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RESEARCH ARTICLE

Determinants of Digital Wallet Usage: An Empirical Study of Multidimensional Factors among Malaysians

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ABSTRACT

In the present digital era, people are looking for easier and safer ways to make their lives easier and more comfortable. To achieve this goal, digital wallets are an alternative. A digital wallet is a tool that helps people do transactions electronically using mobile devices. Digital wallets contribute to the development of a cashless society. Despite the long-standing support for digital wallets, the penetration of digital wallets remains low in Malaysia, especially outside of urban areas. This research surveyed 166 people to understand the multidimensional determinants of digital wallet adoption (demographic, compatibility, innovation, response efficacy, task characteristics, income level, technology characteristics, fit of the task technology) using questionnaires. SPSS is used to analyze data. The results show a significant relationship between determinants with adoption of digital wallets and the most popular digital wallet is Touch and Go. This research contributes to the components of digital technology acceptance modeling, especially useful in digital adoption during the digital age. The wide usage of digital payment contributes to the development of smart cities that promote sustainability.

INTRODUCTION

In the world of modern technology, a digital wallet plays an important role in replacing the traditional wallet and allowing consumers to make payments more convenient, secure and efficient. As a new technology, digital wallets have been used in daily life, and inside Malaysia, they have gained momentum in recent years. However, even though digital wallets are growing in popularity, it is still necessary to understand the factors that affect user acceptance and adoption behavior.

This research paper aims to investigate the determinants of adoption of digital wallets among Malaysian consumers, focusing on income level, innovation, task characteristics, technology characteristics, demographic factors, response efficacy, and compatibility. By examining these

factors, the study aims to gain insights into the factors and problems of digital wallet adoption to design effective strategies for policymakers, financial institutions, and digital wallet providers to promote the widespread adoption of digital wallets and improve a cashless society in Malaysia.

The purpose of this study has many objectives. Firstly, it aims to identify the factors that influence the adoption of digital wallets among Malaysian consumers. Second, it studies the relationship between income level and the adoption of digital wallets. Third, it plans to study the impact of innovation on the adoption of digital wallet behavior. Furthermore, this study aims to explore the role of task characteristics and technology characteristics in users' perceptions of digital wallets. In addition, it also aims to analyze the impact of demographic factors such as age, gender, and education level on the adoption of digital wallets. Finally, this study aims to evaluate the importance of responsiveness, efficiency, and compatibility in the adoption of digital wallets among Malaysian consumers.

With these objectives, this study aims to contribute to the existing literature on the adoption of digital wallets by providing experience insights into the factors that influence user acceptance and adoption behavior. By understanding these factors, policy makers and organizations can develop targeted interventions and strategies to promote widespread adoption of digital wallets, to improve the facilitation of Malaysian transactions in a cashless society.

1.1 Problem Statement

Since the government supporting digital wallets has been established among Malaysians for a long period, the usage of digital wallets is still low and has a slow growth rate. Teenage Generation Z are the main user groups of digital wallets currently in Malaysia and are the largest users and consumers of digital wallets (Jugindar et al., 2022). The digital wallet can replace the physical wallet such as cash efficiently (Kadir et al., 2022).

Furthermore, the adoption of digital wallets is faced with the challenge of the growing rate of use in Malaysians, such as cyber security. Due to the digital wallet that stores user's assets and personal information on the Internet, Malaysians have trust issues on the security level of the digital wallet (Kadir et al., 2022) due to the increasing rate of cyber crimes such as hacking and online scams over years, this will lead users of the digital wallet feel that using the digital wallet will lose their assets or personal information more easily than cash that is allow them to hold it in their hand (Fleck et al., 2024).

Last but not least, one of the challenges of the adoption of digital wallets in Malaysia is the coverage and usage of digital wallets that still needs to be improved. The coverage of the digital wallet is still at a low level and needs to improve in some villages that are far from the city, as not all stores and vendors are accepting digital wallets to be their main financial asset and a way to run their business (Daud et al., 2020). The usage and the limited coverage or the amount of the digital wallet are also one of the challenges that is only included in online shopping or some supermarkets; this leads to problems that users of digital wallets still need to prepare cash with them when they want to consume in some stores that are not accepting digital wallets (Abdul-Halim et al., 2021).

2.0 REVIEW OF THE LITERATURE

2.1 Impact of income level on adoption of digital wallet

Adoption is a means of accepting and usage of electronic payment methods through mobile devices in Malaysia. One of the factors that could affect the adoption of digital wallets in Malaysia is income level (Teo et al., 2020). The person with higher income level tends to have a higher tendency towards adopting digital wallet due to their increased financial capabilities and willingness to embrace new technology and the person with lower income level may be more reluctant to adopt digital wallet as they may have limited access to new technology and be more reliant on cash transactions. Furthermore, a person with a higher income level may have greater familiarity and comfort with using digital platforms for financial transactions. This could be one of the reasons why they are more willingness to be exposed to new technology. On the other hand, they may also be willing to use a

digital wallet as their daily financial application with more convenience and efficiency. Therefore, income level plays an important role in the adoption of digital wallets in Malaysia, with higher income levels being more likely to embrace and use a digital wallet as their daily financial transactions (Abdullah et al., 2020).

2.2 Impacts of innovation on the adoption of digital wallets

Innovativeness plays an important role in the adoption of digital wallets in Malaysia (Haridan et al., 2020). The advanced and innovative features developed by the digital wallet providers could attract more users and encourage them to use the new digital transaction. According to research factors that affect digital wallet adoption, the level of innovation could have a great effect on the adoption of digital wallet in Malaysia (Singh et al., 2020). Furthermore, new technologies such as biometric authentication and contactless payments could improve convenience, security, and efficiency with users doing financial transactions (George & Sunny, 2020).

2.3 Compatibility

Recently, digital wallets have complemented consumer lifestyles; everywhere we can hear about using digital wallets to make payments. In a similar study, compatibility with digital products was mentioned as related to consumers' previous experience of consumers with the product. If digital payments are more compatible with personal values, needs, and experiences, it will encourage more consumers to try this technology (Shetu et al., 2022). Most people prefer to use digital wallets compared to credit cards and cash to complete transactions because it can be perceived as consistent with existing values, beliefs, experiences and needs of individuals, and it is an essential element in technology adoption models (Raimee et al., 2021). Furthermore, perceived compatibility refers to the extent to which individuals perceive an innovation to be consistent with their beliefs, lifestyle, values and current needs. Research suggests that when a new technology aligns with an individual's values and lifestyle, they are more likely to accept and use it. Therefore, compatibility plays a crucial role in individuals' decisions to adopt new technologies such as digital wallets (Senali et al., 2023).

2.4 Integration of task technology

The task technology fit (TTF) was developed to find a balance between user needs and available technology; if the balance between task requirements and available technology cannot be found, then one will not adopt the technology (Baxi et al., 2024). The original TTF model assumes that users tend to use information technology to obtain benefits, such as improved job performance (Yaakop et al., 2021). In digital wallet settings, it is considered a task feature that makes consumer banking easier, because the TTF model has a positive impact on consumer technology adoption behavior (Tam & Oliveira, 2019). In addition, TTF demonstrates that technology can help users perform tasks and simplify their operations (Rahi et al., 2023). In terms of digital wallet usage, it has been confirmed that there is a positive correlation between the TTF model and the use of digital wallets(Abdul-Halim et al., 2022).

2.5 Demographic

Firstly, age is a significant determinant when considering the adoption of digital wallets. Research has found that younger ages are more likely to learn to use digital wallets because they are very familiar with using technology compared to older users (Kasirye & Masum, 2021). Older ages generally do not fully trust digital wallets to make transactions because they worry about using technology compared to younger ages (Kasirye & Masum, 2021). This is because younger people know a lot about technology and the Internet and older people might think that digital wallets are risky to use. Second, gender plays an important role in determining how effective digital wallets are. In the research, men like to learn new technology compared to women (Kolandaisamy et al., 2022). This is because women could think that the new technology in the transaction is more risky. Lastly, the research found that people with higher levels of education were more likely to embrace new technology compared to people with lower levels of education. Furthermore, people with higher education levels are more inclined to adopt new technology because they have the ability to determine whether the technology has a positive or negative impact (Caroline, 2021).

2.6 Response effectiveness

The adoption of digital wallets is influenced by various factors and response efficacy plays an important role. Response efficacy refers to a user's beliefs in the effectiveness of using digital wallets to achieve desired outcomes such as convenience, security, and efficiency in financial transactions. Response efficacy refers to the consumer's perception of the effectiveness of mobile wallets in financial transactions. Consumers who perceive digital wallets as effective tools to conduct transactions are more likely to adopt them (Chen YY et al., 2021). The impact of response efficiency on the adoption of electronic wallets (Li et al., 2023). Their study revealed a strong link between fast and reliable transaction processing and user preference for e-Wallets. Delays and inconsistencies were identified as key barriers. Optimizing response efficiency is crucial to fostering user satisfaction and driving adoption.

2.7 Task characteristics

Anything that is easy to use and adds comfort to one's life is also a task characteristic. Convenience is defined as being comfortable and easy to use, with benefits derived from usage motivated by portability and instant accessibility (Mastor, 2021). Everyone is using digital wallets, a recent trend in the market. Because it provides a wide range of services, users can benefit from it in various ways. For developers of digital wallet platforms to make improvements and better serve customers, researchers must understand the intentions when using digital wallets. Customers are increasingly choosing to replace traditional payment methods in favor of digital wallet applications (Chelvarayan et al., 2022).

In this scenario, the issue of having to count cash before, during, or after payment is resolved. A digital wallet simplifies money management at anytime and anywhere compared to conventional payment methods (Mastor, 2021). Using a digital wallet can allow users to make payments while traveling overseas, even if the home currency is different from the foreign currency. They can change the currency mode in the mobile application, so they would not have to deal with the issue of currency exchange. It only takes a few clicks to convert RMB to Malaysian ringgit (Jian et al., 2020).

2.8 Technology characteristics

The special two-dimensional QR code that the vendor generates to receive the customer's payment can also be utilized by a digital wallet. Touch n Go e-wallet, Grab Pay, Boost, Alipay, Shopee Pay, etc. are a few examples (Kolandaisamy & Subaramaniam, 2020; Ting et al., 2024). Customers can pay with just a few taps of their digital wallet app; it can save time from having to search for cash. Furthermore, Malaysia's public transportation system is growing rapidly nowadays, and digital wallets with tap-and-go capabilities let customers avoid standing in line (Yi et al., 2020).

Many biometric identification methods, including voice, facial, iris, fingerprint, and even behavioral biometrics such as keystroke dynamics, can be used with digital wallets. These methods use an individual's behavior or features to identify them specifically (Fortress Payments, 2024). In just a few seconds, users can access their mobile wallet by simply scanning their finger, facial, or iris. This can save users time and trouble. Biometric authentication is more secure than conventional methods since biometric traits are harder to duplicate, steal, or figure out than codes or passwords. Therefore, it can reduce the possibility of fraud, identity theft, and illegal access to a user's mobile wallet (Financial Technology, 2024).

2.9 Conceptual framework

Based on the literature review, this study constructed a conceptual framework to achieve the objective of this investigation, as shown in Figure 1.

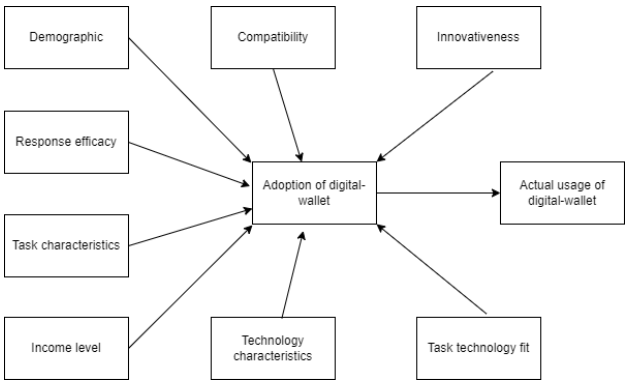

Figure 1: The conceptual framework of the study was developed on the review of the literature.

3.0 RESEARCH METHODOLOGY

This research focuses on studying the adoption of digital wallets among Malaysians. The aim of this project is to explore the factors that affect their decision making about the use of digital wallet, with a specific emphasis on understanding their behaviors, preferences, and attitude on adoption of the digital wallet. This research aims to collect different demographic groups of participants and to explore the factors that will impact of adoption of digital wallet in Malaysia. This research managed to gain 166 participants, which is a bit far from our target number, but the data analysis still managed to carry on. The Google online form is used for data collection. It has a user-friendly interface and customizable question formats with data analysis tools to gather and analyze responses efficiently. The survey form is distributed through multiple social media such as Facebook, Whatsapp, Instagram, and XiaoHongShu to reach a wide audience and be able to have a wider range of perspectives and insights on the topic and enhance our data collection efforts. Our aim is to maximize participation and engagement in our survey. 166 respondents responded through the survey form. Table 1 shows the detail of the questionnaire items adopted by Rahi et al., 2023.

Table 1: Questionnaire design adapted from Rahi et al., 2023.

Construct	**Item**	**Options**
Innovativeness	The digital-wallet service is an innovative service I would like to experiment with the digital-wallet banking service. If I heard about digital wallet, I will be the first to use this technology. In my family and friends, I always show eagerness to use new technology	Strongly disagree. 1 2 3 4 5 Strongly Agree
Compatibility	I believe that use of digital-wallet fits the way i like to use Use of digital-wallet is compatible with my life style	Strongly disagree. 1 2 3 4 5 Strongly Agree
Response Efficacy	Use of digital-wallet is effective to perform financial transactions Use of digital-wallet is effective and bring ease in financial transactions Use of digital-wallet is compatible with all kinds of online payment	Strongly disagree. 1 2 3 4 5 Strongly Agree

Task Characteristics	Use of digital-wallet allow consumer to transfer money anytime Use of digital-wallet gives real time control on bank account Use of digital-wallet technology allow user to manage account anytime The use of digital-wallet is in line with my financial tasks	Strongly disagree. 1 2 3 4 5 Strongly Agree
Technology Characteristics	Using digital-wallet banking service is real time experience The digital-wallet technology is ubiquitous (universal/everywhere) for financial transactions The digital-wallet banking technology is secure for financial transactions	Strongly disagree. 1 2 3 4 5 Strongly Agree
Task Technology Fit	Using digital-wallet banking service is appropriate for my financial tasks The use of digital-wallet service is adequate and meet end-user need I can manage financial operations effectively using digital-wallet Use of digital-wallet service offer complete account management system	Strongly disagree. 1 2 3 4 5 Strongly Agree
Adoption of Digital-Wallet	I intend to use digital wallet in next months I predict that I will use digital wallet in next months I plan to use digital wallet in next months Digital wallet can substitute the cash based payment methods Using digital wallet is beneficial	Strongly disagree. 1 2 3 4 5 Strongly Agree
Actual Usage of Digital-Wallet	I plan to use of digital-wallet king service frequently I prefer to use digital-wallet service in my daily financial activities I intend to use of digital-wallet technology in near future	Strongly disagree. 1 2 3 4 5 Strongly Agree

Analysis Methods

We use multiple analysis methods to examine the data collected from our survey. These methods included summarizing key factors in our survey form such as demographic, compatibility, innovation, response efficacy, task characteristics, income level, technology characteristics, and fit of task technology. Based on the data collected, we managed to gain a deeper understanding of the adoption of the digital wallet among teenagers.

4.0 RESULTS AND DISCUSSIONS

The questionnaire items used in this study are analyzed using Cronbach Alpha and the results are shown in Table 2. It was found that the measured items have a closely related and high value of alpha.

Table 2: Reliable Level of Questionnaires Items

Questionnaire Item Section	**Cronbach's Alpha Based on Standard Item**	**Number of Item**
Innovativeness Measurement	0.84	4
Compatibility Measurement	0.88	2

Response Efficacy Measurement	0.89	3
Task Characteristic Measurement	0.85	4
Technology Characteristics Measurement	0.81	3
Task Technology Fit Measurement	0.90	4
Adoption of Digital-Wallet Measurement	0.93	5
Actual Usage of Digital Wallet Measurement	0.90	3
Total		28

Demographic information of the participants

Table 3 shows a total of 166 demographic data responses. The highest percentage of gender is females. 60.8% of the total have 101 females respond. For male total of 65 responded, which is 39.2%.

Table 3: Demographic information of the participants

Characteristics	Frequency (N)	Percent (%)
Age		
Young Adult 17-30 years old	115	69.3
Middle-aged adult 31-35 years old	19	11.4
Old-Adult 45 and above	32	19.3
Gender		
Male	65	39.2
Female	101	60.8
Higher Education Level		
Primary school	2	1.2
Secondary school	35	21.1
Diploma	54	32.5
Bachelor Degree	72	43.4
Masters degree	2	1.2
PhD	1	0.6
Monthly Income		
Less Than RM 1000	76	45.8
RM1000 - RM2000	21	12.7
RM2001 - RM3000	28	26.9
RM 3001-RM4000	18	10.8
RM4001 and above	23	13.9
Which digital wallet are you most likely to use?		
Alipay	3	1.8
Grab Pay	9	5.4
Lazada E-Wallet	1	0.6
Shopee Pay	8	4.8
Touch n Go E-Wallet	145	87.3
Total	166	100.0

Pearson correlation analysis

Table 4 shows that the information of the Pearson correlation coefficient is one of the ways to determine the dependent variable (Digital wallet adoption) and the independent variable (Factor - Innovativeness, Compatibility, Response efficacy, Task characteristics, Technology Characteristics and Fit of the task technology). The findings show that all of the factors have a significant positive effect on the adoption of digital wallet.

Table 4: Pearson correlation between factors and Adoption of the digital wallet

	Adoption of Digital-Wallet	SD	Hypothesis
Innovativeness	0.700***	2.74	Supported
Compatibility	0.755***	1.23	Supported
Response efficacy	0.750***	1.92	Supported
Task Characteristics	0.681***	2.62	Supported
Technology Characteristics	0.667***	1.81	Supported
Task Technology Fit	0.695***	2.56	Supported

Note: Significant at level.05 (2-tailed), ***sig < 0.001

DISCUSSIONS

Digital wallets are the new trend in the world, which rises rapidly by providing multiple functions that allow users to manage their money with more convenience and safety in a more easier way that requires only devices such as phones or computers. It also contains the advantage that users can have their financial activities anywhere and anytime without just requiring a network connection(Financial services ., 2023). Based on this research, it was found that most of the participants are more interested and willing to use a digital wallet as their daily financial way to replace the old financial way such as cash or credit card and this has been proved with data World Payments Report 2023 which shows that the non-cash transaction is increasing rapidly year by year from 1016 billions in year 2021 to 1334 billions in year 2023 (Financial services, 2023).

The result of this study shows that multiple factors such as compatibility, innovation, response effectiveness, task characteristics, income level, technology characteristics, and task technology fit are having a significant impact on the adoption of digital wallets that are shown in Table 3. Based on data from Malaysia going cashless fast. (Fintech News Network, 2023) We found that the cashless transaction is growing compared to the cash and cheque transaction. Today, thanks to the era of technology, people can carry out their tasks with more high-level technologies with less time consuming. Thus, the digital wallet that contains multiple functions is starting to become a new trend that allows users to carry out their financial transactions for multiple purposes that could replace cash transactions.
Lastly, the result of this study shows that multiple factors could help in the adoption of the digital wallet in Malaysia, as shown in Table 4. But does the cashless transaction do any help to the market and economy or just a new transaction way for transferring money and paying bills? This requires further research on different aspects of the economy and the market impact caused by the adoption of digital wallets.

5.0 CONCLUSIONS

The age group with the highest percentage of adoption of digital wallets is 17 to 30 years old. Compared to other age groups, this younger population is more likely to adopt and use digital wallets. The education level that has the highest adoption rate for digital wallets is those with a Bachelor's degree. People in university-level education are generally more accepting of and at ease with the use of digital wallet technologies. Among the various digital wallet options available, the study found that those in the targeted demographic ages 17-30 with a bachelor's degree are most likely to use the Touch & Go e-wallet service. For this particular user base, this Touch 'n Go digital wallet appears to be well liked or the top option. In summary, the research indicates that young adults between 17-30 years of age, particularly among women who have obtained a Bachelor's Degree represent the group with the highest adoption rates for digital wallets and income levels below Rm1000, with the Touch 'n Go e-Wallet being their most popular platform.

The **limitation** of this study is the adoption of digital wallets, and usage patterns can vary significantly between different demographics, such as age groups, income levels, and education levels. Capturing a representative sample and accounting for these diverse user groups can be

challenging in research studies. User attitudes toward digital wallets can shift rapidly due to factors such as security incidents, new technologies, or changing preferences. Capturing these dynamic attitudes in research can be difficult. Future work in the adoption of digital wallets focuses on improving privacy and security protocols. To improve the security of user data and transactions, research is being done on biometric authentication, advanced encryption techniques, and other security measures. Creating privacy-preserving procedures and methods to allay customer concerns regarding the privacy of their data and guarantee adherence to laws. Furthermore, future work can investigate creative ways such as offline payment options or alternate connectivity to circumvent infrastructure and connectivity constraints in underprivileged areas. Investigating assistive technologies and inclusive design approaches to increase the accessibility of digital wallets for people with disabilities or those living in low-literate situations.

Contribution

The contribution of this study is to develop a research paper that can explore the adoption of digital wallet services among consumers. By incorporating the concept framework of a digital wallet such as demographic, compatibility, innovation, response efficacy, task characteristics, income level, technology trends, task technology fit in the adoption of digital wallets among Malaysian consumers. Through these analysis and statistics results, the study highlights the importance of factors such as compatibility and trust in forming consumer behavior toward digital-wallet usage. This contribution not only enriches the existing literature on e-banking, but also provides practical implications for policymakers and industry stakeholders aiming to promote the adoption of digital-wallet services.

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