Mobile payment and e-wallet adoption in emerging economies: A systematic literature review

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ABSTRACT

Against the backdrop of greater smartphone and internet penetration across the emerging markets, electronic wallet (e-wallet) has emerged as a reliable and well-known digital payment method. The main purpose of this paper is to review the growing volume of studies on e-wallet adoption in this region. E-wallet is widely used worldwide, but it has yet to become mainstream in developing countries, including Malaysia. Hence, scholars have conducted numerous studies on e-wallet use, but there seems to be a lack of consensus on the predictors influencing its adoption. This study examines these publications to analyze the potential research gaps, offer a multi-stakeholder eco-system framework and make recommendations for future research. We retrieved scholarly articles on E-Wallet adoption published from 2016-2021 through the Google Scholar and Scopus database. After the screening process in which some papers were excluded, 77 previous studies were reviewed regarding the methodology, findings and adaptation of theories/models. Considering that a large portion of the studies are grounded based on the technology acceptance framework and typically involved drivers and enablers, we call for a distinct approach that draws in other factors into the equation. For instance, future research may divulge the inhibitors to E-wallet adoption and incorporate the external environment and consumer psychological factors as potential predictors.

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1. Introduction

The evolution of Information and Communication Technology (ICT) has impacted the lives of mankind. The proliferation of ICT enormously contributes to the transformation of businesses’ financial operations (Slozko & Pello, 2015) and enhances their bottom line performance (Ali et al., 2010). Through nearly infinite number of applications available, mobile apps and the internet drive consumers to move
beyond traditional routines and embrace digital transactions. For instance, the swap from cash-based payment to electronic-based payment. With the help of internet growth, the trend of using e-commerce is constantly on the uptrend. E-commerce is now a popular platform to conduct transaction between business partners (B2B), or business and customers/consumers (B2C). Correspondingly, electronic payments—a requisite for any e-Commerce transactions to conclude, are rapidly substituting the use of banknotes and cash-based systems. These developments drive the emergence of a digital payment application, termed as the electronic wallet or e-wallet. Generally, E-wallet is considered as an online prepaid account that can be used to store money and operate online/offline transactions through the use of a mobile app (Pahwa, 2017).

A recent Dataportal’s survey on online transactions revealed that 58% of Malaysian purchased by using mobile phone apps, 66% of users has made bank transactions, and 42% of consumers has made online payment (Kepp, 2019). The market research agency also reported that the share of e-wallet in e-commerce transaction and point-of-sale (POS) spending are 7% and 1%, respectively. In the same year, Nielsen Malaysia’s (2019) survey found that 67% of Malaysian users performed cashless-based payment that comprises of online banking (57%), credit/debit cards (27%), and mobile wallets (8%). The reported lack of e-wallet usage in POS and retail transactions among Malaysians are a serious concern considering the country's ambition to transform itself into a cashless society. In view of this issue, the aim of this paper is to analyze the research trend involving e-wallet adoption and provide insights on potential avenues for future researchers to investigate.

According to The Economic Times (2018), e-wallet is defined as an electronic card or an app that consumers use when conducting online transactions via mobile devices such as tablet, laptop, or smartphone. The functions of an e-wallet is similar to a traditional wallet and it should be connected to the user’s account in order for it to function securely. The use of e-wallet allows for hassle-free sales transactions between any businesses and their customers, thus aiding in revenue generation (Kony, 2018). In another perspective, e-wallet is an app created by the authorized bank (or licensed non-bank E-money issuer) that converts the physical wallet into digital features (Singh & Sinha, 2020). For an e-wallet to function, the account needs to have sufficient balance pre-loaded and hence it requires money to be credited. Therefore, e-wallets often require users to store certain bank and card details. Users can also accept, store and transfer money between accounts. Boost, Touch n Go, or GrabPay are the most popular examples of e-wallet applications in Malaysia.

People often confuse themselves over the interchangeable use of the terms e-wallet and digital wallet. However, Pahwa (2017) argued that digital wallet is slightly different from e-wallet, in the sense that a digital wallet serves a platform to keep user’s card details for cardless transactions (in which consumers need to register, save, and validate their card details). Contrary to e-wallets that mandate users to place their money in advance, digital wallets do not require any reload top-ups or upfront credits as the users’ money remained in their respective bank accounts. Among the well-known examples of digital wallets are Masterpass, Google Wallet, and Apple Passbook. Despite this argument, it may appear that digital wallet and e-wallet are similar to one another as there are companies, such as, Paypal that provide both services. Moreover, there is also the term mobile wallet (m-wallet) that refers to apps that only support buyer-merchant transactions only via the smartphone instead of laptop, tablet, or other devices. To clear up the misunderstanding around the use of the term, we define E-wallet as a mobile device-based platform that facilitates cashless payments of a sales transaction—either in proximity or remotely, between consumers and merchants or service providers.

Numerous studies on the use of e-wallets have been undertaken (refer to Table 2 and 3), but there appears to be a lack of consensus on the factors that influence its acceptance especially within the emerging markets context. Hence, this study aims to examine these publications to identify the research gaps and offer recommendations for future research on e-wallet adoption.
1.1 History and types of e-wallet

The origins of payment can be traced back to 1997 when Coca Cola served cokes that can be purchased via text messages, to their consumers in Helsinki through vending machines. Although this kind of digital payment is different compared to the modern e-wallet transaction, it serves as a proving ground for future developments that later saw the advancement of mobile phones as the device to purchase tickets, food, and book hotel accommodations. Digital payment does not involve the exchange of currency notes, by which, the process of releasing and accepting money is performed digitally (Sahayaselvi, 2017). In the early days, electronic payment can be managed by using several methods such as debit/credit card, Automated Clearing House (ACH) network which consists of direct debit, e-cheque, and direct deposit (Hord, 2005).

Besides, by using Near Field Communications (NFC) technology, Google became the starter in launching a mobile wallet (m-wallet) around 2011. This m-wallet enables consumers to make transactions such as digital payment, receiving loyalty points or retrieve coupons and rewards. At that point of time, these transactions can only be made on mobile devices and received by only a few merchants, but it was very popular. A year later, Apple Passbook emerged to conduct digital transactions such as processing boarding pass, tickets, or redeem vouchers. This trend is followed by the establishment of Apple Pay, Android Pay and Samsung Pay, all of which operate using the NFC technology. Given the diverse operationalization and usage of e-wallets, we classified the different types of e-wallet according to themes, specifically (1) accessibility, (2) technology-based, and (3) network-vs-card-based.

This classification is summarized in Table 1 below. In terms of accessibility, the users are served with three different types of e-wallets which are closed e-wallet, semi-closed e-wallet, and open e-wallet. Users of closed e-wallets can perform transactions with only the specific e-wallet providers—for example, Starbucks cards or Lazada Wallet. Meanwhile, semi-closed e-wallet allows the users to purchase goods and services from merchants who contract with the e-wallet providers—for instance, Alipay or LinePay. On the other hand, consumers of open e-wallet are enabled to conduct transactions in stores, apps, or web. Only banks can be the issuer of open e-wallet, which works like credit cards, up to pre-funded amounts. Examples of open e-wallet are Visa Checkout or Masterpass. Trotman (2021) indicated that between these types of e-wallets, the open e-wallet has an extra advantage that enables the users to withdraw money via ATMs.

In addition, e-wallet services can be segregated based on different technological bases. Some e-wallet only requires an internet connection to reach their customer, but transactions can only be conducted online rather than on-site. For over-the-counter retail dealings, NFC and QR-code based technologies are widely used via the smartphone. NFC-based e-wallets work via radio-frequencies, and rapidly communicate with the merchants’ RFID terminal upon physical contact with the NFC-enabled smartphone. Meanwhile, QR-code-based e-wallets operate through QR image scans (printed or displayed) to make payments without physical contact.

Furthermore, e-wallet can be categorized into network-based e-wallet and card-based e-wallet. Both network-based and card-based are capable of issuing electronic money and performing activities with other merchants (open-loop). However, only a card-based e-wallet is linked to the card scheme (Wycech, 2015). In Malaysia, the examples of network-based e-wallets are Touch n Go e-wallet and Boost. Meanwhile, Aeon wallet and BigPay wallet are famous examples of card-based e-wallet.
Table 1. Summary on E-wallet by category

| Category      | Description                                                                 | Pros                                                          | Cons                                                                                           | Example                        |
|---------------|-----------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------|
| Accessibility | Closed Exclusively transactions at e-wallet issuer’s company.               | Express purchase activities as the payment are made straight to the e-wallet issuer. | The fund stored cannot be used for other purposes except purchasing from the particular issuer | Starbucks card, Lazada wallet, The Coffee Bean card |
|               | Semi-closed All transactions can be conducted at any merchants that provide card-scanning terminal. | Users are allowed to make variety of purchases at many merchants Cash withdrawal is available | Transactions can be longer due to security issues Only bank can be the issuer of this type of e-wallet | Big Pay, Ali Pay, Line Pay, Touch n Go, Boost, Grabpay Masterpass, Visa Checkout |
|               | Open All transactions can be carried out at merchants that registered with the e-wallet provider. |                                                                 |                                                                                               |                                |
| Technology    | NFC E-wallet that includes secure element either inserted in the device or employ HCE (Host Card Emulation) in the cloud | Very fast, secure, flexible Limited to PoS terminal that provide NFC, Distance limitation Can be difficult to read in less than ideal lighting conditions Cannot be used in physical world | ApplePay, Samsung Pay          |
|               | QR-code Transactions can be made by scanning QR-code that provided by merchants or in the user’s device. | Very simple and quick application, Do not require any physical contact Simple to install | Touch n Go, Boost, Grabpay, WeChat Pay, AliPay Paypal |                                |
|               | Internet Created only for online uses |                                                                 |                                                                                               |                                |
|               | Network-based e-wallet The fund must be loaded first (prepaid) to make payment. Network-based e-wallet does not connected to bank account | No need for card to enjoy services as this e-wallet is installed in user’s device. Commonly, the services are come with variety of incentives | Depends on internet availability | Boost, Grabpay, Touch n Go, Setel |
|               | Card-based e-wallet Collaboration between e-wallet provider and credit card network | Promptly can be used at any card accepting merchants without time consuming process | Balance statement is not available for user | BigPay, Aeon wallet |

1.2 Benefits and issues arising from e-wallet use

Some benefits drive e-wallet adoption among consumers. To seek consumers’ attention, the providers commonly serve plenty of incentives as a reward for using their services. For instance, they offer cashbacks, reward points, good deals, or discounts. By using e-wallet services, consumers can easily transfer their money to other third-party accounts. Moreover, e-wallet users are also able to pay the same receipt separately because it has the capability to split the bills. Some e-wallet providers offer consumers to save on costs provided by their related services. For example, there will be no processing fee for AirAsia ticket purchases made by travelers who pay using the Big Pay wallet. Likewise, road users are able to earn toll payment discounts when they signed up and reload with the Touch n Go e-wallet app.

To attract consumers, e-wallet providers have invested significantly to enhance their services’ security, safety, and convenience. For instance, the user’s information in the e-wallet account is typically encrypted and not saved on the mobile phone. Plus, all the payment transactions are stored automatically to be easy for the consumers to refer to the historical ledger. Convenient-wise, e-wallet users also do not have to scramble around to locate and count the banknotes and coins. Travelers can also save time and physical...
effort. For instance, Touch n Go card users can link their smart card with the e-wallet, thus allowing them to top-up their money online rather than physically queuing at selected merchants. From the ecological view, reducing paper use promotes a lesser risk of environmental waste and pollution.

However, several reasons kept thwarting Malaysia from achieving a successful e-wallet adoption among its citizens. Rathore (2016) suggested that security and confidentiality are the main problems, especially in terms of the safety of the bank account details and funds credited. Besides losing money, consumers fear that their confidential banking information would be leaked and severely compromised if their phones are lost or stolen (Upadhayaya, 2012). Consumers face security risks such as hack, malware, and phishing attacks in online transactions. Due to the newness, e-wallets may have some forms of security risks and issues that experts find hard to resolve (Yuen, 2019). Other than security issues, consumers’ interest in using e-wallet may wane due to internet inaccessibility. This barrier toward e-wallet adoption commonly persists in rural areas, as any e-wallet providers’ serviceability is primarily supported by the internet connection (Rathore, 2016). The consumers are left with no choice but to reuse the cash when the phone is out of battery or no internet coverage (Yuen, 2019). Besides, the usage of e-wallet application might cause overspending as the inclination of consumers to use up more money is greater if they use the intangible digital money. Furthermore, e-wallet services can be pretty inconvenient when it requires the consumers to constantly upgrading the application. Sometimes, it demands the consumers to go through a few unnecessary stages to process a transaction that raises annoyance for the consumers, especially the first-time users. However, these issues are highly subjective and may resolve over time.

1.3 E-wallet in Malaysia

The year 1997 had witnessed the dawn of electronic money in Malaysia that emerged in the form of Touch n Go cards, a contactless smart card used mainly for the country’s toll, parking, and transit collection system. Users can link it with credit or bank cards or conduct the transactions at toll booth or certain ATM terminals to load money in the cards. Since then, the card was the leading electronic payment for its citizens, despite its limited use in the transportation sector and its unsuccessful adoption in retail transactions. As the world rapidly embraced e-wallets as a payment method of choice in the 2010s – especially in China and Scandinavia, the rate of e-wallet penetration among Malaysians remains dismal. They conservatively prefer cash and cards, not unlike their other Southeast Asian counterparts.

The situation appears to look promising in 2017 when several dozens of e-wallet providers entered the market. To date, Bank Negara Malaysia (BNM) has granted 54 e-money issuer licenses to 6 banks and 48 non-banks e-money issuer. Despite having e-wallet services launched for several years, e-wallet adoption is still in its early stages compared to other countries with higher utilization rates (Yuen, 2019). The adoption of e-wallet services is slow considering that most of the Malaysian users have ignored the fact that e-wallet serves many benefits and has limited knowledge regarding e-wallet usage. An industry report revealed that Malaysian users tend to choose debit cards or online banking rather than e-wallet regarding non-cash payment transactions (Omarini, 2018). To mitigate this problem and accelerate the country’s cashless society agenda, the country’s central bank introduced the Financial Sector Blueprint (FSBP) to encourage e-wallet usage. This incentive includes providing financial aids for merchants in the small/medium business sector and e-wallet cash handouts for its citizens. Despite the waves of reform measures to shift the consumers preference to digital payment over the cheque or cash, the outcomes remain uncertain (Tan & Li, 2018).
2. Research methodology

This article review is conducted to provide comprehension of the current state of e-wallet adoption. This study started with an extensive search on articles that are related to e-wallet adoption. Several prominent scholarly databases namely Google Scholar, and Elsevier's Scopus were employed due to their reliability, accuracy and comprehensiveness in measuring the impact of scholarly manuscripts and the people who authored them (Walters, 2009). By using the funneling method, several articles that are related to e-wallet adoption were considered and retrieved. The article search included keywords as follows: “E-wallet” “digital wallet” “digital payment” “mobile payment” “electronic payment” and “mobile payment system”.

Three stages of screening process were formed to obtain the most suitable studies to be reviewed. At the first stage, this study combined and assessed the data from the previous literature of digital wallet or digital payment between 2016 to 2021 by using a systematic review of the electronic wallet acceptance research. The rationale of choosing this time of period is basically to gather data and information on e-wallet adoption in the current context, assuming that the number of published papers regarding this area...
has increased. The past studies in the last five years are believed to provide more insight than several years before. After screening the abstracts, 190 past papers were gathered. At the second stage, the articles were separated based on some specifications. These papers should be written in English, conducted in countries listed as advanced emerging (AE) or secondary emerging (SE) economies, complete, and full access. The main reason to choose articles from AE and SE countries is because of the economic condition. These countries are believed to have similar economic conditions whereby they are not too advanced or too lagging. Although the list of countries by FTSE indicated that China is one of the secondary emerging countries, e-wallet adoption studies originated from China were excluded on the basis that the country has reached maturity (more than 90% penetration in urban populations) in e-wallet adoption. Moreover, 76% of Chinese are active smartphone users. This high penetration rate –higher than United States' penetration rate of 36%, drives them to embrace e-wallet services currently duopolized by Alibaba's Alipay Tencent's WeChat Pay (Groenfeldt, 2017). One hundred and four articles were successfully retrieved. At the last stage, 28 documents were removed due to duplication, student’s thesis or dissertation, or not strongly related to the e-wallet adoption. Seventy-three articles were analyzed at the final review.

3. Analysis of result

This study prioritizes the published research articles in academic journals and conference proceedings. At the end of the screening process, 76 papers were successfully obtained and considered sufficient for the final review. These papers were classified into two categories, quantitative and qualitative. The findings indicated that quantitative studies on proximity-based mobile payment were dominant. Out of 76, 73 articles were done using a quantitative approach. Meanwhile, the rest used a qualitative approach. The details of the past studies are summarized and presented in Table 2 and Table 3 below.

Table 2. Summary of qualitative studies on proximity-based mobile payments adoption in Developing Countries (excluding China)

| Sources                  | Country | Context                                                                 | Findings                                                                 |
|--------------------------|---------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Halaweh and Qaisi (2016) | UAE     | A total number of 18 participants from public and private business sectors were directly interviewed to solicit their views regarding NFC technology as a mobile payment at their Point of Sale (POS). | The authors discovered that there is still a lack of knowledge, awareness and experience on the part of both merchants and retailers concerning the NFC mobile payment system. |
| Adharsh et al. (2018)    | India   | The researchers conducted interview (in-person questionnaires) with certain group among student to assess the degree of mobile wallet usage | Indians mostly use e-wallets on online activities, ticket booking, and mobile reloads due to their time-saving benefit. The impacts of demonetization in India drive the proliferation of its’ e-wallet services. The promotions and incentives served by the providers have attracted Indian consumers to choose and use e-wallets. |
| Moghavvemi et al. (2021) | Malaysia| In-depth interviews with merchants from multiple retail categories were conducted to gain insight into their motivational drives, barriers, and challenges in the context of the adoption and implementation of m-payment | M-payment adoption among merchants is impacted by decreasing payment processing time and fees, convenience, enhanced payment security features. Meanwhile, they refuse to use m-payment because of technological incompatibility, complexity, the cost of investment, and the lack of critical mass and knowledge. |
Table 3 Summary of quantitative inferential studies on proximity-based mobile payments adoption in Developing Countries (excluding China) from 2016 to 2021.

| Sources          | Country      | Context                                                                 | Theory                          | Predictors                                                                    | Mediators/Moderators (if any) | Outcome                        |
|------------------|--------------|-------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------|-------------------------------|--------------------------------|
| Rouibah et al. (2016) | Kuwait      | 150 employees who graduate from leading business school in Kuwait (Online based) 200 students (Paper-based) | Cognitive Dissonance Theory (CDT) | Perceived enjoyment (sig), Customer trust (sig), Perceived risk (ns)          |                               | Adoption intention          |
|                  |              |                                                                        |                                  | Personal innovativeness (sig), Propensity to trust (sig), Familiarity (sig), Presence of third-party seals (sig), Perceived enjoyment (sig), Perceived risk (sig) |                               | Consumer trust               |
|                  |              |                                                                        |                                  | Personal innovativeness (sig)                                                 |                               | Perceived enjoyment          |
|                  |              |                                                                        |                                  | Presence of third-party seals (ns)                                             |                               | Perceived risk               |
| De Luna et al. (2016) | Brazil     | 423 mobile phone users in Brazil                                        | Technology Acceptance Model (TAM) | Attitude towards the use (sig), Perceived Ease of Use (sig), Perceived usefulness (sig), Subjective norm (sig), Perceived security (sig), Perceived compatibility (sig), Individual mobility (ns), Personal innovativeness in IT (sig) |                               | Intention to use mobile payment |
| Sources            | Country     | Context                       | Theory                                                                 | Predictors                                                                 | Mediators/Moderators (if any) | Outcome                        |
|-------------------|-------------|-------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------|--------------------------------|
| Abrahão et al. (2016) | Brazil      | 605 mobile phone users        | Unified theory of acceptance and use of technology (UTAUT)             | Performance expectancy (sig), Effort expectancy (sig), Social Influence (sig), Perceived risk (sig), Perceived Cost (ns) |                                | Behavioural intention          |
| Trivedi (2016)     | India       | 336 students (Gen Y)          | Theory of reasoned action (TRA), Technology Acceptance Model (TAM)      | Perceived usefulness (sig), Perceived ease of use (sig), Subjective norm (ns), Perceived trust (ns), Attitude (ns), Self-efficacy (ns) |                                | Behavioural intention for using e-wallet |
| Aydin and Burnaz (2016) | Turkey      | 639 mobile wallet users, 666 non-users | Unified theory of acceptance and use of technology (UTAUT)             | Attitude (ns), Compatibility (ns), Perceived ease of use (ns), Personal innovativeness (ns), Perceived security (ns), Social influence (ns), Perceived usefulness (ns), Rewards(ns) |                                | Use intention                  |
| Abidin et al. (2017) | Philippines | 90 mobile phone subscribers   | Unified theory of acceptance and use of technology 2 (UTAUT 2)         | Performance expectancy (ns), Effort expectancy (sig), Social influence (ns), Facilitating condition (ns), Hedonic motivation (ns), Price value (ns), Habit (ns), Trust (sig), Perceived risk (sig) |                                | Behavioral intention          |
| Sources                  | Country          | Context                          | Theory                                                  | Predictors                                                                                   | Mediators/Moderators (if any) | Outcome                      |
|-------------------------|------------------|----------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|
| Manikandan and Jayakodi (2017) | India            | 150 mobile wallet users in Chennai | No model or theory specified                           | Privacy (ns), Security (ns), Ease of use (ns), Convenience (sig), Pricing (ns), Utility of innovation (ns), Usefulness (sig), Brand loyalty (ns) |                                | Usage of mobile wallet        |
| Oney et al. (2017)      | Turkey           | 299 Turkish university students. | No model or theory specified                           | Perceived security (sig), Perceived trust (sig), Technical protection (sig), Transaction procedure (ns), Security statements (sig: PS), Past experience (sig) |                                | Electronic payment system (EPS) use, Perceived security, Perceived trust |
| Trachuk and Linder (2017) | Russian          | 429 consumers                    | Perceived Organizational E-Readiness (POER), Perceived Environmental E-Readiness (PEER), Technology Acceptance Model (TAM) | Testing capability (sig), Comparative advantage (sig), Complexity (sig), Enjoyment of use(ns), Reliability (sig), Control of usage process (sig), Risk of use (sig), Technical feasibility (sig), Perceived risk(ns), Perceived advantage and need for alternative payment system (sig), Operating costs (sig), Network effect (sig), Market pressure (sig), Technological changes in the industry (sig) |                                | Use of technology             |
| Sources                | Country     | Context                               | Theory                               | Predictors                                | Mediators/                      | Outcome                   |
|------------------------|-------------|---------------------------------------|---------------------------------------|-------------------------------------------|----------------------------------|---------------------------|
| Aslam et al. (2017)    | Pakistan    | 335 users of mobile payment system    | Technology Acceptance Model (TAM)     | Perceived security (ns), Perceived compatibility (sig), Perceived usefulness (sig), Perceived ease of use (ns), Subjective norm (sig) | Attitude towards usage (sig)    | Intention to use          |
| Busu et al. (2018)     | Malaysia    | 150 students of a higher education institutions | Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) | Perceived usefulness (sig), Perceived ease of use (ns), Compatibility (sig), Perceived cost (sig), Additional value (ns), Personal innovativeness (ns), NFC related knowledge (ns), Concern on theft/fraud/loss (ns), Consumer trust (ns) |                                   | Intention to adopt        |
| Kongarchapatara (2018) | Thailand    | 275 respondents who had experience with QR-code payment application | Technology Acceptance Model (TAM)     | Perceived usefulness (sig), Perceived ease of use (sig), Perceived credibility (sig) | Perceived self-efficacy** (sig) | Behavioral intention to use |
| Jaz et al. (2018)      | Kuwait      | 132 users of mobile application       | Technology Acceptance Model (TAM)     | Perceived ease of use (sig), Perceived usefulness (ns), Trust (ns), Social influence (sig), Online payment (sig) |                                   | Adoption                  |
| Sources                        | Country | Context                                                                 | Theory                                                                 | Predictors                                                                 | Mediators/ Moderators (if any) | Outcome                |
|-------------------------------|---------|-------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------|------------------------|
| Chakraborty and Mitra (2018)  | India   | 150 respondents in India                                                | Unified theory of acceptance and use of technology (UTAUT)             | Perceived usefulness (sig), Perceived ease of use (sig), Social influence (sig), Perceived self-efficacy (sig), Personal innovativeness and Individual playfulness (sig), Personal compatibility (ns), Attractiveness of alternative (sig), Perceived value (sig), Perceived risk (ns) |                                | Adoption intention     |
| Padiya and Bantwa (2018)      | India   | 318 smartphone users were chosen through non-probability convenience sampling to answer a structured questionnaire | No model or theory specified                                           | Pricing (sig), Ease of use (sig), Security (ns), Privacy (sig), Discount offer (sig), Trendy to use (ns), Usage by peers (ns), E-commerce (sig), Record keeping of transaction (sig), Refund or failed transaction (ns), Ability to pay from anywhere (ns), Cashback benefits (sig) |                                | E-wallet adoption      |
| Lonare et al. (2018)          | India   | 285 valid responses: consumers and vendors                             | Technology Acceptance Model (TAM)                                     | Perceived ease of use, Perceived usefulness                              | Attitude*, Intention to use*   | Actual use             |

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| Sources                              | Country      | Context                          | Theory                                      | Predictors                                                                                           | Mediators/Moderators (if any)                      | Outcome          |
|--------------------------------------|--------------|----------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------|
| Taufan and Yuwono (2018)             | Indonesia    | 214 GoPay e-wallet users         | Technology Acceptance Model (TAM)           | Attractiveness of alternative (ns), Perceived security (ns), perceived ease of use (sig), Perceived usefulness (sig), Social influence (ns), Perceived trust (ns), Perceived value (sig) |                                                   | Intention to use |
| Humbani and Wiese (2018)             | South Africa | 416 mobile phone users           | Technology-Readiness Index (TRI)            | Drivers: Optimism(ns), Innovativeness(ns), Convenience (sig), Compatibility (sig)                   | Gender** (sig)                                   | Adoption         |
| Ruangkanjanases and Sirikulprasert (2018) | Thailand    | 400 respondents                  | Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) | Complexity(ns), Trust and Security(ns), Relative advantage (sig), Cost(ns), Compatibility (sig), Social influence (sig) |                                                   | Intention to adopt |
| Intarot and Beokhaimook (2018)       | Thailand     | 400 individuals in Metropolitan areas | Unified theory of acceptance and use of technology (UTAUT) | Performance expectancy (sig), Effort expectancy (sig), Social influence(ns), Facilitating condition(ns) |                                                   | Behavioural intention |
| Matemba et al. (2019)                | South Africa | 224 Wechat e-wallet users        | Observational Learning Theory (OLT)         | Familiarity (sig), Word-of-Mouth (sig), Scan merchant services (sig)                               |                                                   | Adoption         |
| Ng and Mei (2019)                    | Malaysia     | 384 M-wallet users in Klang      | Technology Acceptance Model (TAM)           | Convenience (sig), Confidential(ns), Social influence (sig)                                        |                                                   | Perceived usefulness |
| Sources                  | Country            | Context                                                                 | Theory                                                                 | Predictors                                                                 | Mediators/                    | Outcome                     |
|-------------------------|--------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------|-----------------------------|
| Almasri and Alshareef   | Saudi Arabia       | More than 100 responses from three main regions: Western, eastern and   | No model or theory specified                                           | Anonymity and Privacy, Usability, Reliability, Trust, Security, Scalability and Efficiency, Mobility and Ubiquity, Transaction cost and expenses |                                | M-payment system usage      |
| (2019)                  |                    | Saudi Arabia                                                           |                                                                         |                                                                             |                               |                             |
|                         |                    |                                                                         |                                                                         |                                                                             |                               |                             |
| Nizam et al. (2019)     | Malaysia           | 222 e-wallet users in Malaysia                                          | No model specified                                                     | Convenience (sig), Security (sig), Cost-saving (sig)                       |                                | Consumer purchase decision  |
|                         |                    |                                                                         |                                                                         |                                                                             |                               |                             |
| Widodo et al. (2019)    | Indonesia          | 345 respondents                                                         | Unified theory of acceptance and use of technology 2 (UTAUT 2)         | Performance expectancy (sig), Effort expectancy (ns), Social influence (ns), Facilitating condition (sig), Hedonic motivation (ns), Price value (ns), Habit (sig), Perceived risk (ns), Trust (sig) |                                | Behavioural intention       |
|                         |                    |                                                                         |                                                                         |                                                                             |                               |                             |
| Baraja & Gunawan,       | Indonesia          | 110 merchants in SME sector who use OPay and OVO                       | Behavioral Reasoning Theory (BRT)                                      | Cost (ns), Usage barrier (ns), Risk barrier (ns)                           |                                | Adoption intention          |
| (2019)                  |                    |                                                                         |                                                                         |                                                                             |                               |                             |
| Sitinjaka and Koesrindartoto (2019) | Indonesia | 1005 students                                                           | Unified theory of acceptance and use of technology (UTAUT)             | Performance expectancy (sig), Effort expectancy (sig), Social influence (sig), Perceived risk (ns), Costs (sig) | Involvement** (sig: PE & SI; ns: EE) | Behavioural intention       |
|                         |                    |                                                                         |                                                                         |                                                                             |                               |                             |
| Isrososianwan et al.    | Indonesia          | 100 DANA e-wallet customers among postgraduate students                | Technology Acceptance Model (TAM)                                      | Perceived usefulness (sig), Perceived ease of use (sig)                    |                                | Mobile payment usage        |
| (2019)                  |                    |                                                                         |                                                                         |                                                                             |                               |                             |
| Sources                        | Country   | Context                          | Theory                                      | Predictors                                      | Mediators/ Moderators (if any) | Outcome                      |
|-------------------------------|-----------|----------------------------------|---------------------------------------------|------------------------------------------------|-------------------------------|-------------------------------|
| Wijayanthi (2019)             | Indonesia | 183 mobile phone users           | Technology Acceptance Model (TAM)           | Perceived usefulness (sig), Perceived trust (sig) | Attitude towards using* (sig) | Intention to use              |
| Vasantha and Sarika (2019)    | India     | 200 mobile wallet users          | Technology Acceptance Model (TAM)           | Perceived enjoyment (sig), Social norms (sig), Perceived innovativeness (sig) |                               | Intention to use mobile wallet |
| Tiwari et al. (2019)          | India     | 200 NCR consumers                | No model specified                          | Age (sig), gender (sig), annual income (sig), occupation (sig), marital status (sig) and qualifications (sig) |                               | Awareness about digital wallet |
| Malik et al. (2019)           | India     | 100 mobile wallet app consumers  | Unified theory of acceptance and use of technology (UTAUT) | Performance expectancy (sig), Ease of use (sig), Social influence (sig), Enjoyment (sig), Incentives (sig), Aesthetics (sig), Trust |                               | Adoption                      |
| Bobde (2019)                  | India     | 250 mobile wallet users in Pune  | No model specified                          | Perceptive, Discretionary, Systemic (risk factor) |                               | Mobile wallet usage           |
| Malaquias and Hwang (2019)    | Brazil    | 201 Brazilian undergraduate students | Technology Acceptance Model (TAM) | Perceived usefulness (sig), Perceived ease of use (sig), Trust (sig), Social influence (sig) |                               | Mobile banking use            |

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| Sources                | Country          | Context                                                                 | Theory                      | Predictors                                                                 | Mediators/ Moderators (if any) | Outcome                  |
|------------------------|------------------|-------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------|-------------------------------|--------------------------|
| Nookhao and Chaveesuk (2019) | Thailand        | 350 respondents who had experience with e-wallet usage                | Information System (IS) Success Model | Information quality (sig), Service quality (sig), System quality (sig)      | Trust                         | Trust                    |
|                        |                  |                                                                        |                             | Trust (sig), Satisfaction (sig)                                            |                               | Satisfaction             |
| Alabdan (2019)         | Saudi Arabia     | 198 respondents among students and staffs in Majmaah University        | Technology Acceptance Model (TAM) | Awareness(ns), Availability(ns), Security (sig)                           |                               | Mobile payment adoption  |
| Chua and Ling (2019)   | Malaysia         | 387 WechatPay consumers                                                | Technology Acceptance Model (TAM) | Perceived usefulness (sig), Perceived ease of use (sig), Perceived risk (sig) |                               | Mobile payment acceptance|
| Leong et al. (2020)    | Malaysia         | 478 respondents in four states                                         | Innovation Resistance Theory (IRT) | Age (ns), Education (sig), Income (ns), Usage barrier (sig), Value barrier (sig), Risk barrier (sig), Tradition barrier (sig), Image barrier (sig), Perceived novelty (sig) |                               | Mobile wallet resistance |
| Islam et al. (2020)    | Pakistan         | 320 smartphone users                                                   | Technology Acceptance Model (TAM) | Perceived ease of use (sig), Perceived risk(ns), Perceived trust*(sig)     |                               | Intention to adopt m-payment |
| Sources                  | Country                | Context                                      | Theory                                                      | Predictors                                                                 | Mediators/ Moderators (if any) | Outcome                      |
|-------------------------|------------------------|----------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------|-------------------------------|
| Giovanis et al. (2020)  | Greece                 | 513 users of mobile payment in Greece        | Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), Decomposed Theory of Planned Behavior (DTPB), | Facilitating condition (sig), Self-efficacy (sig), Interpersonal influence (sig), External influence (sig), Perceived usefulness (sig), Perceived ease of use (sig), Compatibility (sig), Perceived risk (sig) |                                | Intention to use, Perceived behavioral control, Subjective norm, Attitude |
| Hariguna et al. (2020)  | Thailand               | 402 users of Mobile Money Application (MMA) services | No model specified                                         | Perceived value (sig), Economic trust (sig), Service trust (sig)          |                                | Intention to use              |
|                         |                        |                                              |                                                             | Perceived value (sig)                                                    | Economic based trust           |                               |
|                         |                        |                                              |                                                             | Service trust                                                            |                                |                               |
| Mouakket (2020)         | United Arab Emirates (UAE) | 416 mobile payment users | Information System (IS) Success Model                       | Satisfaction (sig)                                                       |                                | Continuance usage intention  |
|                         |                        |                                              |                                                             | Effort expectation (sig), Performance expectation (sig)                 |                                |                               |
|                         |                        |                                              |                                                             | Personal Innovative (sig), Self-efficacy (sig), System Quality (sig), Information quality (ns), Service quality (sig) |                                |                               |
|                         |                        |                                              |                                                             | System Quality (sig), Information quality (sig), Service quality (ns)   |                                |                               |

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| Sources                        | Country        | Context                                      | Theory                                          | Predictors                                                                 | Mediators/                     | Outcome                        |
|-------------------------------|----------------|----------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------|--------------------------------|--------------------------------|
| Malaquias and Silva (2020)    | Brazil         | 115 respondents from rural areas             | Technology Acceptance Model (TAM)                | Perceived usefulness (sig), Perceived ease of use (sig), Trust (sig), Social influence (sig), Price (ns) |                                | Mobile banking usage           |
| Giovanis et al. (2020)        | Greece         | 513 consumers of mobile internet service providers | Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Decomposed theory of planned behaviour (DTPB) | Perceived usefulness (sig), Perceived ease of use (sig), Compatibility (sig), Attitude (sig), Interpersonal influence (sig), External influence (sig), Subjective norm (sig), Self-efficacy (sig), Facilitating condition (sig), Perceived behavioral control (sig), Financial risk (sig), Performance risk (sig), Privacy risk (sig), Psychological risk (sig), Time risk (sig) |                                | Intention to use               |
| Chawla and Joshi (2020)       | India          | 744 respondents                             | Unified theory of acceptance & use of technology (UTAUT), Innovation diffusion theory (IDT) | Perceived usefulness (sig: TR), Trust (sig: ATT), Facilitating condition (sig: PU), Perceived security (sig: TR), Lifestyle compatibility (sig: ATT), Perceived ease of use (sig: PU), Facilitating condition (sig: PU), Perceived security (sig: TR) | Perceived usefulness* (sig: ATT), Trust* (sig: ATT), Attitude* (sig) | Behavioural intention          |
| Sources                  | Country  | Context        | Theory                                                                 | Predictors                                                                 | Mediators/ Moderators (if any) | Outcome        |
|-------------------------|----------|----------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------|----------------|
| Patil et al. (2020)     | India    | 491 Indian consumers | Unified theory of acceptance and use of technology (UTAUT)             | Facilitating condition (sig)                                               |                                | Effort expectancy |
|                         |          |                |                                                                        | Performance expectancy (sig), Effort expectancy (sig), Anxiety (sig), Trust (sig), Personal innovativeness (sig) |                                | Attitude        |
|                         |          |                |                                                                        | Attitude (sig), Social influence (sig), Facilitating condition (sig)       |                                | Behavioral intention |
|                         |          |                |                                                                        | Performance expectancy (sig), Behavioral intention (sig), Grievance redressal (sig) |                                | Use behaviour    |
| Revathy and Balaji (2020)| India    | 318 e-wallet users | Unified theory of acceptance and use of technology (UTAUT)             | Performance expectancy (sig), Effort expectancy (ns), Social Influence (sig), Perceived Security (sig) |                                | Behavioural intention |
| Singh et al. (2020)     | India    | 206 online respondents | Unified theory of acceptance and use of technology 2 (UTAUT 2)         | Satisfaction (sig)                                                        | Social influence** (sig)       | Recommendation to use |
|                         |          |                |                                                                        | Intention to use (sig)                                                    | Innovativeness (ns), Stress to use technology (sig)                        | Satisfaction        |
|                         |          |                |                                                                        | Perceived ease of use (sig), Usefulness (sig), Perceived risk (ns), Attitude (sig) |                                | Intention to use |
| Sources                        | Country       | Context                              | Theory                                      | Predictors                                                                                                       | Mediators/Moderators (if any) | Outcome               |
|-------------------------------|---------------|--------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------|
| Soodan and Rana (2020)        | India         | 613 customers of e-wallet in Punjab state | Unified theory of acceptance and use of technology 2 (UTAUT) | Performance expectancy (sig), Effort expectancy (ns), Social influence (sig), Facilitating condition (sig), Hedonic motivation (sig), Price value (sig), Habit (ns), Perceived security (sig), General privacy (sig), Perceived saving (sig) |                             | Intention to use     |
| Laywilla et al. (2020)        | Indonesia     | 100 mobile wallet users               | Unified theory of acceptance and use of technology (UTAUT) | Performance expectancy (sig), Effort expectancy (sig), Social influence (sig), Facilitating condition (sig) |                             | Intention to adopt   |
| Chresentia and Suharto (2020) | Indonesia     | 100 respondents                      | Unified theory of acceptance and use of technology 2 (UTAUT) | Performance expectancy (sig), Effort expectancy (sig), Social influence (ns), Facilitating condition (ns), Hedonic motivation (ns), Price value (sig), Habit (sig), Trust (sig) |                             | Behavioral intention |
| Rantung et al. (2020)         | Indonesia     | 96 users of Gopay                    | Technology Acceptance Model (TAM)           | Perceived trust (sig), Perceived usefulness (ns), Perceived ease of use (sig)                                 |                             | Behavioural intention |

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| Sources               | Country         | Context                                                                 | Theory                                      | Predictors                                                                 | Mediators/ Moderators (if any) | Outcome                        |
|-----------------------|-----------------|--------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------|-------------------------------|--------------------------------|
| Aji et al. (2020)     | Indonesia, Malaysia | 259 e-wallet users in Indonesia and Malaysia                             | Technology Acceptance Model (TAM)           | Perceived Covid-19 risk (sig), Government support (ns), Perceived usefulness (sig) | Perceived usefulness* (sig: PR & GS), Country group** (sig: GS) (ns: PR & PU) | Intention to use                  |
|                       |                 |                                                                         |                                             |                                                                          |                               | Perceived usefulness** (sig)  |
|                       |                 |                                                                         |                                             |                                                                          |                               | Government support            |
| Ariffin and Lim (2020) | Malaysia        | 211 young professional                                                  | Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), | Perceived usefulness (ns), Perceived ease of use (ns), Attitude (sig), Subjective norm (ns), Perceived behavioural control (sig) | Trust** (sig: SN & ATT) (ns: PU, PEOU & PBC) | Intention to use                  |
| Abdullah et al. (2020)| Malaysia        | 400 respondents among students or employees of Malaysian public universities in Klang valley | Unified theory of acceptance and use of technology (UTAUT) | Performance expectancy (sig), Effort expectancy(ns), Social influence (sig), Facilitating condition (sig), Security(ns), Trust (sig) |                               | Behavioural intention          |
| Tan et al. (2020)     | Malaysia        | 64 undergraduates                                                       | Technology Acceptance Model (TAM)           | Perceived Usefulness: Social influence (sig), Perceived enjoyment (sig), Information and knowledge (sig), Perceived Ease of Use: Previous experience (sig), Facilitating conditions (sig) |                               | Intention of using mobile wallet |
| Sources                | Country       | Context                        | Theory                                | Predictors                                      | Mediators/Moderators (if any) | Outcome                        |
|-----------------------|---------------|--------------------------------|---------------------------------------|------------------------------------------------|--------------------------------|--------------------------------|
| Karim et al. (2020)   | Malaysia      | 289 University students       | Technology Acceptance Model (TAM)     | Perceived usefulness (sig), Perceived ease of use (sig), Privacy and Security (sig) |                                | Behavioural intention          |
| Ming et al. (2020)    | Malaysia      | 450 respondents               | Technology Acceptance Model (TAM)     | Perceived usefulness (sig), Perceived ease of use (sig), Perceived risk (sig), Rewards (sig) |                                | Adoption of e-wallet           |
| Rosli et al. (2020)   | Malaysia      | 50 users of QR-code mobile payment | Unified theory of acceptance and use of technology 2 (UTAUT 2) | Performance expectancy (sig), Effort expectancy (sig), Social influence (ns), Facilitating condition (ns), Hedonic motivation (sig), Price value (sig), Habit (sig), Trust (sig) |                                | Behavioural intention          |
| Teoh et al. (2020)    | Malaysia      | 210 e-wallet users            | Unified theory of acceptance and use of technology (UTAUT) | Performance expectancy (sig), Effort expectancy (sig), Social influence (sig), Perceived risk (ns), Perceived cost (ns) |                                | Behavioral intention           |
| Alabdan and Sulphey (2020) | Saudi Arabia | 414 mobile phone users       | Innovation Resistance Theory (IRT)    | Ease of use (sig), Utility (ns), Security (sig), Awareness (sig) |                                | Mobile payment acceptance     |
| Sources                        | Country     | Context                      | Theory                                      | Predictors                                                                                                                                                                                                 | Mediators/Moderators (if any) | Outcome                  |
|-------------------------------|-------------|------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------|
| Lin et al. (2020)             | Taiwan      | 342 Taiwanese                | Unified theory of acceptance and use of technology 2 (UTAUT 2), Diffusion of Innovation (DOI) | Performance expectancy (ns), Effort expectancy (ns), Social influence (sig), Facilitating condition (sig), Hedonic motivation (sig), Price value (sig), Compatibility (sig), Innovation (sig), Relative advantage (sig), Complexity (ns), Observability (sig) |                                | Behavioural intention   |
| Yeh (2020)                    | Taiwan      | 709 college and graduate students | Diffusion of Innovation (DOI)               | Usage intention (sig)                                                                                                                                                                                     | Service quality** (sig), Service innovation** (sig), Brand equity** (sig), Switching cost** (sig), Public policy** (sig) | Usage behaviour          |
| Ladkoom and Thanasopon (2020) | Thailand    | 115 Promptpay users          | Expectation-Confirmation Theory (ECT)        | Satisfaction (sig), Attitude (sig), Confirmation (sig), Perceived usefulness (sig), Trust (ns), Concern for information privacy (ns)                                                                  | Relative advantage (sig), Compatibility (sig), Complexity (sig), Trialability (sig), Observability (sig) | Reuse intention of Promptpay |
| Sources                  | Country               | Context                                                                 | Theory                                      | Predictors                                              | Mediators/                        | Outcome                             |
|-------------------------|-----------------------|-------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------|-----------------------------------|-------------------------------|
| Alshurideh et al.       | United Arab Emirates (UAE) | 850 e-payment users                                                    | Technology Acceptance Model (TAM)           | Trust (sig), Perceived usefulness (sig), perceived ease of use* (sig) | Gender**(sig: TR & PU) (ns:PEOU) | Intention to use e-payment technology |
|                         |                       |                                                                        |                                             | Perceived security (sig), Trust (sig), Perceived ease of use (sig) |                                   | Perceived usefulness            |
|                         |                       |                                                                        |                                             | Trust (sig), Perceived privacy (sig)                |                                   | Perceived ease of use           |
| Rabaa'i and Zhu         | Kuwait                | 311 users in Kuwait                                                    | Technology Acceptance Model (TAM)           | Perceived cost(ns), Perceived usefulness (sig), Perceived ease of use (sig), Perceived security (sig), Trust (sig), Attractiveness of alternatives (sig) |                                   | Behavioral intention           |
| Persada et al. (2021)   | Philippines           | 155 respondents among Generation Z e-wallet users (online transaction and in-store transaction) | Theory of Planned Behavior (TPB)           | Online transaction: Attitude (sig), Subjective norm (sig), Perceived behavioral control (sig) |                                   | Behavioral intention           |
| Sources            | Country          | Context                  | Theory                                      | Predictors                                      | Mediators/ Moderators (if any) | Outcome                  |
|--------------------|------------------|--------------------------|---------------------------------------------|------------------------------------------------|--------------------------------|--------------------------|
| Amoroso et al. (2021) | Philippines     | 1050 Philippines smartphone users | No model or theory specified               | Trust (sig), Switching cost (sig), Loyalty* (sig: TR), Habit* (sig: SC) |                                   | Future repurchase intention |
| Suebtimrat and Vonguai (2021) | Thailand | 1800 users of QR-code based mobile payment | Technology Acceptance Model (TAM) | Compatibility (sig), Attitude (sig), Perceived trust(ns), Adoption readiness (sig), Perceived risk(ns), Perceived innovativeness (sig) | Reciprocity (sig), Trust | Behavioural intention |
| Komba and Razak (2021) | Malaysia        | 384 users in Kuala Lumpur | No model                                   | Brand image (sig), Perceived price (sig), Perceived quality (sig), Relationship marketing (sig) |                                   | Consumer retention |
| Yang et al. (2021)   | Indonesia       | 501 e-wallet consumers in Indonesia | Unified theory of acceptance and use of technology (UTAUT) | Perceived usefulness (sig), Perceived ease of use (sig), Social influence (sig), Facilitating condition (ns), Lifestyle compatibility (sig), Perceived trust (sig) | Behavioural intention* (sig), Age** (ns), Gender** (ns), Education** (ns) | Adoption of e-wallet |

Note: *=mediator, **=moderator, sig=significant, ns=not significant
3.1 Geography and research design

Researchers across the developing world have carried out studies on digital wallet or online payments. Figure 2 above indicates that most of the quantitative studies on e-wallet adoption originate from India. This is followed by Malaysia, Indonesia, Thailand, Brazil, the Philippines, South Africa, Kuwait, the UAE, Saudi Arabia, Greece, Taiwan, Turkey, and Pakistan. However, among Indian-sourced studies, there was one past paper used the qualitative approach, by which, study by Adharsh et al. (2018). Apparently, the quantitative field is dominated by the Indian context. India-originated quantitative-based investigations comprise 14 out of 78 reviewed articles, of which the majority of the research focused on consumers’ behavioural intention toward using mobile wallets. Malaysia obtains the second spot in mobile payments research with 13 quantitative-based articles and one qualitative-based article by (Moghavvemi et al., 2021). Most of these studies focused on consumer’s intention to use e-wallets as the endogenous variable. However, there are several exceptions, notably the effectiveness of e-wallet (Nizam et al., 2019) and consumer retention for e-wallet services (Komba & Abd Razak, 2020). Obviously, a more extensive study on other predictors is needed in the Malaysian context. In this regard, Kabir et al. (2015) echoed that scholars should explore the roles of government, financial institutions, and other stakeholders in the mobile payments platform.

Next is Indonesia, with 12 articles. Indonesian researchers tend to study digital wallets from a specific perspective, such as demographic or e-wallet brands. For instance, Taufan and Yuwono (2018) conducted a study focused on usage intention towards GoPay wallet through the TAM approach. Another example is a study conducted by Laywilla et al. (2020) that considered only the female users’ perspective. In addition, seven articles were obtained from Thailand, four past studies were retrieved from Brazil, three papers from Saudi Arabia, South Africa, Philippines, and Kuwait, two articles from UAE, Taiwan, Greece, Turkey, and Pakistan, one paper from Romania. To reiterate, these previous studies were conducted by using the quantitative approach. The data were gathered by dissemination of self-administered questionnaires to the e-wallet or mobile payment services consumers. Besides the Indian-sourced and Malaysia-sourced studies, there was one study has adopted a qualitative approach. To be specific, a study from UAE carried out by Halaweh and Qaisi (2016).
3.2 Sample and unit of analysis

Choosing appropriate respondents is very critical to the researcher as their selection greatly impacts the research quality. Respondents are derived from the sample size of a particular target population; they are selected to fulfill the research need. According to the result, most previous studies on e-wallet adoption tend to use consumers as their respondents. However, some of the past research have a specific preference of respondents. For example, Karim et al. (2020) chose to sample Malaysian young adults. Only a few studies sampled merchants or vendors. For instance, Lonare et al.’s (2018) study on the diffusion and adoption of e-wallet in India focused on vendors or merchants as the main respondents.

In respect of Malaysia, all quantitative-based papers reviewed have selected consumers as their respondents. Perhaps the newness of e-wallet services in Malaysia has driven the researchers to contextualize e-wallet adoption from the consumers’ perspective instead of other types of respondents such as bank staff, e-wallet providers, or merchants.

3.3 Adapted theories and models

The adaptation of theories at different levels of the research process is crucial as it strengthens the impact of findings whether the study is quantitative, qualitative, or mixed method (Stewart & Klein, 2015). Based on the findings, technology use and acceptance models (TAM, UTAUT & UTAUT2) – which underpins 42 of the reviewed frameworks, are the most frequently used by the past studies. Several authors integrate different theories in establishing their research framework. For example, Ruangkanjanases and Sirikulprasert (2018) researched consumer intention to adopt NFC mobile payment in Thailand by employing the TAM model and Diffusion of Innovation theory.

The prevalence of technology acceptance models in mobile payment research is not unexpected considering that e-wallet is an information and communications technology tool. Nonetheless, other theories were also employed, such as Theory Planned Behaviour (TPB) (Persada et al., 2021), OLT, or
Information Learning Theory (Matemba et al., 2019), Diffusion of Innovation (DOI) (Yeh, 2020), Technology Readiness Index (TRI) (Humbani & Wiese, 2018), Innovation Resistance Theory (IRT) (Alabdan & Sulphey, 2020; Chua & Ling, 2019), Information System (IS) Success Model (Malaquias & Hwang, 2019; Mouakket, 2020), Cognitive Dissonance Theory (CDT) (Rouibah et al., 2016), Behavioral Reasoning (BRT) (Baraja & Gunawan, 2019) and Expectation-Confirmation Theory (Ladkoom & Thanasopon, 2020). In addition, eleven previous studies were not adapting any theories when developing their framework. Instead of employing model or theory, these studies chose to use relevant variables from previous research that were already validated. Nevertheless, most of the selected variables are related to popular model/theory such as TAM, UTAUT, or DOI. For example, a study by Amoroso et al. (2021) has selected Habit as a predictor in determining future repurchase intention. Apparently, Habit is one of the variables in UTAUT 2 model. Other predictors were including Loyalty, Switching Cost, Reciprocity, and Trust. These details are summarized in Table 4 below.

Table 4. Analysis of adapted theories/models

| Theories/ Models                                      | Frequency |
|------------------------------------------------------|-----------|
| Technology Acceptance Model (TAM)                    | 24        |
| Unified Theory of Acceptance and Use of Technology   | 12        |
| (UTAUT)                                              |           |
| No Model/Theory specified                            | 11        |
| Combination of Theories                              | 9         |
| Unified Theory of Acceptance and Use of Technology II (UTAUT 2) | 6         |
| Innovation Resistance Theory (IRT)                   | 2         |
| IS Success Model                                     | 2         |
| Theory of Planned Behaviour (TPB)                    | 1         |
| Diffusion of Innovation (DOI)                        | 1         |
| Expectation Confirmation Theory (ECT)                | 1         |
| Technological Readiness (TRI)                        | 1         |
| Observational Learning Theory (OLT)                  | 1         |
| Cognitive Dissonance Theory (CDT)                    | 1         |
| Behavioral Reasoning Theory (BRT)                    | 1         |

4. Discussion and conclusion

To conclude, this paper has reviewed previously published studies on mobile e-wallet adoption (digital payment) from 2016 to early 2021. These articles were selected from developing countries given the lower levels of e-wallet adoption in these countries as compared to the developed countries and China. A few main points were focused on and highlighted in this paper: the study approach, the geographical and research paradigm, the respondent’s unit of analysis, and the adapted theories. The result proposed that e-wallet adoption researchers primarily selected quantitative studies for the last five years. The majority of the previous studies had concurred that the adoption mobile payment among the developing nations is rather late than their developed counterparts. On the brighter side, the size of the untapped market may also spark further questions if e-wallet providers may benefit from the early mover advantage strategy—in tandem with the idiom ‘the early bird catches the worm’.

We also found that TAM-based models remain popular and widely used as the predictors of e-Wallet intention and usage behaviour. However, in isolation, this perspective could not offer plausible reasons for the slow e-wallet adoption in developing countries. Sahut (2008) contended that costs, burdens, and risks that come along with digital transactions are the main points why the consumer refuse to use mobile
wallet. In addition, the consumer’s rejection is a continuous phenomenon—even in developed economies, due to lack of common standards and inconsistencies between system in digital wallet services (Dahlberg et al., 2015). This is an area that we feel is entirely lacking in the literature and the final section if this paper discussed how this issue could be addressed (see Figure 5).

![Figure 4. The eco-system and value chains surrounding e-Wallet adoption](image)

Understanding the value chain structure is critical for the further development of prospective e-Wallet adoption models. In cognizant of this issue, the eco-system and value chains surrounding e-Wallet adoption are illustrated in Figure 3 above. E-Wallet providers have the obligation of providing satisfactory services to both consumers and merchants. According to the social exchange theory (Emerson, 1976), people make decisions by consciously or unconsciously evaluating the costs and rewards of an action, with the ultimate aim of maximizing the benefits earned. Similarly, end-users would evaluate the risks and rewards when deciding whether to use or not to use e-wallet. From the end-users’ perspectives, the risks form barriers or inhibitors, while the rewards establish motivation or drivers. This dual-stance of measuring the psychological perception of e-wallet use and identifying the potential predictors influencing e-wallet’s use, will be further elaborated in the final section below.

5. Limitations and future research directions

One of the weak points of this study is the geographical limitation reviewed. A total number of 106 articles were selected based on strict criterion—the title should be related to e-wallet adoption. After the exclusion of irrelevant articles, majority of the studies were conducted in India, Malaysia and Indonesia. Several papers were retrieved from other countries namely Brazil, South Africa, Saudi Arabia, Greece, Philippines, Turkey, Thailand and Taiwan. Furthermore, this study only focused on a few perspectives such as the demographic, methodology, and adapted theories/models. Other than India, Malaysia and Indonesia, it is suggested that future researcher to review more articles from other countries in the FTSE
list of advance and secondary emerging economies. The inclusion of FTSE’s frontier countries would give different results that are more impactful and generalizable to the poorest of nations.

Secondly, this paper investigated the phenomenon of e-Wallet from the adoption perspective rather than the technology and eco-system dimensions (Dahlberg et al., 2015). This ‘adoption’ research stream has gradually become saturated with studies that are grounded based on the technology acceptance framework, that typically involve the drivers and enablers of E-Wallet adoption. Thus, we call for researchers to factor in other unique predictors into the equation. The antecedents of E-wallet adoption may be investigated from other consumer psychology standpoints namely brand equity, consumption values, protection motivation, and social identity theories. We argue that studies on inhibitors and barriers of e-wallet use are insufficient, and its investigation in the context of emerging markets is beyond the radar of researchers (Leong et al., 2020; Sharma et al., 2018). As illustrated in Figure 5, we offer a strategic framework that multiple stakeholders can use as a reference to understand the contours of the mobile payment and e-wallet adoption, especially in the emerging markets.

We also recommend for future research to diversify the respondents beyond consumers; specifically merchants and e-wallet providers, to gain more understanding from the other stakeholders’ viewpoints. Perhaps, understanding the key drivers and inhibitors of e-wallet adoption from these stakeholders allow researchers to comprehend the phenomenon holistically. Apparently, cross-sectional and quantitative-based surveys are widely favoured by the researchers, hence, it is recommended for future research to consider longitudinal, comparative and multi-level quantitative surveys.

We strongly suggest that researchers look beyond the planned behavior and technology acceptance theories that generally predict users’ intention. Instead, scholars could explore the roles of health concerns (fear toward microbial contamination associated with banknotes and coins in post-Covid-
19 era), ecological awareness (paperless movement), brand image, government incentives, and cost and time efficiencies as potential predictors of e-wallet adoption. Furthermore, the literature lacks much-needed knowledge on the inhibitors and barriers that prevent its adoption. This includes task complexities, security concerns, connectivity, and payment system interoperability issues (e.g., QR-codes standard, NFC infrastructure). Besides, certain psychological factors could be evaluated, namely choice overload (due to too many e-wallet options in the market), attachments toward banknotes, and excessive self-regulation (due to fears of impulsive spending). Figure 5 summarizes the potential research streams that could be investigated other than the traditional concepts, considering their scarcity in the literature. These are the areas of future research opportunities that could be explored to better comprehend the main-effects and contingency approaches of e-wallet adoption. We also call for additional qualitative works on these domains given the method’s capacity to capture richer implicit knowledge in the form of unarticulated behaviour and unique insights, that are not bound by the limitations of quantitative methods.

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References

Abdullah, N., Redzuan, F., & Daud, N. A. (2020). E-wallet: Factors influencing user acceptance towards cashless society in Malaysia among public universities. *Indonesian Journal of Electrical Engineering and Computer Science, 20*(1), 67–74. https://doi.org/10.11591/ijeecs.v20.i1.pp67-74

Abidin, W. Z., Rivera, O., Maarop, N., & Hassan, N. H. (2017). Mobile payment framework for the unbanked Filipinos. *International Conference on Research and Innovation in Information Systems, ICRIIS*. https://doi.org/10.1109/ICRIIS.2017.8002478

Abrahão, R. de S., Moriguchi, S. N., & Andrade, D. F. (2016). Intention of adoption of mobile payment: An analysis in the light of the Unified Theory of Acceptance and Use of Technology (UTAUT). *RAI Revista de Administração e Inovação, 13*(3), 221–230. https://doi.org/10.1016/j.raifl.2016.06.003

Adharsh, R., Harikrishnan, J., Prasad, A., & Venugopal, J. S. (2018). Transformation towards E-Wallet Payment Systems Pertaining to Indian Youth. *International Journal of Pure and Applied Mathematics, 119*(12), 2583–2594.

Aji, H. M., Berakon, I., & Md Husin, M. (2020). COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia. *Cogent Business and Management, 7*(1), 1804181. https://doi.org/10.1080/23311975.2020.1804181

Alabdan, R. (2019). Exploring barriers mobile payments adoption: A case study of Majmaah University in Saudi Arabia. *Communications in Computer and Information Science, 1098 CCIS*(November), 144–160. https://doi.org/10.1007/978-3-030-36368-0_13

Alabdan, R., & Sulphey, M. M. (2020). Understanding proximity mobile payment acceptance among Saudi individuals: An exploratory study. *International Journal of Advanced Computer Science and Applications, 11*(4), 264–270. https://doi.org/10.14569/ijacsa.2020.0110436

©UiTM Press, Universiti Teknologi MARA
Ali, I., Rehman, K. U., Ali, S. I., Yousaf, J., & Zia, M. (2010). Corporate social responsibility influences, employee commitment and organizational performance. *African Journal of Business Management, 4*(13), 2796-2801.

Almasri, M., & Alshareef, H. (2019). Mobile cloud-based e-payment systems in Saudi Arabia: A case study. *ACM International Conference Proceeding Series, 5–10.*
https://doi.org/10.1145/3361785.3361795

Alshurideh, M. T., Al Kurdi, B., Masa’deh, R., & Salloum, S. A. (2021). The moderation effect of gender on accepting electronic payment technology: a study on United Arab Emirates consumers. *Review of International Business and Strategy.*
https://doi.org/10.1108/RIBS-08-2020-0102

Amoroso, D., Lim, R., & Roman, F. (2021). The effect of reciprocity on mobile wallet intention: A study of filipino consumers. *International Journal of Asian Business and Information Management, 12*(2), 57–83. https://doi.org/10.4018/IJABIM.20210401.oa4

Ariffin, S. K., & Lim, K. T. (2020). Investigating Factors Affecting Intention to Use Mobile Payment Among Young Professionals in Malaysia. *141*, 6–11. https://doi.org/10.2991/aebmr.k.200514.002

Aslam, W., Ham, M., & Arif, I. (2017). Consumer behavioral intentions towards mobile payment services: An empirical analysis in Pakistan. *Market-Trziste, 29*(2), 161–176. https://doi.org/10.22598/mt/2017.29.2.161

Aydin, G., & Burnaz, S. (2016). Adoption of mobile payment systems: a study on mobile wallets. *Pressacademia, 5*(1), 73–73. https://doi.org/10.17261/pressacademia.201611655

Baraja, Y. A., & Gunawan, J. (2019). Identifikasi Karakteristik Merchant dalam Mengadopsi Layanan Mobile Payment Studi Kasus: Merchant OVO dan Merchant Gopay di Surabaya. *Jurnal Sains Dan Seni ITS, 8*(2), 405-410.

Bobde, A. B. (2019). Factors impacting mobile wallet usage in Pune city. *International Journal of Research in Humanities, Arts and Literature, 7*(6), 141–150.

Busu, S., Karim, N. A., & Haron, H. (2018). Factors of adoption intention for near field communication mobile payment. *Indonesian Journal of Electrical Engineering and Computer Science, 11*(1), 98–104. https://doi.org/10.11591/ijeeecs.v11.i1.pp98-104

Chakraborthy, S., & Mitra, D. (2018). A Study on Consumers Adoption Intention for Digital Wallets in India. *International Journal on Customer Relations, 6*(1), 38–57. http://eserv.uum.edu.my/docview/2024116193?accountid=42599

Chawla, D., & Joshi, H. (2020). Role of Mediator in Examining the Influence of Antecedents of Mobile Wallet Adoption on Attitude and Intention. *Global Business Review, 21*, 1-17.
https://doi.org/10.1177/0972150920924506

Chresentia, S., & Suharto, Y. (2020). Assessing Consumer Adoption Model On E-Wallet: An Extended UTAUT2 Approach. *International Journal of Economics, Business and Management Research, 4*(06), 232–244.
Chua, J., & Ling, A. W. P. (2019). Acceptance of WeChat Pay among Consumers in Malaysia. INTI Journal, 6, 48. Retrieved from http://eprints.intimal.edu.my/1322/.

Dahlberg, T., Guo, J., & Ondrus, J. (2015). A Critical Review of Mobile Payment Research. Electronic Commerce Research and Applications, 14. 265-284. 10.1016/j.elerap.2015.07.006”.

de Luna, Iviane & Ríos, Francisco & Liébana-Cabanillas, Francisco & Luna, João. (2016). NFC technology acceptance for mobile payments: A Brazilian Perspective. Review of Business Management. 19. 10.7819/rbgn.v0i0.2315

Francisca A. Marina & Sahayaselvi, S. (2017). An Overview On Digital Payments. International Journal of Research, 13(4), 1–12. https://doi.org/10.36106/gjra/8906567

 Giovanis, A., Tsoukatos, E., & Vrontis, D. (2020). Customers’ intentions to adopt proximity m-payment services: Empirical evidence from Greece. Global Business and Economics Review, 22(1–2), 3–26. https://doi.org/10.1504/GBER.2020.105026

Groenfeldt, T. (2017). “China Leads On Mobile Wallets - Will Others Follow?” Forbes. Retrieved February 3, 2021, from https://www.forbes.com/sites/tomgroenfeldt/2017/04/26/china-leads-on-mobile-wallets-will-others-follow/?sh=6a4d0ef44537

Halaweh, M., & Qaisi, H. Al. (2016). Adoption of near field communication (NFC) for mobile payments in the UAE: A merchants’ perspective. International Journal of E-Business Research, 12(4), 38–56. https://doi.org/10.4018/IJEBR.2016100103

Hariguna, T., Adiandari, A. M., & Ruangkanjanases, A. (2020). Assessing customer intention use of mobile money application and the antecedent of perceived value, economic trust and service trust. International Journal of Web Information Systems, 16(3), 331–345. https://doi.org/10.1108/IJWIS-12-2019-0055

Hord, J. (2005). “How Electronic Payment Works.” Howstuffworks. Retrieved February 5, 2021, from https://money.howstuffworks.com/personal-finance/online-banking/electronic-payment1.htm (Retrieved on 5 February 2021)

Humbani, M., & Wiese, M. (2018). A Cashless Society for All: Determining Consumers’ Readiness to Adopt Mobile Payment Services. Journal of African Business, 19(3), 409–429. https://doi.org/10.1080/15228916.2017.1396792

Intarot, P., & Beokhaimook, C. (2018). Influencing Factor in E-Wallet Acceptant and Use. International Journal of Business and Administrative Studies, 4(4), 167–175. https://doi.org/10.20469/ijbas.4.10004-4

Islam, T., Saif-Ur-Rehman, Abid, C. M. S., & Ahmer, Z. (2020). How perceptions about ease of use and risk explain intention to use mobile payment services in Pakistan? The mediating role of perceived trust. Pakistan Journal of Commerce and Social Science, 14(1), 34–48.

Isrososiwaw, S., Hurriyati, R., & Dirgantari, P. D. (2019). Technology Acceptance Model (TAM): Study of “Dana” E-Wallet Users. Jurnal Minds: Manajemen Ide Dan Inspirasi, 6(2), 181. https://doi.org/10.24252/minds.v6i2.11274

©UiTM Press, Universiti Teknologi MARA
F. J. Jaz, F. H. AlSabah and M. Sarfraz. (2018). Mobile Commerce Applications and Adoption for Kuwait. M. A. E Barr, F. Al-anazi, & M. Sarfaz (Eds.). 2018 International Conference on Computing Sciences and Engineering (ICCSE) (pp. 1-6). IEEE. https://doi.org/10.1109/ICCSE1.2018.8374217

Kabir, M. A., Saidin, S. Z., & Ahmi, A. (2015). Adoption of e-payment systems : a review of literature. Proceedings of the International Conference on E-Commerce, October, 112–120. https://doi.org/10.1200/JCO.2007.14.9336

Karim, M. W., Haque, A., Ulfy, M. A., Hossain, M. A., & Anis, M. Z. (2020). Factors Influencing the Use of E-wallet as a Payment Method among Malaysian Young Adults. Journal of International Business and Management, 3(2), 1-11. https://doi.org/10.37227/jibm-2020-2-21/

Kepp, S. (2019). “Dataportal Digital 2019 Spotlight.” Dataportal. Available at https://dataportal.com/reports/digital-2019-global-digital-overview (Retrieved 13 April 2021)

Komba, K. J., & Abd Razak, K. (2021). Factors Influencing Customer Retention for Electronic Wallet Services in Malaysia. International Journal of Social Science and Humanity, 11(2), 44–47. https://doi.org/10.18178/ijssh.2021.v11.1037

Kongarchapatara, B. & Rodjanatara, C. (2018, April 1-3). Factors affecting adoption versus behavioral intention to use QR code payment application. 2018 International Conference on E-Commerce, e-Administration, e-Society, e-Education, and e-Technology, Osaka, Japan. https://www.cm.mahidol.ac.th/research/index.php/publications?view=publication&task=show&id=748

Ladkoom, K., & Thanasopon, B. (2020). Factors influencing reuse intention of e-payment in Thailand: A case study of promptpay. ICEIS 2020 - Proceedings of the 22nd International Conference on Enterprise Information Systems, 1(Iceis), 743–750. https://doi.org/10.5220/0009410407430750

Laywilla, E., Kartar Singh, J. S., & Yin Fah, B. C. (2020). Drivers of Intention to Adopt Mobile Wallet: A Quantitative Study Among Females in Jakarta. International Journal of Academic Research in Business and Social Sciences, 10(11), 804–820. https://doi.org/10.6007/ijarbs/v10-i11/8061

Leong, L. Y., Hew, T. S., Ooi, K. B., & Wei, J. (2020). Predicting mobile wallet resistance: A two-staged structural equation modeling-artificial neural network approach. International Journal of Information Management, 51(2020), 102047. https://doi.org/10.1016/j.ijinfomgt.2019.102047

Lin, W. R., Lin, C. Y., & Ding, Y. H. (2020). Factors affecting the behavioral intention to adopt mobile payment: An empirical study in Taiwan. Mathematics, 8(10), 1–19. https://doi.org/10.3390/math8101851

Lonare, A., Yadav, A., & Sindhu, S. (2018). E-Wallets: Diffusion and Adoption in Indian Economy. Indian Journal of Commerce & Management Studies, 9(2), 9. https://doi.org/10.18843/ijcms/v9i2/02

Lustigová, L., & Šálková, D. (2018). Shopping via mobile phones in the Central European Czech Republic market. Agris On-Line Papers in Economics and Informatics, 10(4), 49–58. https://doi.org/10.7160/aol.2018.100405

©UiTM Press, Universiti Teknologi MARA
Malaquias, Rodrigo F., & Hwang, Y. (2019). Mobile banking use: A comparative study with Brazilian and U.S. participants. *International Journal of Information Management, 44*(2019), 132–140. https://doi.org/10.1016/j.ijinfomgt.2018.10.004

Malaquias, Rodrigo Fernandes, & Silva, A. F. (2020). Understanding the use of mobile banking in rural areas of Brazil. *Technology in Society*, 62(2020), 101260. https://doi.org/10.1016/j.techsoc.2020.101260

Malik, A., Suresh, S., & Sharma, S. (2019). An empirical study of factors influencing consumers’ attitude towards adoption of wallet apps. *International Journal of Management Practice, 12*(4), 426–442. https://doi.org/10.1504/IJMP.2019.102534

Manikandan, S., & Jayakodi, J. M. (2017). An Empirical Study on Consumers Adoption of Mobile Wallet With Special Reference To Chennai City. *International Journal of Research -GRANTHAALAYAH, 5*(5), 107–115. https://doi.org/10.29121/granthaalayah.v5.i5.2017.1843

Matemba, E. D., Li, G., & Maiseli, B. (2019). Influence of word-of-mouth and familiarity on diffusion and adoption of WeChat wallet in South Africa. Wang, S (Eds.), 2019 2nd *International Conferences on Intelligent System Research and Mechatronics Engineering (ISRME 2019)*. Web of Proceedings of Francis Academic Press. https://doi.org/10.25236/isrme.2019.098

Ming, K. L. Y., Jais, M., Wen, C. C., & Zaidi, N. S. (2020). Factor Affecting Adoption of E-Wallet in Sarawak. *International Journal of Research in Accounting, Finance and Management Sciences, 10*(2), 244–256. https://doi.org/10.6007/ijrafms/v10-i2/7446

Moghavvemi, S., Mei, T. X., Phoong, S. W., & Phoong, S. Y. (2021). Drivers and barriers of mobile payment adoption: Malaysian merchants’ perspective. *Journal of Retailing and Consumer Services, 59*(2021), 102364. https://doi.org/10.1016/j.jretconser.2020.102364

Mouakket, S. (2020). Investigating the role of mobile payment quality characteristics in the United Arab Emirates: implications for emerging economies. *International Journal of Bank Marketing, 38*(7), 1465–1490. https://doi.org/10.1108/IJBM-03-2020-0139

Ng, B. A., & Mei, Y. C. (2019). Factors Influencing Consumers’ Perceived Usefulness of M-Wallet in Klang Valley, Malaysia. *Review of Integrative Business and Economics Research, 8*(4), 1–23. https://www.researchgate.net/publication/333673788

Nielsen, 2019. *Cash or cashless? Malaysia’s shifting payment landscape*. Retrieved April 13, 2021, from https://www.nielsen.com/my/en/insights/article/2019/cash-or-cashless-malaysias-shifting-payment-landscape/.

Nizam F., Hwang H.J., Valaei N. (2019) Measuring the Effectiveness of E-Wallet in Malaysia. In: Lee R. (eds) *Big Data, Cloud Computing, Data Science & Engineering. BCD 2018*. Studies in Computational Intelligence, vol 786. Springer, Cham. https://doi.org/10.1007/978-3-319-96803-2_5

Nookhao, S., & Chaveesuk, S. (2019). The Consumer Trust Influencing Intention to Use Electronic Wallet in Thailand. *2019 11th International Conference on Information Technology and Electrical Engineering, ICITEE 2019, 7*, 1–6. https://doi.org/10.1109/ICITEED.2019.8929973
Omarini, A. E. (2018). Fintech and the future of the payment landscape: The mobile wallet ecosystem - A challenge for retail banks? *International Journal of Financial Research, 9*(4), 97–116. https://doi.org/10.5430/ijfr.v9n4p97

Ony, E., Guven, G. O., & Rizvi, W. H. (2017). The determinants of electronic payment systems usage from consumers' perspective. *Economic Research-Ekonomska Istrazivanja*, 30(1), 394–415. https://doi.org/10.1080/1331677X.2017.1305791

Padiya, Jasmin and Bantwa, Ashok, Adoption of E-wallets: A Post Demonetisation Study in Ahmedabad City (2018). *Pacific Business Review International Volume 10 Issue 10*, April 2018, Available at SSRN: https://ssrn.com/abstract=3735394

Pahwa, A. (2017). *E-wallet: Everything you should know about e-wallet*. Retrieved February 15, 2021, from https://www.feedough.com/e-wallet/

Patil, P., Tamilmani, K., Rana, N. P., & Raghavan, V. (2020). Understanding consumer adoption of mobile payment in India: Extending Meta-UTAUT model with personal innovativeness, anxiety, trust, and grievance redressal. *International Journal of Information Management, 54*(2020), 102144. https://doi.org/10.1016/j.ijinfomgt.2020.102144

Persada, S. F., Dalimunte, I., Nadilifatin, R., Miraja, B. A., Redi, A. A. N. P., Prasetyo, Y. T., Chin, J., & Lin, S.-C. (2021). Revealing the Behavior Intention of Tech-Savvy Generation Z to Use Electronic Wallet Usage: A Theory of Planned Behavior Based Measurement. *International Journal of Business and Society, 22*(1), 213–226. https://doi.org/10.33736/ijbs.3171.2021

Rabaa, A. A., & Zhu, X. (2021). Understanding the determinants of wearable payment adoption: An empirical study. *Interdisciplinary Journal of Information, Knowledge, and Management, 16*, 173–211.

Rantung, H. M., Tumbuan, W. J. F. A., & Gunawan, E. M. (2020). the Determinants Influencing Behavioral Intention To Use E-Wallet During Covid-19 Pandemic in Manado. *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi, 8*(4), 352–360. https://doi.org/10.35794/embav8i4.30784

Rathore, H. S. (2016). Adoption of digital wallet by consumers. *BVIMR’s Journal of Management Research, 8*(1), 69–75.

Revathy, C., & Balaji, P. (2020). Determinants of Behavioural Intention on E-Wallet Usage: An Empirical Examination in Amid of COVID-19 Lockdown Period. *International Journal of Management (IJM), 11*(6), 92–104. https://doi.org/10.34218/IJM.11.6.2020.008

Rosli, N. F. A., Ibrahim, R., Yahya, Y., Zainuddin, N. M. M., Yaacob, S., & Yusoff, R. C. M. (2020). Consumers’ Intention to Use Mobile Payment: A Case of Quick Response (QR) Code Applications. *Mathematical Sciences and Informatics Journal, 1*(1), 20–34.

Rouibah, K. P. B. Lowry, and Y. Hwang (2016), “The effects of perceived enjoyment and perceived risks on trust formation and intentions to use online payment systems: New perspectives from an Arab country,” *Electron Commer. Res. Appl., vol. 19*, pp. 33–43, 2016. https://doi.org/10.2139/ssrn.2810637
Ruangkanjanases, A., & Sirikulprasert, N. (2018). Predicting consumer intention to adopt near field communication enabled mobile payment in Thailand. *Journal of Telecommunication, Electronic and Computer Engineering, 10*(2–7), 147–152.

Sharma, S. K., Mangla, S. K., Luthra, S., & Al-Salti, Z. (2018). Mobile wallet inhibitors: Developing a comprehensive theory using an integrated model. *Journal of Retailing and Consumer Services, 45*(2018), 52–63. https://doi.org/10.1016/j.jretconser.2018.08.008

Singh, N., & Sinha, N. (2020). How perceived trust mediates merchant’s intention to use a mobile wallet technology. *Journal of Retailing and Consumer Services, 52*(2020), 101894. https://doi.org/10.1016/j.jretconser.2019.101894

Singh, Nidhi, Sinha, N., & Liébana-Cabanillas, F. J. (2020). Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence. *International Journal of Information Management, 50*(2020), 191–205. https://doi.org/10.1016/j.ijinfomgt.2019.05.022

Sitinjaka, D., & Koesrindartoto, D. (2019). Factors Influencing the Consumer Adoption of Mobile QR Code Payments in Indonesian University Students. Aprianingsih A., Aprilianty F., Belgiawan P. F., Mayangssari L., Wasesa M., Windasari N. A., Wulansari A. (Eds.) *International Conference on Management in Emerging Markets* (pp. 79-84). The School of Business and Management-Institusi Teknologi Bandung (SBM ITB). https://journal.sbm.itb.ac.id/index.php/ProceedingSBMITB/article/download/3454/1335

Soodan, V., & Rana, A. (2020). Modeling customers’ intention to use e-wallet in a developing nation: Extending UTAUT2 with security, privacy and savings. *Journal of Electronic Commerce in Organizations, 18*(1), 89–114. https://doi.org/10.4018/JECO.2020010105

Stewart, D., & Klein, S. (2015). The use of theory in research. *International Journal of Clinical Pharmacy, 38*(3), 615–619. https://doi.org/10.1007/s11096-015-0216-y

Suebtimrat, P., & Vonguai, R. (2021). An Investigation of Behavioral Intention Towards QR Code Payment in Bangkok, Thailand. *Journal of Asian Finance, Economics and Business, 8*(1), 939–950. https://doi.org/10.13106/jafeb.2021.vol8.no1.939

Tan, O. K., Abdul Aziz, F., Ong, C. H., Goh, C. F., Lim, K. Y., Saadon, M. S. I., & Choi, S. L. (2020). E-Wallet Acceptance among Undergraduates in Malaysia. *Test Engineering and Management, 83*(2020), 12990–12998.

Tan, Y., & Li, C. Y. (2018). *Banking on the e-wallet in Malaysia*. Retrieved April 1, 2019, from https://www.pwc.com/my/en/assets/blog/pwc-my-deals-strategy-banking-on-the-ewallet-in-malaysia.pdf

Taufan, A., & Yuwono, R. T. (2018). Analysis of Factors That Affect Intention to Use e-Wallet through the Technology Acceptance Model Approach (Case Study: GO-PAY). *International Journal of Science and Research, 8*(7), 413–419.

Teoh, M. T. T., Hoo, C. Y., & Lee, T. H. (2020). E-Wallet Adoption: a Case in Malaysia. *International Journal of Research in Commerce and Management Studies, 2*(4), 135–3.
The Economic Times. (2018). E-Wallet Definitions. Retrieved April 25, 2021 from https://economictimes.indiatimes.com/definition/e-wallets.

Tiwari, P., Garg, V., & Singhal, A. (2019). A study of consumer adoption of digital wallet special reference to NCR. Proceedings of the 9th International Conference On Cloud Computing, Data Science and Engineering, Confluence 2019, 664–669. https://doi.org/10.1109/CONFLUENCE.2019.8776939

Trachuk, A., & Linder, N. (2017). The adoption of mobile payment services by consumers: An empirical analysis results. Business and Economic Horizons, 13(3), 383–408. https://doi.org/10.15208/beh.2017.28

Trivedi, J. (2016). Factors determining the acceptance of e-wallet. Journal of Applied Marketing and Management, 1(2), 42–53.

Trotman, J. (2021). E wallets 2021 Trend, Types of E wallets, and Challenges. Retrieved March 3, 2021, from https://www.nimbleappgenie.com/blogs/e-wallets-2020-trend-types-and-challenges/

Upadhayaya, A. (2012). Electronic Commerce and E-Wallet. International Journal of Recent Research and Review, 1(2012), 37–41. http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.379.7069

Vasantha, S., & Sarika, P. (2019). Empirical analysis of demographic factors affecting intention to use mobile wallet. International Journal of Engineering and Advanced Technology, 8(6), 768–776. https://doi.org/10.35940/ijeat.F1149.0886S19

Walters, W. H. (2009). Google Scholar Search Performance: Comparative Recall and Precision. Portal: Libraries and the Academy, 9(1), 5–24.

Widodo, M., Irawan, M. I., & Sukmono, R. A. (2019). Extending UTAUT2 to explore digital wallet adoption in Indonesia. 2019 International Conference on Information and Communications Technology (ICOIACT 2019) (pp.78–883). IEEE. https://doi.org/10.1109/ICOIACT46704.2019.8938415

Wijayanthi, I. M. (2019). Behavioral Intention of Young Consumers Towards E-Wallet Adoption: an Empirical Study Among Indonesian Users. Russian Journal of Agricultural and Socio-Economic Sciences, 85(1), 79–93. https://doi.org/10.18551/rjoas.2019-01.09

Wycech, S. (2015). An Investigation of Attitudes towards Mobile Payments [Master's Theses, University of Dublin. https://www.scss.tcd.ie/publications/theses/diss/2015/TCD-SCSS-dissertation-2015-017.pdf

Yang, M., Al Mamun, A., Mohiuddin, M., Nawi, N. C., & Zainol, N. R. (2021). Cashless transactions: A study on intention and adoption of e-wallets. Sustainability, 13(2), 1–18. https://doi.org/10.3390/su13020831

Yeh, H. (2020). Factors in the Ecosystem of Mobile payment affecting its use: From the customers’ Perspective in Taiwan. Journal of Theoretical and Applied Electronic Commerce Research, 15(1), 13–29. https://doi.org/10.4067/S0718-1876202000100103

©UiTM Press, Universiti Teknologi MARA
Yuen, M. (2019). Cashing in on e-wallets. *Thestar*. Retrieved February 25, 2021, from https://www.thestar.com.my/news/nation/2019/02/03/cashing-in-on-ewallets-its-a-growing-trend-more-people-are-using-ewallets-in-their-phones-these-days

**Appendix**

FTSE country classification of equity markets as at March 2021

| Developed | Advanced Emerging | Secondary Emerging | Frontier |
|-----------|-------------------|--------------------|----------|
| Australia | Brazil            | Chile              | Bahrain  |
| Austria   | Czech Republic    | China              | Bangladesh|
| Belgium/Luxembourg | Greece | Colombia           | Botswana |
| Canada    | Hungary           | Egypt              | Bulgaria |
| Denmark   | Malaysia          | India              | Cote d'Ivoire |
| Finland   | Mexico            | Indonesia          | Croatia  |
| France    | South Africa      | Kuwait             | Cyprus   |
| Germany   | Taiwan            | Pakistan           | Estonia  |
| Hong Kong | Thailand          | Philippines        | Ghana    |
| Ireland   | Turkey            | Qatar              | Iceland  |
| Israel    |                   | Romania            | Jordan   |
| Italy     |                   | Russia             | Kazakhstan|
| Japan     |                   | Saudi Arabia       | Kenya    |
| Netherlands |                | UAE                | Latvia   |
| Norway    |                   |                   | Lithuania|
| Norway    |                   |                   | Malta    |
| Poland    |                   |                   | Mauritius|
| Portugal  |                   |                   | Morocco  |
| Singapore |                   |                   | Nigeria  |
| South Korea |             |                   | Oman     |
| Spain     |                   |                   | Palestine|
| Sweden    |                   |                   | Peru     |
| Switzerland |             | Republic of North Macedonia |   |
| UK        |                   | Serbia             |         |
| USA       |                   | Slovak Republic    |         |
| USA       |                   | Slovenia           |         |
| USA       |                   | Sri Lanka          |         |
| USA       |                   | Tanzania           |         |
| USA       |                   | Tunisia            |         |
| USA       |                   | Vietnam            |         |