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Determinants of digital wallet adoption and super app: A review and research model

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Abstract. *As many companies are transforming through digitalisation to increase efficiency and effectiveness of business processes, financial technology firms innovated the digital wallet as an omnichannel payment to facilitate the digital payments. This review aims to explore the conceptual structure of the digital wallet knowledge base in business and management literature and the determinants that influence the consumer adoption decision of a digital wallet. A bibliometric approach is used to analyse 156 Scopus-indexed documents in this study field. Author co-citation reveals four key schools of thought: digital marketing and consumer behaviour, management and business analytics, mobile commerce and technology, and information and communication technology. The temporal overlay keyword cooccurrence map shows the topical focus changes of research from mobile payment technology, business uses, and determinants of digital wallet adoption. The top cited empirical documents also show that perceived usefulness, perceived ease of use, trust or perceived ability, perceived risk, and perceived value are consumers' key considerations in choosing digital wallets for payments. This review seeks to contribute to both scientific knowledge and the model of research practice that could provide insights into digital wallet payment. The comprehensive research framework proposes the facilitators and inhibitors which employ the status quo bias theory and presents the mediating effects of the unified theory of acceptance and use of technology constructs on behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction. Four additional determinants augment the existing theories, including perceived trust, perceived security and privacy, promotion, and super app for novelty.*

Keywords: digital wallet, super app, adoption, bibliometric review, status quo bias, unified theory of acceptance and use of technology.

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Introduction

The evolution of mobile telecommunications and information technology in the past decade has rapidly turned companies to digitalisation to increase efficiency and effectiveness of business processes. The advancement of wireless networks by boosting the bandwidth, capacity, and reliability of cellular broadband has significantly improved the speed of data

transmission and stability of connectivity (Akyildiz et al., 2016). This technology power is changing the business model and financial landscape to a digital economy as consumer behaviour changed to transact all activities via Internet-based and mobile applications on smartphones (Widayani et al., 2022). Many companies, including small and medium-sized enterprises (SMEs), have taken this opportunity to enhance the consumer shopping experience by launching e-commerce to increase sales volume as the online product and service presentations can interact with the customers and attract a wider group of customers (Hoang & Nguyen, 2022). The e-business model is a radical innovation to explore new markets, enhance the client experience, and generate more profits (Lee & Trimi, 2018). Financial technology firms (Fintech) also innovated the digital wallet as an omnichannel payment with various payment channels integrated on the back-end system to form a single platform in a smartphone application (Alam et al., 2021). Users can preload an amount of money and store bank account, debit card, and credit card data in the application for electronic payments instead of using cash (Che Nawi et al., 2022; Omarini, 2018). Hence, merchants can integrate online shopping and payment experiences for customers. A recent report shows that the digital wallet is expected to account for more than 50 percent of global e-ecommerce payments in 2025 (FIS, 2022).

Some fintech firms have increased the e-business value by platform-based ecosystem innovation called super application or "super app". The super app is super because it is a marketplace that offers a wide range of services from music to ride hailing to money in a single application on smartphones (Steinberg et al., 2022). The contributions of involved companies in the platform ecosystem are value-added to the final users (Palmié et al., 2022). Gawer and Cusumano (2014) wrote that "the more users who adopt the platform, the more valuable the platform becomes to the owner and to the users because of the increasing access to the network of users and often to a growing access of complementary innovations". The digital wallet is a complement to the platform ecosystem as it provides more flexibility than mobile banking operated by commercial banks. While the unbanked population can access financial services via digital wallets (Madan & Yadav, 2016), companies can embed promotion and loyalty programs in digital wallet features for customer retention (Putra et al., 2021). The successful super apps with digital wallets in Southeast Asia are WeChat, Alipay, Gojek, and Grab, as they provide a convenient, seamless, integrated, and efficient experience for daily use (Salehi et al., 2023). Boku (2021) reports that there were more than 2.8 billion digital wallet users worldwide in 2020, and is expected to increase to 4.8 billion by 2025 with the highest growth expected in Asia-Pacific. However, each country has an unequal adoption pace to support the digital wallet sustainability as people have different understanding and concern levels that hinder the digital wallet adoption (Leong et al., 2020). Therefore, it is important to study both facilitators and inhibitors of digital wallet adoption for effective strategic planning to ensure the growth of users.

This review aims to explore the conceptual structure of the digital wallet knowledge base in business and the management literature and the determinants that influence the consumer adoption decision of a digital wallet. The research questions address the following:

1. What is the intellectual structure of the digital wallet studies in business and management?
2. What is the topical focus of the published knowledge base on the digital wallet?
3. What do the top-cited empirical documents reveal regarding the determinants that influence consumer adoption of digital wallets?

This review seeks to contribute to both scientific knowledge and the model of research practice that could provide insights into digital wallet payment. This paper is organised as follows: introduction, literature review of existing research, methodology and analysis, research model development, and conclusions. A comprehensive research framework is proposed to investigate the facilitators, including super app for novelty, and inhibitors which employ the status quo bias theory, and to prove the mediating effects of unified theory of acceptance and use of technology constructs on behavioural intention to use, positive word of mouth, and user satisfaction for future study.

Literature review

The unified theory of acceptance and use of technology (UTAUT)

The UTAUT is one of the most influential information technology research frameworks to predict the behavioural intention to use and technology use in various study fields, such as smartphone adoption, e-learning and social learning systems, as well as mobile payment systems, e-commerce, and digital wallets (Che Nawi et al., 2022). Venkatesh et al. (2003) developed the UTAUT by synthesising the prior eight theories of technology acceptance, including the Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), Combination TAM and TPB (C-TAM-TPB), Model of Personal Computer Utilisation (MPCU), Innovation Diffusion Theory (IDT), Motivational Model (MM), and Social Cognitive Theory (SCT).

The explanatory power of UTAUT has proven to be higher than the previous eight technology acceptance theories using the same measurement in organisational contexts. The UTAUT's results of repeated examination of employees' technology acceptance in three different timelines showed the highest degree of the square of the correlation (R^2). The variance in behavioural intention to use a technology was 69 percent explained by the UTAUT model while the explanatory power using the previous eight theories ranged from a minimum 17 percent to a maximum 42 percent (Momani, 2020).

All four core UTAUT constructs have definitions similar to the constructs in other technology acceptance theories. First, performance expectancy is the degree to which users consider that using the technology will help them achieve better performance, and it is the same characteristic as perceived usefulness of technology in the TAM and job fit in the MPCU. Second, effort expectancy is the degree of ease associated with using technology in users' activities, and it is the same definition as perceived ease of use in the TAM and complexity in the MPCU. Third, social influence is the effort of others, such as family and friends to change the users' behaviour to adopt a particular technology, a subjective norm in the TRA and the TPB. Fourth, facilitating conditions include the technical support and infrastructure in favour of users while using the technology to perform their activities, and these share the characteristics of perceived behavioural control in the TPB and compatibility in the IDT. The original UTAUT model also included the moderating effects of gender, age, experience, and voluntariness of use to increase the explanatory power (Momani, 2020).

The model output showed that performance expectancy, effort expectancy, and social influence have significant effects on employees' behavioural intention to use the technology while facilitating conditions, and behavioural intention influenced the technology usage behaviour. Moreover, age had a significant moderating effect on all relations between core constructs and the behavioural intention to use and technology use. Gender moderated the relationship between core constructs and the behavioural intention (Venkatesh et al., 2003).

While the UTAUT was developed within a mandatory employee usage environment, there were modifications of UTAUT2 in a voluntary consumer context by incorporating three new constructs: hedonic motivation, price value, and habit. The result of variance explained in the behavioural intention to use a technology was significantly improved to 74 percent compared to 69 percent in the original UTAUT (Venkatesh et al., 2012).

Status quo bias theory (SQB)

Payment service providers' willingness to adopt digital wallet payments requires understanding how consumers evaluate changes and make decisions. As user resistance has been identified as a major hindrance to new technology success, payment service providers need to study and have strategic plans to manage users' concerns (Leong et al., 2020). Samuelson and Zeckhauser (1988) formalised SQB in three categories to explain how people make decisions when they need to select only one choice from many available options and why people refuse to change the status quo and stay with their preference.

First, rational decision making indicates that users' status quo has an influence on alternative decision making after considering transition and uncertainty costs. Transition costs include time, money, and effort. If the new alternative benefits are not larger than the users' current state, they will not change the status quo. Moreover, if there is uncertainty with the new alternative, users will prefer to maintain the status quo.

Second, the cognitive misperception of loss aversion is a psychological principle in decision making. Consumers often weight potential losses from switching the current payment method as larger than potential gains from digital wallet payments. Therefore, they decide to do nothing due to the benefit loss costs misperception.

Third, psychological commitment refers to three factors: sunk costs, regret avoidance, and efforts to feel in control. Sunk costs refer to previous commitments, which cause reluctance to change to a new alternative. Regret avoidance happens when users had unpleasant experiences in the past from their decisions to change the status quo. Such status quo bias causes users to not change decisions or to adhere to social norms whether they like it or not. Efforts to feel in control enforce individuals' desires to control their own situation. This desire can result in status quo bias because consumers do not want to lose control by changing to an unfamiliar payment method or feel frustrated when using with the functions in digital wallet applications.

Super apps

The super app is a marketplace in a closed ecosystem of many apps that allows the users to transact many activities from e-Commerce to food delivery, financial services, and social networks in a single application on smartphones (Roa et al., 2021). Steinberg et al. (2022) described that the super app was originally developed in Asia with three prominent variations: the chat app origin super app, the delivery-and-transactional super app, and the app family model of the super app.

The first model of chat app origin super app includes KakaoTalk dominant in Korea, WeChat dominant in China, and LINE dominant in Japan. They created a complement of super apps that started as chat apps, and borrowed, copied, and swapped affordances, interface, and features from each other. The second model of delivery-and-transactional super apps is Grab in Malaysia and Gojek in Indonesia. They began as a ride-hailing service and expanded to provide food delivery and digital payments.

Lastly, example of app family model of the super app is the collaboration between Meta's WhatsApp (Facebook/Meta) and Reliance Jio's JioMart in India to onboard millions of small grocery store owners and retailers for e-commerce and digital payments. As a result, WhatsApp becomes a super app enabling trade between customers and retailers. The targets of Facebook are not only new user acquisition with commercial services in large population countries but also digital payment opportunities among the users' communication and trades.

Methodology and analysis

This paper used bibliometric review to quantify and synthesise patterns in knowledge production across a large database. The bibliometric method is associated with research evaluation using publication statistics and the extent to which these publications are cited as indicators of scientific productivity and impact. Studying statistical relationships in terminology is one way of identifying conceptual structure and dynamics within a research field (Zupic & Čater, 2015). Therefore, bibliometric review has an ability to visualise the state-of-the-art in digital wallet studies.

The Scopus database published by Elsevier was selected for research evaluation as it represents one of the leading databases for high-quality indexing journals in the field of social sciences, arts and humanities (Mongeon & Paul-Hus, 2016). The keyword search included one of the following: "digital wallet", "mobile wallet", or electronic money", and "e-money". After filtering and screening relevant English articles and reviews in business and management area for period ending 10 July 2022, the search found 156 documents in journals during 1996 to 2023 for further processing and analyses in Excel and VOSviewer software. The digital wallet is considered as emerging literature because 66 percent of total published knowledge base on the digital wallet are between 2019 to 2023.

According to Zupic and Čater (2015), bibliometric review includes descriptive statistics, citation, co-citation, and keyword co-occurrence analyses to identify patterns within the respective database and explore a new focus in the research field. Citation analysis reveals the literature impact of authors and articles that have been cited by other documents in the Scopus database. Co-citation analysis is a complementary perspective to Scopus citation to highlight the relationships between authors and documents within the study field as it calculates the frequency with which two items are cited together by other documents in the 'reference lists of the review documents' themselves, not in the 'source' of citations. If the frequency of two authors or articles cited together is high, it is likely that there is a similarity in the intellectual knowledge. Lastly, keyword co-occurrence analysis focuses on the most frequently studied topics and study trends within particular research areas. Therefore, the findings from these three analyses help to broaden perspectives and initiate new lines of research in this field.

Intellectual structure of the digital wallet knowledge base

Author co-citation analysis (ACA) was conducted in VOSviewer to identify the intellectual structure of the digital wallet in the business and management literature. Since the digital wallet is a financial innovation, it mainly involves mobile technology, information systems, and consumer behaviour in technology adoption. Figure 1 illustrates four schools of thought mapping, including information and communication technology (11 authors), mobile commerce and technology (26 authors), management and business analytics (32 authors),

and digital marketing and consumer behaviour (34 authors). These schools of thought contain fundamental theories and research front in the digital wallet literature (Zupic & Čater, 2015).

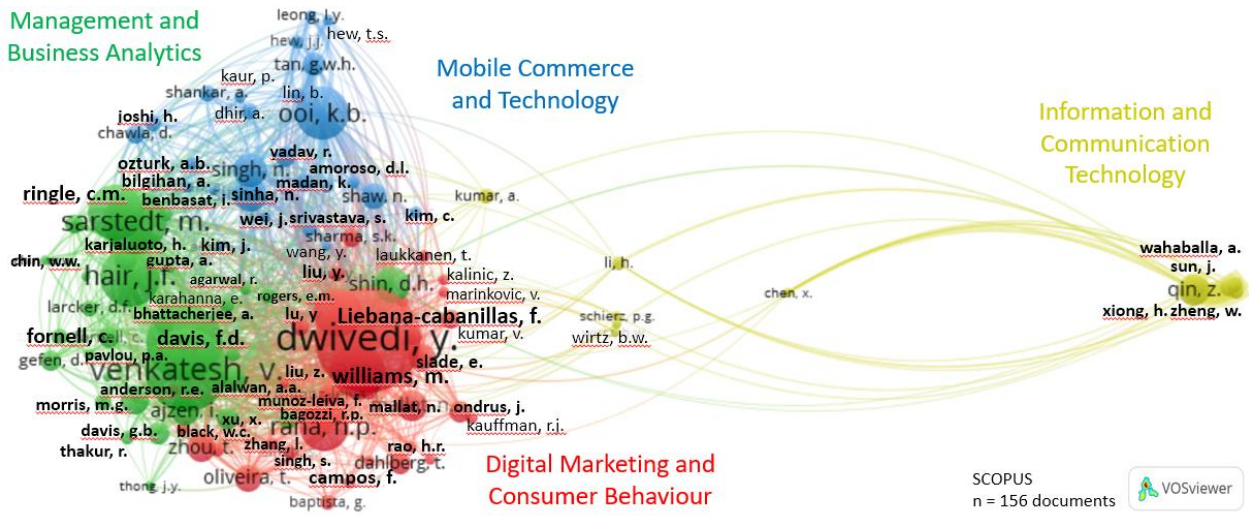


Figure 1. Author co-citation map showing the schools of thought comprising the literature on the digital wallet (author co-citation network 9,187 authors; citation threshold 14; display 103 authors)
Source: Authors' own research result.

Digital marketing and consumer behaviour are the largest schools of thought in the red cluster which include Dwivedi, Y. (140 co-citations), William, M. (72 co-citations), Liebana-cabanillas, F. (65 co-citations), Rana, N.P. (65 co-citations), and Mallat, N. (42 co-citations). Scholars in this research stream examined the effects of digital wallet payment that helped businesses improve efficiency, enhance customer experience, and open more market opportunities. However, a new technology becomes sustainable when users are willing to change their status quo for a better alternative. Previous studies employed many technology adoption theories with extended constructs to predict behavioural intention to use digital wallets and the continuation of use intention in several markets, such as China, India, Indonesia, and Malaysia (Foster et al., 2022; Leong et al., 2020; Mombeuil & Uhde, 2021; Soodan & Rana, 2020; Yang et al., 2021).

Management and business analytics are the second largest schools of thought in the green cluster which consists of Venkatesh, V. (110 co-citations), Davis, F.D. (100 co-citations), Sarstedt, M. (85 co-citations), Hair, J.F. (80 co-citations), and Ringle, C.M. (74 co-citations). Venkatesh and Davis were co-authors of the unified theory of acceptance and use of technology (UTAUT). This theory had higher prediction power of behavioural intention to use and technology use than the previous technology acceptance theories (Venkatesh et al., 2003). Although UTAUT was originally studied in an organisational context, many other scholars applied it to wider technology domains, including digital wallet payment (Che Nawi et al., 2022). Since most studies in this field were conducted by quantitative method, business analytics required statistical assessments, such as regression analysis, structural equation modelling (SEM), and partial least squares structural equation modelling (PLS-SEM) techniques (Loh et al., 2021; Malik et al., 2019; Singh & Sinha, 2019). Therefore, this research

stream employed both the theoretical framework of technology adoption and statistical analysis in empirical studies of digital wallet adoption.

The blue cluster is the school of thought in mobile commerce and technology. This research stream is led by Ooi, K.B. (72 co-citations), Singh, N. (46 co-citations), Sinha, N. (45 co-citations), Shaw, N. (35 co-citations), and Tan, G.W.H. (32 co-citations). Digital wallet supported not only online payments, but also payments at the point of sales in stores with near-field communication (NFC) and quick response (QR) scanning technologies (Leong et al., 2020). Many retailers offered multiple payment options, including digital payment, for their customers' convenience and quick purchase decision makings (Seldal & Nyhus, 2022). Marketing campaigns and loyalty programs could be embedded in digital wallets to encourage repurchasing customers (MahindraComviva, 2016). Scholars in this research stream were interested in buyer motivation to choose digital wallet payment over other methods (Chawla & Joshi, 2019; Madan & Yadav, 2016).

Information and communication technology is the smallest school of thought in the yellow cluster which includes Qin, Z. (42 co-citations), Xiong, H. (23 co-citations), Sun, J. (22 co-citations), Wahaballa, A. (21 co-citations), Kumar, A. (20 co-citations). This cluster highlighted the telecommunication technology in mobile networks. Cyber security and data privacy became major concerns of technology users as digital wallets contain personal and financial information (Bezovski, 2016). Scholars in this research stream reviewed security and personal data protection techniques, such as authentication and authorisation to build trust in digital wallet payments (Qin et al., 2017).

Topical focus of the published knowledge base on digital wallet

Keyword co-occurrence analysis (CWA) was conducted in VOSviewer to identify the most frequently used keywords and emerging research topics within the literature (Zupic & Čater, 2015). The top five most co-occurring keywords were displayed in the larger green and yellow nodes (Figure 2), including "mobile wallets" (37 cases), "e-wallets" (27 cases), "electronic money" (18 cases), "mobile payments" (17 cases), and "digital wallets" (13 cases). The temporal overlay keyword occurrence map in Figure 2 visualises the changes of research keywords in the past. Scholars gave attention to mobile payment innovation and its related technology systems, such as security of data, network protocols, and data communication systems in the early stage of the literature on digital wallets. Once mobile payments played an important role in e-commerce and business use, the scholarly research topics became mobile wallets, e-wallets, and digital wallets in the later stage. The recent emerging research topics showed the determinants of mobile wallet adoption, such as perceived usefulness, perceived ease of use, social influence, compatibility, perceived trust, perceived security, user satisfaction, and continuance intention.

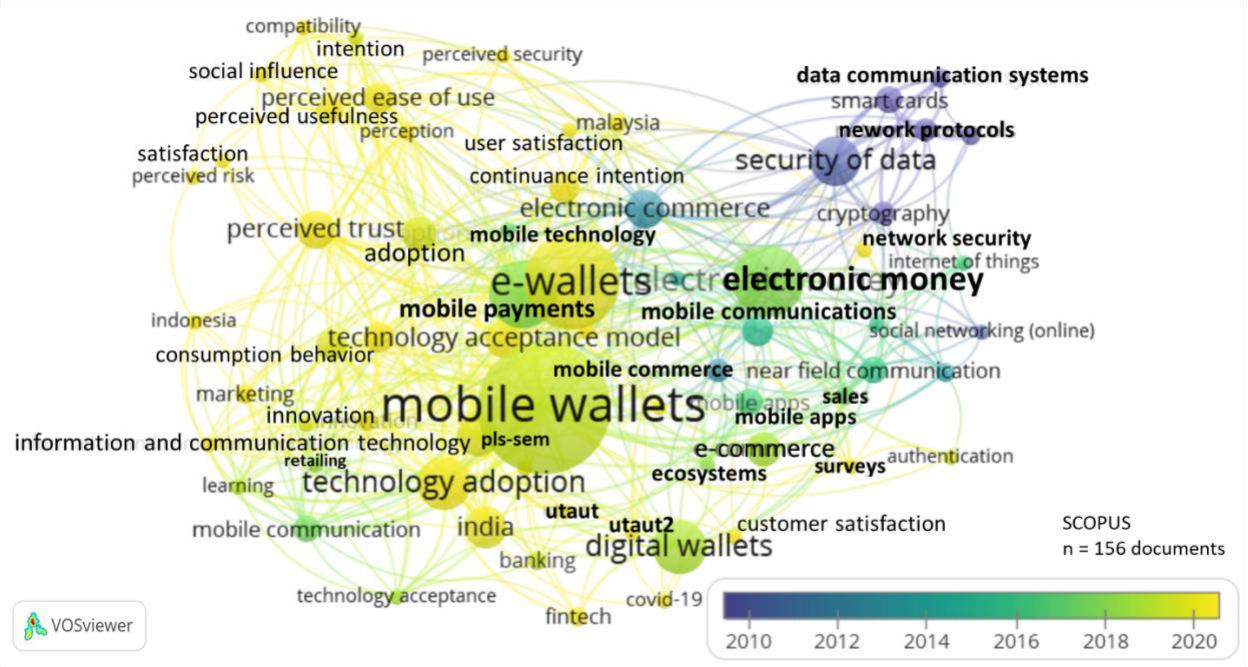


Figure 2. Temporal overlay on a keyword co-occurrence map for the digital wallet knowledge base (keyword co-occurrence network 850 keywords; co-occurrence threshold 3; display 66 keywords)

Source: Authors' own research result.

Conceptual structure of digital wallet literature

Based on the above schools of thought and topical focus changes of the digital wallet knowledge base in the past decade, the conceptual structure of the digital wallet literature is summarised in Figure 3. Information and communication technology (ICT) disruption created opportunities for mobile payments, and Fintech firms innovated the digital wallet as a new alternative payment. Therefore, ICT scholars wrote the literature relevant to the technological environment and mobile payment technology, such as mobile wallet programming and security systems (Dahlberg et al., 2015; Qin et al., 2017). After the digital wallet was introduced for commercial use, many companies implemented disruptive innovation by offering it to their customers for online and in-store payments. This resulted in a larger business ecosystem and induced researchers to examine the influencing factors of behavioural intention to use and actual adoption of digital wallets in various markets.



Figure 3. Conceptual structure of digital wallet literature

Source: Authors' own research result.

Determinants of digital wallet adoption in the literature

We first conducted document citation analysis (DCA) in VOSviewer to reveal the most cited journal articles in this study field. The top 15 most cited documents by Scopus citation in empirical studies were selected for determinants of digital wallet payment analysis as shown

in Table 1. Thirteen out of 15 articles focused on a single perspective of either facilitators (11) or inhibitors (2). Only two articles combine both perspectives for studies.

The most influential theoretical framework in the digital wallet literature was the UTAUT (Venkatesh et al., 2003; Venkatesh et al., 2012), as six out of 15 documents employed this theory. Some researchers also used the technology acceptance model (TAM) (Davis, 1989), innovation resistance theory (IRT) (Ram & Sheth, 1989), diffusion of innovation theory (DOI) (Ooi & Tan, 2016; Rogers, 2003), perceived characteristics of innovation theory (PCI) (Moore & Benbasat, 1991), mobile technology acceptance model (MTAM) (Ooi & Tan, 2016), critical mass theory (Prahl et al., 1991), flow theory (Getzels & Csikszentmihalyi, 2017), uses and gratification theory (UGT) (Katz et al., 1973), and dual factor theory (DFT) (Cenfetelli, 2004) to examine the influencing factors of the behavioural intention to use, customer satisfaction, recommendation to use, and continuance intention.

The top five most frequently used determinants in the most cited empirical studies are (1) perceived usefulness or performance expectancy or relative advantage or perceived benefit (11 documents), (2) perceived ease of use or effort expectancy or no need to carry cash (9 documents), (3) trust or perceived trust or perceived ability (7 documents), (4) perceived risk or riskiness (7 documents), and (5) perceived value or cost or no transaction fees or price benefit (6 documents). Therefore, these determinants are consumers' key considerations in choosing digital wallets for payments. Although most scholars investigated similar constructs in the existing theories, more predictors and indicators were consistently extended in their research models for new knowledge contribution.

Table 1. Most highly cited empirical studies by Scopus citation (ranked by publication year)

No.	Document	Theory	Predictors	Indicators
1	Shaw (2014). The mediating influence of trust in the adoption of the mobile wallet.	TAM	Perceived ease of use, Perceived usefulness, Trust, Mobile wallet self-efficacy, Informal learning	Intention to use in Canada
2	Kapoor et al. (2015). Examining the role of three sets of innovation attributes in determining the adoption of the interbank mobile payment service.	DOI, PCI	Voluntariness, Visibility, Trialability, Social approval, Riskiness, Relative advantage, Compatibility, Complexity, Cost, Image, Observability, Result demonstrability, Communicability	Behavioural intention in India
3	Madan and Yadav (2016). Behavioural intention to adopt mobile wallet: a developing country perspective.	UTAUT	Performance expectancy, Effort expectancy, Social influence, Facilitating conditions, Perceived value, Perceived risk, Perceived trust, Perceived regulatory support, Promotional benefits	Behavioural intention in India

No.	Document	Theory	Predictors	Indicators
4	Bagla and Sancheti (2018). Gaps in customer satisfaction with digital wallets: Challenge for sustainability.	TAM	Cashback and rewards, Wide acceptability, Easy to use interface, Instant transfer of money, No need to carry cash, Minimisation of risk (no need to give debit/credit card details), No transaction fees, Insistence by a merchant/service provider for payment through a digital wallet	Customer satisfaction in India
5	Grover and Kar (2018). User engagement for mobile payment service providers – introducing the social media engagement model.	UGT	User engagement, Content frequency and type, Time	User retention in India
6	Chawla and Joshi (2019). Consumer attitude and intention to adopt mobile wallet in India – an empirical study.	UTAUT	Perceived ease of use, Perceived usefulness, Facilitating conditions, Security, Trust, Lifestyle compatibility, Attitude	Intention to use in India
7	Singh et al. (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.	UTAUT, DOI	Perceived ease of use, Usefulness, Perceived risk, Attitude, Innovativeness, Stress to use a technology, Social influence	Intention to use, Perceived satisfaction, and Recommendation to use in India
8	Chawla and Joshi (2020). The moderating role of gender and age in the adoption of mobile wallet.	TAM, UTAUT	Perceived ease of use, Perceived usefulness, Facilitating conditions, Security, Trust, Lifestyle compatibility, Attitude, Age, Gender	Intention to use in India
9	Gupta et al. (2020). How pre-adoption expectancies shape post-adoption continuance intentions: An extended expectation-confirmation model.	UTAUT	Pre-adoption performance expectancy, Pre-adoption effort expectancy, Perceived user interface quality, Confirmation, Post-adoption self-efficacy, Post-adoption perceived usefulness, Post-adoption perceived security, User satisfaction	Continuance intention in India

No.	Document	Theory	Predictors	Indicators
10	Kaur et al. (2020). An innovation resistance theory perspective on mobile payment solutions.	IRT	Usage barrier, Value barrier, Risk barrier, Tradition barrier, Image barrier	Use intentions and Intentions to recommend in India
11	Leong et al. (2020). Predicting mobile wallet resistance: A two-staged structural equation modelling-artificial neural network approach.	IRT	Age, Education, Income, Usage barrier, Value barrier, Risk barrier, Tradition barrier, Image barrier, Perceived novelty	Mobile wallet resistance in Malaysia
12	Lew et al. (2020). The disruptive mobile wallet in the hospitality industry: An extended mobile technology acceptance model.	MTAM, Self-efficacy theory, Critical mass theory, Flow theory	Mobile usefulness, Mobile ease of use, Mobile self-efficacy, Technology self-efficacy, Perceived critical mass, Perceived enjoyment	Behavioural intention in Malaysia
13	Pal et al. (2020). Contextual facilitators and barriers influencing the continued use of mobile payment services in a developing country: Insights from adopters in India.	N.A.	Price benefit, Network externalities, Trust, Habit, Perceived risk, Unavailability of facility conditions, Operational constraints	Intent to continue usage in India
14	Talwar et al. (2021). Positive and negative word of mouth (WOM) are not necessarily opposites: A reappraisal using the dual factor theory.	DFT	Perceived information quality, Perceived ability, Perceived benefit, Perceived cost, Perceived risk, Perceived uncertainty	Word of mouth and Continued intentions to use in India
15	Yang et al. (2021). Cashless transactions: A study of the intention and adoption of e-wallets	UTAUT	Perceived usefulness, Perceived ease of use, Social influence, Facilitating conditions, Lifestyle compatibility, Perceived trust	Intention to use and Adoption of e-wallet in Indonesia

Source: Authors' own research.

Research Model Development

Our proposed research model is formulated to investigate facilitators and inhibitors of behavioural intention to use (BI), positive word of mouth (PWOM), and user satisfaction (US) in digital wallet payment for future study. Therefore, the study groups can be both potential

adopters and experienced adopters. Most studies presented the UTAUT constructs as direct facilitators, including performance expectancy, effort expectancy, social influence, and facilitating conditions. However, this model proposes to study the mediating effects of the UTAUT constructs. Four additional determinants of facilitators are also augmented in the existing theory, including perceived trust, perceived security and privacy, promotion, and super app for novelty. The inhibitors employ the status-quo bias theory, which includes transition costs for rational decision making, benefit loss costs for cognitive misperception, and technological self-efficacy for psychological commitment.

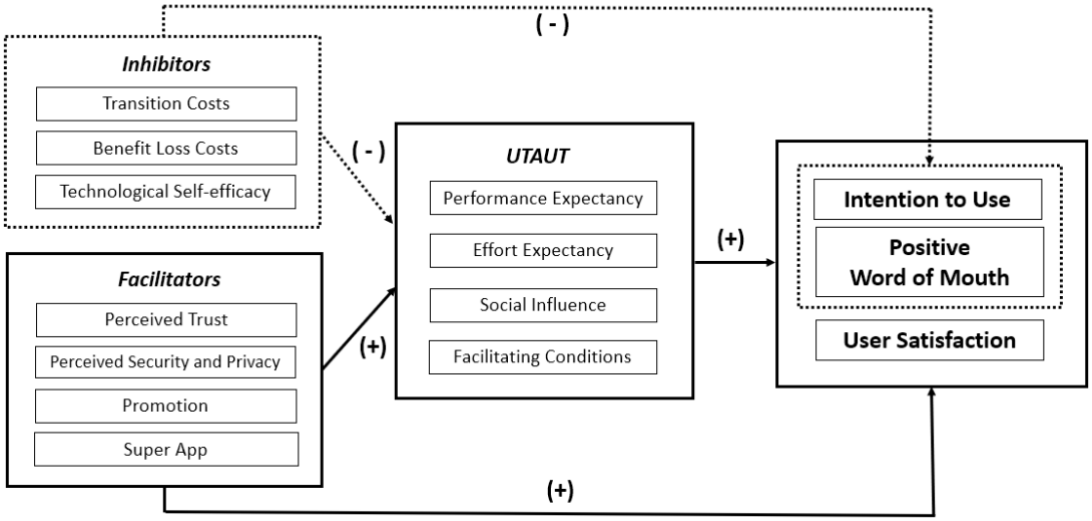


Figure 4. Proposed research framework

Source: Authors' research.

Behavioural intention to use

Behavioural intention to use (BI) refers to the degree of one's intention to perform a plan or a specific behaviour (Madan & Yadav, 2016). Several empirical studies confirmed a significantly positive relationship between BI and digital wallet adoption (Che Nawi et al., 2022; Yang et al., 2021). This means that with a higher degree of BI, there is a higher digital wallet adoption. Since BI is antecedent of actual adoption, it is crucial to identify the determinants of BI. Although many scholars have studied various factors to predict BI toward using digital wallets, there are still more factors to examine.

Positive word of mouth

Chang et al. (2019) defined word of mouth as verbal communication with opinion exchange among people's social networks. Positive word of mouth (PWOM) helps not only to alleviate the status quo bias of potential users but also to increase the degree of BI and continuance usage (Talwar et al., 2021). However, if people are dissatisfied with digital wallet payments, they might spread negative word of mouth in social networks very quickly, which may reduce people's confidence in the benefits of digital wallet (Chang et al., 2019; Verkijika, 2020).

User satisfaction

According to Khan et al. (2016), satisfaction refers to "the consumer's response to the evaluation of the perceived discrepancy between prior expectations (or some other norm of

performance) and the actual performance of the product as perceived after its consumption". Hence, satisfaction results from the actual experiences of consumers. Customers with satisfaction (US) are likely to continue using digital wallets, which could lead to PWOM when they have a chance to share their experiences with others (Singh et al., 2019).

Transition costs, benefit loss costs, and technological self-efficacy (collectively called 'Inhibitors')

Since the digital wallet is a relatively new financial technology, people would carefully compare pros and cons before making adoption decisions. Many consumers have concerns about transition costs (rational decision making), benefit loss costs (cognitive misconception), and technological self-efficacy (psychological commitment) although digital wallet payments provide convenience and efficiency (Kuo, 2020; Wang et al., 2019). The main considerations of choosing a payment method are service fee, incentives, and simple functionality on mobile application. If the offers of digital wallets are not attractive or it is too difficult to access the benefits or perform the payment, people are likely to maintain the use of their current payment methods and would not recommend digital wallets to others. Therefore, digital wallet providers need to understand what exactly inhibits consumer adoption.

H1. Each inhibitor has negative effects on the behavioural intention to use a digital wallet and positive word of mouth.

Perceived trust

As the digital wallet is associated with financial payments, trust of service providers is important for the user's consideration. Chawla and Joshi (2019) explained that there are three dimensions in terms of trust: ability, integrity, and benevolence. Ability means that digital wallet providers have enough knowledge and skills to perform the payment functions and service the users. Integrity means that service providers take the responsibilities made by their promises. Finally, benevolence means that service providers care about the users and are concerned with the interests of users, not just their own interests. Their study results showed that trust has a positive effect on users' attitude and BI. Similar results of trust were also confirmed by other studies (Che Nawi et al., 2022; Yang et al., 2021).

H2. Perceived trust has positive effects on the behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction.

Perceived security and privacy

Since a digital wallet requires users to provide personal information to perform payments, such as bank account, credit card, debit card, and transaction details, many people are not willing to adopt as they have concerns about improper access by unauthorised users. Financial crime risk increases as the average of attempted fraudulent online purchases rose by nearly 70 percent in 2020 from the previous year (PWC, 2021). Some people are also worried about their personal data that might be disclosed to third parties for marketing without their prior consent. As consumers are increasingly sensitive to information privacy, many countries have enforced the Personal Data Protection Act (PDPA) to relieve these concerns. Various research in the context of digital wallets found that perceived security and

privacy has positive effects on BI (Chawla & Joshi, 2019; Loh et al., 2021; Soodan & Rana, 2020).

H3. Perceived security has positive effects on the behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction.

Promotion

Promotion is a short-term marketing strategy and is used to create awareness and interest in products or services. Most shoppers change their purchase decision because of special offers and promotions (Madan & Yadav, 2016). Promotional rewards can be discount coupons or cash vouchers in the form of numeric codes, barcodes, or QR codes to increase intention of prospects and existing digital wallet adopters. Service providers can also co-create promotion campaigns with merchants to stimulate usage (Alam et al., 2021). While consumers would enjoy price discounts and have better experiences from digital wallets, merchants would benefit from higher sales volume and lower marketing expense. Many studies confirmed the positive influence of promotion on BI (Wei et al., 2021).

H4. Promotion has positive effects on the behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction.

Super apps

The super app is a marketplace in a closed ecosystem of many apps that allow the users to transact many daily activities in a single application on smartphones such as ride-hailing, food delivery, digital payment, social networks, etc. (Steinberg et al., 2022). The ecosystem of services in super app creates cross-selling opportunities and improves user loyalty (Roa et al., 2021). In addition, merchants save the investment costs in their own mobile application development while consumers save time by performing multiple functions and payments within a single app (Gawer & Cusumano, 2014). A digital wallet is offered in the super app for not only value-added payment services, but also financial inclusions for users who are not eligible to open bank accounts or grant credit facilities from the traditional banks (Madan & Yadav, 2016). The digital wallet payment has become the most popular in China, Japan, and South Korea (Mombeuil & Uhde, 2021). Therefore, using super apps has a correlation to digital wallet adoption.

H5. Using super apps has positive effects on the behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction.

Mediating effects of performance expectancy, effort expectancy, social influence, and facilitating conditions (collectively called 'UTAUT constructs') on BI, PWOM, and US

Performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) are four core constructs of the UTAUT (Venkatesh et al., 2003). In the digital wallet context, PE is the degree to which consumers consider whether using digital wallets will help them make payments faster. EE is the degree of ease associated with using digital wallets for goods and service payments. SI comes from the views of people with whom users have close relationships, such as family members and friends or others in their social

environment, who have influence to change the user's behaviour to adopt digital wallets. FC is the technical support and infrastructure to assist consumers while making payments.

Most empirical evidence confirmed that PE had a positive influence on BI (Che Nawi et al., 2022; Soodan & Rana, 2020; Yang et al., 2021). However, the statistical results of EE and FC were inconsistent and did not necessarily influence consumers' decisions to adopt digital wallets. Mobile wallet studies in India and Malaysia found that EE and FC had positive effects on BI (Chawla & Joshi, 2019; Che Nawi et al., 2022). However, another study in different cities in India reported that FC had a positive effect on BI, but not EE (Soodan & Rana, 2020). Different results were reported in Indonesia that EE had a positive effect on BI, but not FC (Yang et al., 2021). The empirical studies of SI's effect on BI are also inconsistent. Yang et al. (2021) reported that SI had a positive effect on BI in Indonesia. However, there was no evidence to support that SI impacted BI in Malaysia (Che Nawi et al., 2022). There are many studies of the UTAUT direct effects on BI, but limited studies on the indirect effects.

SQB inhibiting factors, i.e., transition costs, benefit loss costs, and technological self-efficacy, are expected to have directly negative effects on BI and PWOM. In addition, we found mediating effects of the UTAUT constructs in relation to SQB constructs in previous studies. In technology context, Kim and Kankanhalli (2009) explained that switching costs increased user resistance in information systems implementation both directly and indirectly through their effect on perceived value. However, Zhao et al. (2016) found that switching benefits and costs jointly explained perceived value of using mobile ticketing. While switching benefits showed a significantly positive effect on perceived value, switching costs had no significant effect. The adoption intention was indirectly increased through the effect of switching benefits on perceived value. In the digital wallet context, Cao and Niu (2019) wrote that PE and EE mediated the effect of context on Alipay user adoption. PE also mediated the effect of ubiquity on Alipay user adoption. Therefore, the study of mediating effects of UTAUT constructs should be extended to both inhibitors and facilitators.

H6a. Each UTAUT construct mediates each of the inhibitor effects on the behavioural intention to use a digital wallet and positive word of mouth.

H6b. Each UTAUT construct mediates each of the facilitator effects on the behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction.

Conclusions

The digital wallet is an emerging literature and has gained increasing interests from business and management researchers. A bibliometric review reveals four key schools of thought in this study field: digital marketing and consumer behaviour, management and business analytics, mobile commerce and technology, and information and communication technology. The temporal overlay keyword co-occurrence map identifies the topical focus changes of research and helps to understand the conceptual structure of the digital wallet knowledge base which includes mobile payment technology, business uses, and determinants of digital wallet adoption. In addition, the most frequently identified determinants in this field of study are perceived usefulness, perceived ease of use, trust or perceived ability, perceived risk, and perceived value. Hence, a comprehensive digital wallet research model should take these constructs into consideration. Since the super app keyword does not appear in the bibliometric analysis, there is a research gap in the study of the relationship between super app and digital wallet adoption. A proposed research framework

employed the UTAUT and SQB theories for facilitator and inhibitor constructs to predict the behavioural intention to use a digital wallet, positive word of mouth, and user satisfaction. Four additional determinants are also incorporated in the model, including perceived trust, perceived security and privacy, promotion, and super app for novelty.

Limitations

Four limitations require mentioning. First, the keywords used in the search for this review conflate various mobile payment systems in the results. The associated research streams may emphasise a different type of digital payment system, i.e., mobile banking. Second, this review employed a bibliometric analysis based on a Scopus-indexed database of documents. Future reviews may span other research methods and database for search and findings. Third, this review selected English documents and excluded other languages for study. The local language literature in this study field could provide useful complement findings to this review. Lastly, the document citation technique over weighted older journal articles because newly published documents would need more time for citations by other scholars.

Implications

The recent digital wallet research focuses on determining factors of digital wallet adoption. The proposed research model in this review aims to explain the facilitators and inhibitors of digital wallet payment and derive important managerial implications. There are many studies of UTAUT constructs, but proving mediating effects in the digital wallet context has rarely been studied. Therefore, future research of this model would help practitioners to prepare strategies for changing consumer status quo and increase digital wallet use. Payment service providers, merchants, and government agencies could also consider digital wallet implementation alternatives such as developing their own proprietary platforms or partnership with super apps which are external platforms as complementary products and services at lower investment costs.

Suggestions for future research

Although extensive studies on determinants of digital wallet adoption exist, most of them are from consumer perspectives. Research from merchant perspectives is still limited (Dahlberg et al., 2015; Singh & Sinha, 2019). The imbalance of research attention creates knowledge gaps to understand the boundaries of this study field. Therefore, future research might focus more studies from merchant perspectives that are crucial in the business ecosystem. More empirical research based on this proposed research model can be conducted for expected rapid growth countries of digital wallet adopters, such as Philippines, Thailand, and Vietnam (Rolfe, 2022). The study extension in these markets would provide a greater understanding of cultural differences.

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