The Impact of Covid-19 Pandemic on Continuance Adoption of Mobile Payments: A Conceptual Framework

Dian Essa Nugrahini(✉) and Ahmad Hijri Alfian

Department of Accounting, Faculty of Economics,
Universitas Islam Sultan Agung, Semarang, Indonesia
{dianessan, hijrialfian}@unissula.ac.id

Abstract. Using mobile-based payments for transactions can be a method to maintain social distancing, preventing the spread of the Covid-19 virus. The continuous usage can be ensured by replacing physical banking transactions, provided the users are satisfied and convinced of its benefits. Besides, most of the services have been offered through online platforms, and consumers are forced to explore online payment options. Hence, this study aims to propose a conceptual framework of mobile payments adoption and its continuance intention. The subject of the study constitutes new adopters of mobile payments. Future research will include validating the proposal framework using empirical data.

Keywords: Continuance intention · Mobile payment · Adoption · COVID-19

1 Introduction

The Covid-19 pandemic has devastated the world's economy and financial markets. To contain the spread and effects of the Covid-19 outbreak, many countries, including Indonesia, have taken preventive measures to reduce the risk of Covid-19, such as social distancing policies. Social distancing policies can help to contain the spread of disease by reducing the possibility of face-to-face or close contact with infected people and contaminated surfaces [1–3] These social distancing policies support the adoption of cashless alternative payment methods to avoid physical contact because cash can accelerate the virus's spread. In addition to social distancing policies, Indonesians are also faced with working from home and studying from home. With these policies, many people use e-commerce services as an alternative to meet their needs.

The rapid development of e-commerce, the emergence of new technologies and the high use of mobile devices have changed the way consumers complete their transactions. It makes mobile payments popular in the community, especially among the millennial generation. Compared to traditional payments, such as cash and debit/credit cards, the advantage of mobile payment is in its convenience because it is not limited to time and place [4]. As an effect of recent e-commerce developments, cashless payments through digital systems refer to smart payment alternatives in several developing countries to achieve sustainable competitive advantage.

L. Barolli et al. (Eds.): CISIS 2021, LNNS 278, pp. 338–346, 2021.
https://doi.org/10.1007/978-3-030-79725-6_33

The growth of the Internet in Indonesia has driven e-commerce from 2013 to 2020. The number of e-commerce users in Indonesia has increased from 34% of the total population in 2015 to 53% in 2020 [5]. The growth of the fintech product market in Indonesia shows an upward trend, as seen from the increase in transaction value and the number of start-ups. Recent data show that mobile payment transactions over the past three years have shown an increasing trend with Rp 56 trillion in 2019, Rp 47 trillion in 2018, and Rp 12 trillion in 2017 (Rp - Rupiah, Indonesian currency. 1 USD = Rp 14,197) [5]. E-money or e-wallet payments are the most popular form of fintech service in Indonesia, followed by web-based investment and pay later services. The most significant digital transactions in Indonesia come from retail (28%), online transportation (27%), food orders (20%), e-commerce (15%), and bill payments (7%).

Digitalization has become a significant factor of consumer behavior leading to a new way of life. The increasing use of online service makes mobile payments more reliable, along with the expansion of the supplier's reach and the delivery network's size. The emergence of digitalization via the internet has accelerated globalization and payment systems from manual to online transactions. It causes dependence on the use of electronic money (e-money) in making transactions.

Several studies on mobile payment have been conducted in recent years, while technology adoption has long been studied. Dahlberg et al. [6] reviewed mobile payment research from 2007 to 2014 and concluded that the research has focused mainly on three themes: strategy and ecosystems, technology, and adoption. In marketing, most research focuses on the factors that influence the adoption of mobile payments. Various theories and models from various disciplines have been applied to provide further explanations. The most widely adopted are the Technology Acceptance Model (TAM), The Unified Theories of Acceptance and Use of Technology (UTAUT), the diffusion theory of belief and innovation, and mental accounting theory. These models have been widely used to investigate technology adoption. However, the contributions made in the field of continuous technology adoption and use are noteworthy. This contribution, in particular, reflects a more rational aspect of adoption, particularly the fact that sometimes consumers do not make decisions of this type based on realistic and reasoned beliefs [7].

Previously, mobile-based payments were a convenience medium; but now it seems necessary after the Covid-19 pandemic. Thus, Covid-19 is expected to increase the use of mobile payments due to two factors. First, mobile payments can act as an instrument to promote social distancing policies, enabling people to make transactions during lockdown and quarantine periods. Second, most of the services have been offered through online platforms, and consumers are forced to use online payments. The central bank has advised bankers and customers to use digital-based payments to avoid physical contact via currency/coin media. Data released by the Bank for International Settlements show a sharp increase in the use of contactless payments in major countries [8]. As the Covid-19 virus infection is expected to continue for some time (until everyone is vaccinated), the adoption of mobile payments can be offered as a method of social distancing. Regular use can be ensured by replacing physical banking transactions, as long as users are satisfied and confident of the benefits.

2 Literature Review

2.1 Technology Adoption Models

Technology adoption has been a critical research area for the last three decades [9]. Many theoretical models have been proposed during this process to investigate the mechanisms of user adoption of technology. It aims to explain better and predict user behavior. The theories include the technology acceptance model (TAM) by [10], theory of reasoned action (TRA) (TRA) [11] and the extended version [12, 13], theory of planned behavior (TPB) by Ajzen [14], and theory of Integrated acceptance and use of technology (UTAUT) by Venkatesh et al. [15] which has been applied widely to explain the adoption of different types of innovation.

TAM, an adapted TRA model, is proposed to investigate the determinants of Information Systems (IS) acceptance. TAM proposes two main factors that influence the acceptance of Information Systems (IS), namely perceived usability and ease of use. The first has to do with the extent to which users perceive IS to help their job performance. The latter relates to their perceptions of difficulties in using IS. Both of these factors can influence the user's attitude towards technology, leading to the system's actual use. Initially, TAM has been extensively tested and modified to predict technology adoption behavior. TAM's main problem is the many additional factors that can influence technology acceptance in a particular context [10].

On the other hand, The Unified Theories of Acceptance and Use of Technology (UTAUT) has four main constructs that influence a person's behavioral intention to use technology: performance expectancy, business expectations, social influence, and facilitating conditions. Performance expectancy is defined as how the use of technology will offer benefits to consumers in carrying out certain activities. Business expectancy is defined as the level of convenience associated with the help of technology by consumers. Meanwhile, social influence shows the extent to which consumers perceive that essential people in their lives, such as family and friends, believe that they must use a particular technology. Lastly, the facilitating condition reflects consumers' perceptions of the resources and support available to carry out the target behavior [16]. Neither of these theoretical models is flawless. Therefore, many researchers tend to investigate practical problems by combining two or more themes.

2.2 Overview of Mobile Payment Adoption

The study of mobile payment user behavior is a topic of current interest in the scientific marketing community (e.g. Smith; Calvo-Porral and Otero-Prada; Calvo-Porral and Nieto-Mengotti [17–19]. One of the most interesting related problems is the adoption of mobile payments [20].

Mobile payment has been defined as using a cell phone or other cellular device to purchase goods or services [21]. Mobile payment service also refers to any business activity that uses a mobile device to complete economic transactions [22]. There are two main types of mobile payment, remote mobile payment and short distance mobile payment [23], which are made remotely and in a physical store. As a new technology,

Mobile payment is recognized as one of the most potential applications [24, 25]. Its use is extensive, from buying cinema tickets to paying for transportation, and many others.

Mobile payments research can be categorized into three lines: strategy and ecosystem [26, 27], technology and the technology environment [28, 29], and adoption [24, 25, 30]. For some reasons, the adoption of mobile payments has received the most attention among marketing experts. The first reason is that mobile payments have great potential. With their simplicity, it can benefit millions of users and companies worldwide [20]. Second, technology adoption has been widely studied in the marketing field, for example, by Sun et al., and Walles et al. [7, 31]. It is important to understand consumer preferences and identify why they are willing or unwilling to use technology. By only this way, it is expected that mobile payment services can generate value for consumers and stakeholders [6].

2.3 Perceived Usefulness

According to TAM, perceived usefulness is the extent to which users believe that adopting a particular technology will improve job effectiveness and performance [32, 33]. It is the user's perception of the increased usability of adopting new technologies [34]. Perceived usefulness, with perceived attitude and ease of use, is one of the antecedents of behavioral intention in the TAM model [10]. Pham and Ho [35] argued that perceived usefulness should be the first characteristic of the new technology to be taken into account.

In mobile payments, the presence of perceived benefits can convince consumers that the mobile payment process may help make certain purchases [36, 37]. Moreover, mobile payments have other functions, for example, to transfer money online. TAM [10] described perceived usefulness as positively associated with consumer attitudes towards certain technologies. In the context of mobile payment, when users realize its usefulness, they will develop attitudes that support it. The unique function of mobile payment will enhance this supportive attitude.

TAM is also expected to predict that an individual's intention to use mobile payment depends on perceived usefulness [38]. Technologies, such as mobile banking, enable its users, anywhere and at any time, to access information about their current balances and past transactions, thereby strengthening user adoption intentions [39]. Mobile banking is a form of mobile payment. All mobile payment services are similar to mobile banking. When users begin to realize the usefulness of mobile payments compared to other payment methods (such as cash and credit cards), for example, by completing their transactions more conveniently, they will tend to adopt mobile payments. It can increase consumer confidence in enjoying the use of mobile payments as an alternative payment and as an effort to reduce the spread of COVID-19.

2.4 Perceived Ease of Use

In the TAM model, it is defined that the perceived ease of use is an individual's perception of the simple, easy and effortless operation of a particular technology system [10]. It is an assessment of the effort involved in using technology [12] and has been considered one of the most influential determinants in adopting new technology [33].

Ease of use and perceived usefulness have been suggested as the two main factors determining the acceptance of new technology [24, 25, 40]. Both are essential and reliable predictors of user attitudes and intentions towards new technology [36, 37]. Perceived ease of use is the most significant and the most proposed precursor in assessing mobile payment adoption [6]. In TAM, it is argued that perceived ease of use positively influences perceived usefulness and indirectly influences intention to use. It has a positive influence on attitudes toward new technology. The perceived ease of use reflects the ease of using technology to access websites to buy online [41]. The use of technology is more profitable for online users. In other words, the easier the application of technology will make alternative payment methods used by consumers as a means of transaction.

2.5 Social Influence

Social influence (SI) has been significantly constructed to assess consumers' willingness to use mobile payment [42]. Potential influencers for consumers to use mobile payments are family members, friends, colleagues, and neighbors [43]. Therefore, SI shows the influence of environmental factors that encourage consumers to buy or sell new products [15]. Similarly, Martins et al. [44] found that social influence impacts online users' intentions to adopt Internet services. On the other hand, Chaouali et al. [45] reported that social influences influence individuals' mindset regarding the use of new innovative products through technology services. Social influence (SI) can be derived from the influence of subjective norms and social factors on the intention to behave using mobile payments at UTAUT.

2.6 Lifestyle Compatibility

Lifestyle compatibility (LC) is defined as the natural alignment of lifestyle choices and values [46]. This aspect of lifestyle compatibility is essential to reduce the potential for uncertainty in technology use regarding users' values, experiences, lifestyle, and preferences [47]. Thus, lifestyle compatibility influences a person's behavior and offers excellent benefits in predicting consumer behavioral intentions [48]. If consumers are accustomed to interacting with applications, they may assume that technology offers the convenience of buying a product.

3 Conceptual Framework

Based on the literature review described above, the conceptual framework is as follows (Fig. 1).

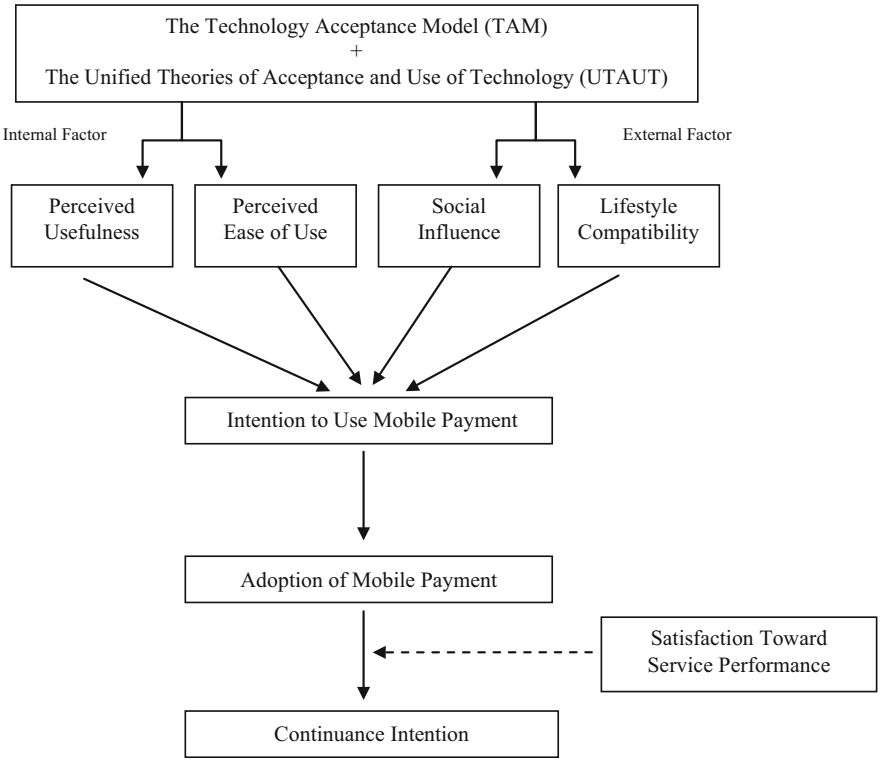

Fig. 1. Conceptual framework

4 Conclusion and Future Research

The conceptual model proposed in this study aims to investigate the general adoption of mobile payments. The definition of mobile payment is a general concept. Simultaneously, specific representations vary, including e-wallets, mobile banking applications, and third-party applications, such as virtual transportation cards based on Alipay and NFC, etc. Each adoption can be different, and this requires specific research.

The COVID-19 pandemic is causing dramatic changes in consumer behavior. In particular, e-commerce, digitization, and systems that allow consumers to avoid direct physical contact are being promoted, and mobile payment system requires no physical contact. In this situation, contactless payments, including a mobile-based payment system, help prevent the pandemic. Hence, the adoption of mobile payments is considered a preventive health behavior. In the post-COVID-19 era, when these behaviors have stabilized and become regular, it is crucial to study the pandemic's fundamental and long-term impact on the adoption of this new technology. Finally, to develop a sustainable intention to use mobile payment services, the study suggests improving service performance by adding more features and services in one platform.

References

1. Chang, S.L., Harding, N., Zachreson, C., Cliff, O.M., Prokopenko, M.: Modelling transmission and control of the COVID-19 pandemic in Australia. Nat. Commun. **11**(1), 1–13 (2020). https://doi.org/10.1038/s41467-020-19393-6
2. Eikenberry, S.E., et al.: To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic. Infect. Dis. Model. **5**, 293–308 (2020). https://doi.org/10.1016/j.idm.2020.04.001
3. Fong, L.S.: Workforce Transformation for, no. June (2018)
4. Shao, Z., Zhang, L., Li, X., Guo, Y.: Antecedents of trust and continuance intention in mobile payment platforms: the moderating effect of gender. Electron. Commer. Res. Appl. **33**,(2019). https://doi.org/10.1016/j.elerap.2018.100823
5. Das, K., Gryseels, M., Sudhir, P., Tan, K.T.: Unlocking Indonesia's digital opportunity. McKinsey Co., no. October, pp. 1–28 (2016). https://www.mckinsey.com/~/media/McKinsey/Locations/Asia/Indonesia/OurInsights/UnlockingIndonesiasdigitalopportunity/Unlocking_Indonesias_digital_opportunity.ashx.
6. Dahlberg, T., Guo, J., Ondrus, J.: A critical review of mobile payment research. Electron. Commer. Res. Appl. **14**(5), 265–284 (2015)
7. Sun, H., Fang, Y., Zou, H.M.: Choosing a fit technology: understanding mindfulness in technology adoption and continuance. J. Assoc. Inf. Syst. **17**(6), 2 (2016)
8. Auer, R., Cornelli, G., Frost, J.: Covid-19, cash, and the future of payments. BIS Bull. **3**, 1–7 (2020)
9. Chuttur, M.Y.: Overview of the technology acceptance model: origins, developments and future directions. Work. Pap. Inf. Syst. **9**(37), 9–37 (2009)
10. Davis, F.D.: A Technology Acceptance Model for Empirically Testing New End-User Information Systems. Massachusetts Institute of Technology, Cambridge, MA (1986)
11. Fishbein, M., Ajzen, I.: Belief, Attitude, and Behavior: An Introduction to Theory and Research. Addison Wessley, Reading, MA (1975)
12. Venkatesh, V., Davis, F.D., College, S.M.W.: Theoretical acceptance extension model: four longitudinal field studies. Manage. Sci. **46**(2), 186–204 (2000)
13. Venkatesh, V., Bala, H.: Technology acceptance model 3 and a research agenda on interventions. Decis. Sci. Inst. **39**(2), 273–315 (2008)
14. Ajzen, I.: The theory of planned behavior. Organ. Behav. Hum. Decis. Process. **50**(2), 179–211 (1991)
15. Venkatesh, V., Thong, J.Y., Xu, X.: Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. MIS Q. **36**, 157–178 (2012)
16. Venkatesh, V., Morris, M.G., And, G.B.D., Davis, F.D.: User acceptance of information technology: toward a unified view. MIS Q. **27**(3), 425–478 (2003)
17. Smith, T.A.: The role of customer personality in satisfaction, attitude-to-brand and loyalty in mobile services. Spanish J. Mark. - ESIC **24**(2), 155–175 (2020). https://doi.org/10.1108/SJME-06-2019-0036
18. Calvo-Porral, C., Otero-Prada, L.-M.: A profile of mobile service users in a mature market: from 'uninvolved pragmatics' to 'potential switchers' (2020)
19. Calvo-Porral, C., Nieto-Mengotti, M.: The moderating influence of involvement with ICTs in mobile services. Spanish J. Mark. - ESIC **23**(1), 25–43 (2019). https://doi.org/10.1108/SJME-08-2018-0036

20. Liébana-Cabanillas, F., Molinillo, S., Ruiz-Montañez, M.: To use or not to use, that is the question: analysis of the determining factors for using NFC mobile payment systems in public transportation. Technol. Forecast. Soc. Change **139**(November), 266–276 (2019). https://doi.org/10.1016/j.techfore.2018.11.012
21. Kim, C., Mirusmonov, M., Lee, I.: An empirical examination of factors influencing the intention to use mobile payment. Comput. Human Behav. **26**(3), 310–322 (2010). https://doi.org/10.1016/j.chb.2009.10.013
22. Liébana-Cabanillas, F., Herrera, L.J., Guillén, A.: Variable selection for payment in social networks: introducing the Hy-index. Comput. Human Behav. **56**, 45–55 (2016). https://doi.org/10.1016/j.chb.2015.10.022
23. Liu, Y.: Consumer protection in mobile payments in China: a critical analysis of Alipay's service agreement. Comput. Law Secur. Rev. **31**(5), 679–688 (2015). https://doi.org/10.1016/j.clsr.2015.05.009
24. Liébana-Cabanillas, F., Sánchez-Fernández, J., Muñoz-Leiva, F.: Antecedents of the adoption of the new mobile payment systems: the moderating effect of age. Comput. Human Behav. **35**, 464–478 (2014). https://doi.org/10.1016/j.chb.2014.03.022
25. Liébana-Cabanillas, F., Sánchez-Fernández, J., Muñoz-Leiva, F.: The moderating effect of experience in the adoption of mobile payment tools in Virtual Social Networks: the m-Payment Acceptance Model in Virtual Social Networks (MPAM-VSN). Int. J. Inf. Manage. **34**(2), 151–166 (2014). https://doi.org/10.1016/j.ijinfomgt.2013.12.006
26. Au, Y.A., Kauffman, R.J.: The economics of mobile payments: understanding stakeholder issues for an emerging financial technology application. Electron. Commer. Res. Appl. **7**(2), 141–164 (2008). https://doi.org/10.1016/j.elerap.2006.12.004
27. De Reuver, M., Verschuur, E., Nikayin, F., Cerpa, N., Bouwman, H.: Collective action for mobile payment platforms: a case study on collaboration issues between banks and telecom operators. Electron. Commer. Res. Appl. **14**(5), 331–344 (2015). https://doi.org/10.1016/j.elerap.2014.08.004
28. Ou, C.M., Ou, C.R.: Adaptation of proxy certificates to non-repudiation protocol of agent based mobile payment systems. Appl. Intell. **30**(3), 233–243 (2009)
29. Ahamad, S.S., Sastry, V.N., Udgata, S.K.: Secure mobile payment framework based on UICC with formal verification. Int. J. Comput. Sci. Eng. **9**(4), 355–370 (2014). https://doi.org/10.1504/IJCSE.2014.060718
30. Lu, Y., Yang, S., Chau, P.Y.K., Cao, Y.: Dynamics between the trust transfer process and intention to use mobile payment services: a cross-environment perspective. Inf. Manag. **48**(8), 393–403 (2011). https://doi.org/10.1016/j.im.2011.09.006
31. Wallace, L.G., Sheetz, S.D.: The adoption of software measures: a technology acceptance model (TAM) perspective. Inf. Manag. **5Q**(2), 249–259 (2014)
32. Davis, F.D.: User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. Int. J. Man. Mach. Stud. **38**(3), 475–487 (1993)
33. de Luna, I.R., Liébana-Cabanillas, F., Sánchez-Fernández, J., Muñoz-Leiva, F.: Mobile payment is not all the same: the adoption of mobile payment systems depending on the technology applied. Technol. Forecast. Soc. Change **146**, 931–944 (2019). https://doi.org/10.1016/j.techfore.2018.09.018
34. Ooi, K.B., Tan, G.W.H.: Mobile technology acceptance model: an investigation using mobile users to explore smartphone credit card. Expert Syst. Appl. **59**, 33–46 (2016). https://doi.org/10.1016/j.eswa.2016.04.015
35. Pham, T.T.T., Ho, J.C.: The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile payments. Technol. Soc. **43**, 159–172 (2015). https://doi.org/10.1016/j.techsoc.2015.05.004

36. Liébana-Cabanillas, F., Muñoz-Leiva, F., Sánchez-Fernández, J.: A global approach to the analysis of user behavior in mobile payment systems in the new electronic environment. Serv. Bus. **12**(1), 25–64 (2017). https://doi.org/10.1007/s11628-017-0336-7
37. Liébana-Cabanillas, F., Marinkovic, V., Ramos de Luna, I., Kalinic, Z.: Predicting the determinants of mobile payment acceptance: a hybrid SEM-neural network approach. Technol. Forecast. Soc. Change **129**, 117–130, 2018 https://doi.org/10.1016/j.techfore.2017.12.015
38. Williams, M.D.: Social commerce and the mobile platform: Payment and security perceptions of potential users. Comput. Human Behav. **115** (2021). https://doi.org/10.1016/j.chb.2018.06.005
39. Mehmet Haluk Koksal: The intentions of Lebanese consumers to adopt mobile banking. Int. J. Bank Mark. **34**(3), 327–346 (2016)
40. Belanche, D., Casaló, L.V., Flavián, C.: Artificial Intelligence in FinTech: understanding robo-advisors adoption among customers. Ind. Manag. Data Syst. **119**(7), 1411–1430 (2019). https://doi.org/10.1108/IMDS-08-2018-0368
41. Grover, P., Kar, A.K., Janssen, M., Ilavarasan, P.V.: Perceived usefulness, ease of use and user acceptance of blockchain technology for digital transactions–insights from user-generated content on Twitter. Enterp. Inf. Syst. **13**(6), 771–800 (2019). https://doi.org/10.1080/17517575.2019.1599446
42. Peng, S., Yang, A., Cao, L., Yu, S., Xie, D.: Social influence modeling using information theory in mobile social networks. Inf. Sci. (Ny) **379**, 146–159 (2017). https://doi.org/10.1016/j.ins.2016.08.023
43. Sarika, P., Vasantha, S.: Impact of mobile wallets on cashless transaction, vol. 7 (2019)
44. Martins, C., Oliveira, T., Popovič, A.: Understanding the internet banking adoption: a unified theory of acceptance and use of technology and perceived risk application. Int. J. Inf. Manage. **34**(1), 1–13 (2014). https://doi.org/10.1016/j.ijinfomgt.2013.06.002
45. Chaouali, W., Ben Yahia, I., Souiden, N.: The interplay of counter-conformity motivation, social influence, and trust in customers' intention to adopt Internet banking services: the case of an emerging country. J. Retail. Consum. Serv. **28**, 209–218 (2016). https://doi.org/10.1016/j.jretconser.2015.10.007
46. Chawla, D., Joshi, H.: Role of Mediator in Examining the Influence of Antecedents of Mobile Wallet Adoption on Attitude and Intention (2020)
47. Lin, H.-F.: An empirical investigation of mobile banking adoption: the effect of innovation attributes and knowledge-based trust. Int. J. Inf. Manage. **31**, 252–260 (2011)
48. Shaw, N, Sergueeva, K.: The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value. Int. J. Inf. Manage. **45**, 44–55 (2019). https://doi.org/10.1016/j.ijinfomgt.2018.10.024.