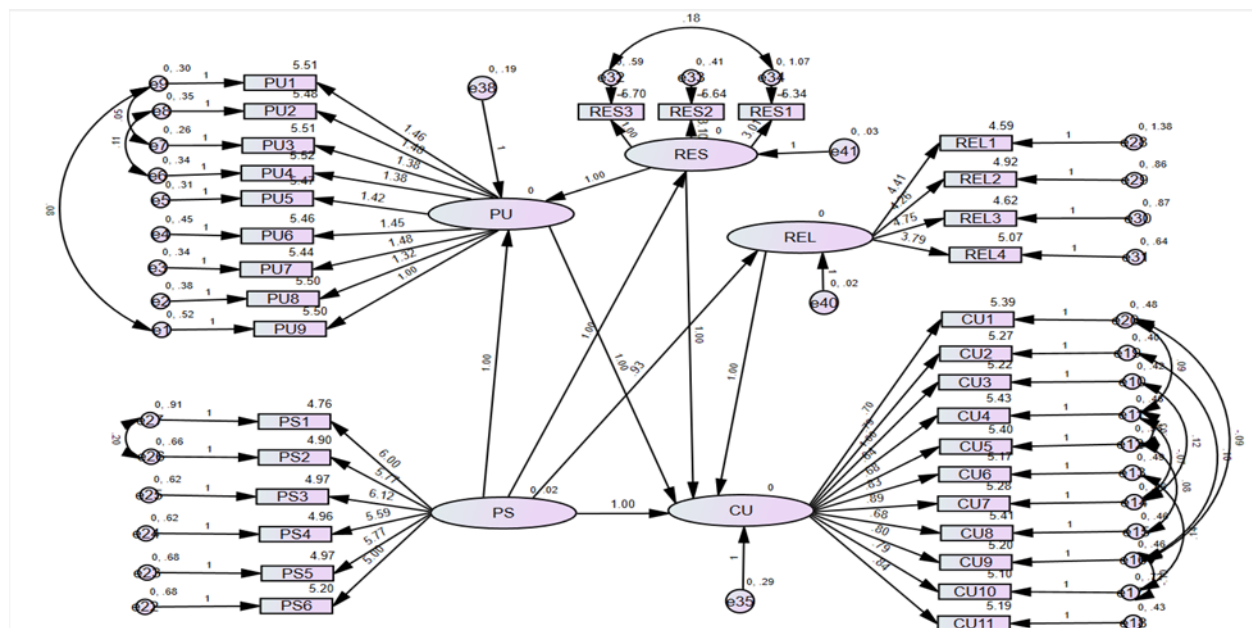

Figure 2. Modified Model

Figure 2 depicts the modified structural equation model of Figure 2; Model modification have two methods for structural remodeling: releasing constraints or adding free parameters and second method is imposing constraints or deleting constraints; the figure shows the backward search approach by imposing constraints through the z and Wald (W) tests (Chou and Bentler, 2002). PS7 has been removed from the model for its high value exceeding the standardized residual covariances, which affects the estimation of the data.

Table 4. Model Fit Indices

Model Fit	Value	Cut-off	References	Remarks
Chi-Square/df	2.587	<5	Marsh and Hocevar (1985)	Acceptable
TLI (NNFI)	0.900	≥0.9	Ibrahim et al. (2021)	Acceptable
CFI	0.910	≥0.9	Mustafa (2021)	Acceptable
NFI	0.862	≥0.8	Ibrahim et al. (2021)	Acceptable
RMSEA	0.064	<0.10	Ibrahim et al. (2021)	Acceptable

Table 4 shows the model fit indices. It shows that the model fit indices of the modified model are all acceptable. It means that the model fit is considered as a good-fitted model.

6. Conclusion

The pandemic has led to the widespread use of e-payments such as Gcash, Maya, Online Banking Application, and Debit and Credit Cards. One of the Higher Education Institutions in Quezon City started to use e-payments as one of the payment methods available. E-payment methods are used in tuition fees, canteen, library, uniforms, organization-related activities, and other documents that are payable in the institution.

This research uses the Technology Acceptance Model (TAM) with added variables such as reliability and responsiveness to assess the factors affecting the perceived satisfaction of students in using e-payment methods inside the institution. The survey with 47 questions received a total of 386 responses from the students. The result shows that perceived security had a significant effect on perceived usefulness, responsiveness, reliability, and continued usage. Also, perceived usefulness was positively influenced by responsiveness. Moreover, perceived security, perceived usefulness, responsiveness, and reliability had a significant effect on the continued usage of e-payment methods in the institution. When the consumer feels secure with the use of e-payment methods instead of cash, they tend to use it more often. When e-payment methods perform their intended use, and how the management responds to the requests of the consumer also affects the continued usage of the consumers.

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