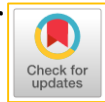


Impact of pandemic COVID-19 on the E-Banking customer behavior: Case of Indonesia



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ABSTRACT

This study aims to evaluate the factors affecting customers' acceptance and use of the internet and mobile banking during the COVID-19 pandemic. In Indonesia, the COVID-19 epidemic has encouraged residents to utilize other payment methods rather than cash, which easily spreading the virus. Internet and mobile banking are examples of technological innovations which can assist banking customers during the COVID-19 pandemic since it is safer, easier to access, and needs less human interaction. This paper utilizes a Unified Theory of Acceptance and Use of Technology (UTAUT) Model to assess consumers' intentions to use the internet and mobile banking. Previous research discussed the mobile banking adoption during the Covid-19 in various fields. Therefore, it is important to analyze the mobile banking intention and behavior in Indonesia. The data collected from questionnaires are used to evaluate the conceptual model, which shows the relationship between UTAUT constructs, performance expectancy, experience expectancy, and social influence. From 158 questionnaires with diverse demographic backgrounds gathered, we found that effort expectancy, performance expectancy, and social influence have a positive impact on the behavioral intention. Furthermore, it found that behavioral intention and facilitating conditions have influence on the using behavior. These results give a suggestion to both the banking industry and government to improve their mobile banking system to improve financial inclusion.

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1. Introduction

Digital development in the form of new technology and applications is transforming and reshaping human habits in several areas of social life, including payment and financial transactions. With the rise of mobile phones, laptop computers, and other technological gadgets, communication, and entertainment have become practically limitless. Mobile phones have multiple functions and the potential to be used as wallets and to process all payments (de Kerviler et al., 2016). The increased ownership and usage of mobile phones have resulted in the expansion of mobile payment services, which have become one of the most important personal and professional consumer activities in recent years (Liébana-Cabanillas et al., 2018). The increasing number of mobile phone users around the world, led the banking sector adopting internet banking as a delivery channel for their services. Numerous researchers examined internet banking adoption in the banking sector. The consumers' attitude towards e-banking depends on how they would adopt new technology-based delivery channels (Adapa & Roy, 2017). The changes in the use of delivery channels would arise as the population matures and confidence, and computer usage increases (Thornton & White, 2001). The UTAUT model has been used in the banking sector to evaluate banking technology adoption (Yu, 2012;

Bhatiasevi, 2015; Tan & Lau, 2016; Afshan & Sharif, 2016; Alalwan et al, 2017; Shaikh et al, 2018). Dwiyyedi et al (2019) integrated UTAUT with TAM and DOI to verify M-payment adoption intentions. Afshan & Sharif (2016) integrated trust in the UTAUT model to evaluate the consumers' continuance intention use of mobile banking in Pakistan. Meanwhile, Zhao & Bacao (2021) integrated the UTAUT with perceived benefits from Mental Accounting Theory (MAT), trust, and perceived security to measure how the pandemic facilitated mobile payment.

Previous studies also found several factors determined the consumer's attitude towards mobile and internet banking, such as motivation, demographic, individual acceptance of new technology, social influence, effort expectancy, and behavior towards different banking technologies. Karjaluoto et al (2002) found that demographic factors impact online banking behavior. Furthermore, a research conducted by Sarel & Marmorstein (2003) in Finland discovered that education and household income significantly affected electronic banking adoption. Meanwhile, Bhatiasevi (2015) explained that Thai people have a strong tendency to take over m-banking, mainly if they use this self-service, easy-to-use technology. As COVID-19 spreads, several limitations have been enforced to limit social engagement. It impacted and created several community behaviors, including banking activities. As people spend most of their time at home, mobile banking has emerged as a feasible option for secure banking transactions. The pandemic of COVID-19 has increased the significance of digital banking in many developing economies. According to the International Monetary Fund's Financial Access Survey, mobile money usage increased significantly in several low- and middle-income economies during the COVID-19 epidemic (Bazarbash et al., 2020). A business model that expands the current ecosystem has been established through such new forms of payment. As a result, the cashless society has grown globally, mobile wallets have become a must-have payment method, and 2.4 billion individuals were using digital banking in 2020. It is projected to reach 3.6 billion by 2024 (Juniper Research, 2020). Hoe (2020) reported more traditional small and medium-sized enterprises (SMEs) registered online banking accounts to support their transactions; similar to that, in South-East Asia, the number of people registering banking accounts with digital banks grew significantly. The same trend also happened in the UK, with a substantial increase in monthly mobile banking transactions from 52% to 57%.

In Indonesia, the bank institution used these situations as momentum to build and launch new features in its online banking, such as biometric security, digital payment, and worldwide transfer mode. People are progressively adopting mobile banking services for varied everyday needs instead of going to the bank. E-banking provides several benefits to its consumers, however, its adoption in Indonesia is still considered low (Barquin et al., 2019). According to reports, approximately only 32% of banking customers actively use online banking services in Indonesia (Barquin et al., 2019). Some issues correlate with this situation, such as the internet connection and accessibility, barriers to technology, and the low trust in e-banking security. Based on the issues discussed above, it is critical to examine the technological factors influencing users' behavioral intentions on the Internet and Mobile Banking during the COVID-19 pandemic to understand better how technology adoption arises. This study proposes to evaluate the factors affecting customers' acceptance and use of the internet and mobile banking during the COVID-19 pandemic. This work thus identifies the impact of COVID-19 on e-banking customer behavior in Indonesia.

2. Literature Review

2.1. The Benefits and Issues of the Internet and Mobile Banking for Consumer

E-banking development has changed traditional banking practices globally. E-banking services through the internet and mobile banking have benefited both the consumer and the banking institutions. Singhal & Padhmanabhanm (2008) argued that e-banking improves daily banking operation efficiency and provides more convenience to customers. Moreover, e-Banking allows banks to extend their services and utilities and improve customer satisfaction. E-banking offers convenience and flexibility to the customer at a lower cost than traditional branch banking (Williamson, 2006). It makes the transaction faster and simpler. The customer can access the bank information every time and everywhere. Srivastava (2007) mentioned that the most significant advantage of e-Banking lies in its flexibility, which allows customers to access banking services remotely. E-banking is equally beneficial to customers and banks (Wang et al., 2019). The benefits for banks and financial institutions include overhead savings, increased availability, and increased customer numbers, while benefits for customers include time flexibility, convenience, and

availability. These include service availability, anonymity, security, and watershed avoidance. Personal risks, health concerns (including but not limited to pandemic-related concerns), transaction costs (Baabdullah et al., 2019), and hassles, and money optimization through the ability to organize digital spending and savings.

For retail banks, e-banking significantly reduces labor costs and the number of brick-and-mortar bank branches (Shaikh et al., 2018). It helps collect data on users' banking habits and customization purposes. Interestingly, with 1.6 billion unbanked mobile phone users, e-banking is also being seen as an alternative to traditional channels to reach this group in the unbanked world. (Choudrie et al, 2018; Farah et al, 2018). Even though e-banking provides several benefits to its consumers, its adoption still needs to grow in Indonesia. Barquin et al (2019) reported that only 32% of the banked population is actively using digital banking services. Some issues correlate with this situation, such as the internet connection and accessibility, barriers to technology, and the low trust in e-banking security. Internet connectivity is a critical factor for e-banking penetration. As reported by statistics, around 185 million people in Indonesia were using the internet in 2019. However, not all areas have a good internet connection which might cause the e-banking penetration to remain low. Moreover, Fonchamyo (2013) found that older consumers are less likely to use e-banking because they have a negative attitude toward technology and innovation compared to younger adults. The latter are more excited about using the new technologies. Another barrier to e-banking penetration is the customers' trust in e-banking services. On the other hand, Santosa et al (2021) found that genX and baby boomers, which are similar to older consumers, have more intention of using digital payment or e-banking, especially during the pandemic COVID-19.

2.2. Consumer Behaviour Towards Internet and Mobile Banking During Pandemic

The consumer's attitude towards online and mobile banking is determined by some factors such as motivation, demographic, individual acceptance of new technology, social influence, effort expectancy, and behavior towards different banking technologies. Research conducted by Karjaluoto et al (2002) found that demographic factors impact online banking behavior. Tan & Lau (2016), using a sample of 347 Malaysian university students, found that when individuals feel high levels of pressure and influence from significant others, they are more likely to adopt mobile banking. Consistent with this finding, a study by Suresh & Latha (2021) empirically tested the impact of social influences on use intentions among 959 rural residents in India. Following this reasoning, Bhatiasevi (2015) explained that Thai people have a strong tendency to take over m-banking, mainly if they use this self-service, easy-to-use technology. Sarel & Marmorstein (2003) researched Finland and found that education and household income significantly affected electronic banking adoption. Furthermore, the consumers' attitude towards e-banking depends on how they would adopt new technology-based delivery channels. The changes in the use of delivery channels would arise as the population matures and confidence, knowledge, and computer usage increase (Thornton & White, 2001).

Unexpected changes in the business environment can lead to significant changes that experts did not foresee or by managers. COVID-19 pandemic is an excellent example of a global phenomenon that has changed dramatically. Consumer behavior, business, and leisure activities. Delivery of products in the real world and access to services such as restaurants has changed. These phenomena are also related to changes in payment methods for goods and services (Szumski, 2022). During to the COVID-19 pandemic, people tend to avoid using physical currency in their transactions with one another (Zhao & Bacao, 2021). Different habits and behavior have shaped the community, including banking activities. The COVID-19 pandemic impacts how bank customers access financial products and services (Tut, 2023). According to Forrester Research, contactless transactions have increased by 69% since January 2020 (Rueter, 2020). Additionally, nearly 50% of shoppers worldwide are using digital payments more than before the pandemic, and the majority plan to continue doing so (yStats GmbH & Co. KG, 2020). Hoe (2020) reported that more traditional small and medium-sized enterprises (SMEs) register online banking accounts to support their transactions; similar to that, in South-East Asia, the number of people registering banking accounts with digital banks grew significantly. The same trend also happened in the UK, where there was a substantial increase in monthly mobile banking transactions.

There are some key economic reasons why the COVID-19 pandemic will accelerate mobile banking adoption. First, COVID-19 is an easily transmitted infectious disease. Consumers are selfish, and they care about their health. Therefore, we may respond to the pandemic by reducing and

minimizing contact. Second, the government responded to the outbreak of the pandemic. In response to the outbreak of the novel coronavirus disease (COVID-19) pandemic, the government has tightened regulations to adapt to the "new normal". The community should maintain social distancing and limit physical interactions. As a result, consumers are expected to move away from payment methods that require physical contact (such as electronic cards) to contactless payment methods, such as mobile banking. The Indonesian government is also promoting cashless payment processes to help society support the "new normal". In consequence, the lack of physical interaction in service encounters has increased customer demands such as banking and financial services (Aji et al., 2020). The immediate onset of the COVID-19 pandemic has resulted in business closures and a general economic slowdown activity. That factor, combined with uncertainty about the duration of the pandemic, means that consumers are likely to minimize the use of interest-bearing payment methods such as credit cards (Szumski, 2022).

2.3. The Unified Theory of Acceptance and Use of Technology (UTAUT) Model

There are different methods applied for analyzing technology adoption. Fishbein & Ajzen (1972) developed the theory of reasoned action (TRA). Explaining an individual's intention to perform a behavior is an intermediate determinant of whether an action happens. Ajzen & Madden (1986) renewed the TRA concept and proposed the theory of planned behavior (TPB). The TPB concept included perceived behavioral control as a determinant of behavior. Davis (1989) advanced the concept by accommodating perceived usefulness (PU) and perceived ease of use (PEOU) as determinants of the intention to use technology, which then impacts the acceptance behavior, called the TAM model. Furthermore, an extension of TAM was built by adding social influence (subjective norm) and cognitive instrumental processes (Venkatesh et al., 2000). Among these theories/models, research indicated that the Unified Theory of Acceptance and Use of Technology (UTAUT) better explains the variance in the behavioral purposeful of utilizing technology (Venkatesh et al., 2003). UTAUT was developed by Venkatesh et al (2003) to measure the behavioral intentions to use a new technology system. It elaborates on four determinants: performance expectancy, social influence, effort expectancy, and facilitating condition. The model to account for 70% of the variance in behavioral intention to use and about 50% in actual use (Venkatesh et al., 2012). Although the original UTAUT is applied favorably to innovations in many contexts, the "consumer technology use context" requires additional variables to clarify and specialize for this circumstance. As a result, Venkatesh et al (2012) upgraded the UTAUT model in 2012 by adding three elements, hedonic motivation, price value, and habit, resulting in UTAUT2. Dwiyeedi et al (2019) stated that the UTAUT model omitted several significant relationships, hypothesized some relationships that may not be suitable to all situations, and removed some constructs that may be important for explaining information systems acceptance and use.

The UTAUT and UTAUT2 frameworks have been adopted in various aspects of technology adoption. Abbad (2021) uses the UTAUT model to evaluate the student's usage of e-learning systems in developing countries. Marinković & Kalinić (2020) elaborated on the UTAUT model with perceived trust and satisfaction to investigate the customers' usage intentions of M-commerce. Furthermore, the UTAUT model has also been integrated with security-related factors, validating that security and trust strongly affect customers' adoption intentions of NFC M-payments in the restaurant industry (Islam et al., 2019). The UTAUT model has also been used in the banking sector to evaluate banking technology adoption. Alalwan et al (2017) argued that UTAUT is considered to be one of the most comprehensive theoretical frameworks for evaluating the consumer behavior based on the adoption of self-service retail banking technologies. Bhatiasevi (2015) integrated UTAUT with TAM and DOI to verify M-payment adoption intentions. Rahi et al (2020) analyzed the role of UTAUT in the internet banking adoption context and found that all factors were significant in predicting users' intention to adopt internet banking. Kasri et al (2022) integrated trust in the UTAUT model to evaluate the consumers' continuance intention use of mobile banking in Jakarta. Zhao & Bacao (2021) integrated the UTAUT with perceived benefits from Mental Accounting Theory (MAT), trust, and perceived security to measure how the pandemic facilitated mobile payment.

Researchers have utilized the UTAUT model to evaluate technology adoption during the COVID-19 pandemic. Puriwat & Tripopsakul (2021) elaborated on the UTAUT model with the perceived fear of COVID-19 in evaluating the technology adoption of food delivery mobile applications. The study found that social influence, performance expectancy, effort expectancy, and perceived fear

impact the intention to use food delivery applications. Furthermore, [Barua & Barua \(2021\)](#) combined situational and health consciousness with the UTAUT model to study the acceptance and usage of mobile Health Technologies during the COVID-19 pandemic, focusing on a developing country. Meanwhile, [Napitulu et al \(2021\)](#) used the UTAUT model to examine factors influencing telehealth acceptance amid the COVID-19 outbreak in Indonesia. The results explained that performance expectancy, effort expectancy, and facilitating conditions significantly affect behavior intention to use Telehealth.

3. Method

The methodology that has been used in this research is quantitative research. A questionnaire is used as an instrument for collecting data. This research utilized an online questionnaire through a Google form, which targeted respondents who use mobile and internet banking during the COVID-19 pandemic. The questionnaire consists of two parts. The first part is the demographics of respondents, such as gender, education level, age, and occupation. The next part is designed based on the previous theory and research on customer intention in mobile and internet banking, consisting of 15 measurement items as indicators to explain performance expectancy, effort expectancy, social influence, and behavioral intention. The questionnaire uses the Likert scale from (1) to (5) to reduce confusion and adequate time for the respondent, with (1) representing strongly disagree and (5) representing strongly agree. It is validated and tested to eliminate possible content and errors. We collected 158 respondents with various demographics. This research uses regression to analyze the impact of performance expectancy, effort expectancy, and social influence on behavioral intention using SPSS and AMOS as statistical tools. Specifically, this study uses an UTAUT Model to assess our hypothesis. The sampling method in this study is purposive sampling.

4. Results and Discussion

[Table 1.](#) shows the characteristics of the respondents with the total of respondents are 158 participants, 32.91 percent were male and 67.09 percent of female. Respondents were predominantly students (73 percent) with average levels of education in high school and first degree. More than half of the respondents were less than 20 years old. It means that Generation Z was the most significant respondent in our survey. Generation Z is a generation that is so technologically tied that these respondents are relevant to see how mobile and internet banking users behave during the COVID-19 pandemic. Additionally, 73 percents of the respondents of this study are students, followed by entrepreneurs (11%), private employees (7%), others (6%), and civil servants (3%). More than half of our respondents had a first-degree educational level of 51.27 percent. Meanwhile, high school and master/doctors were counted as 41.14 percent and 7.59 percent, respectively.

Table 1. Descriptive Statistics

Section	Sub-Section	Frequency	%
Gender	Male	52	32.91
	Female	106	67.09
Educational Level	High School	65	41.14
	Diploma	0	0
	First Degree	81	51.27
	Master/Doctoral Degree	12	7.59
Age	< 20	85	54
	20-30	34	22
	31-40	27	17
	> 41	12	8
Job	Students	116	73
	Entrepreneur	18	11
	Civil Servants	4	3
	Private Employees	11	7
	Others	9	6

Source: data processed

Our survey instrument included a likert scale (1-Strongly Agree to 5 Strongly Disagree) questions to measure the valid UTAUT measures adopted by [Venkatesh et al \(2003\)](#). The internal reliability of

the scales was assessed via factor loading and construct reliability. Hair et al (2010) explained that two major steps are needed in analyzing structural equation modeling data analysis, namely, the measurement model assessment and the structural mode assessment. The first step is to examine the measurement model, which determines the convergent and discriminant validity. The next step is to examine the structural model to determine the strength and direction of the relationships among the constructs.

Table 2. Standard Item Loadings and Validity Test

Construct	Indicator	Factor Loading	Minimum	Result
Effort Expectancy	EE1	0.577	> 0.5	Valid
	EE2	0.535		Valid
	EE3	0.772		Valid
	EE4	0.689		Valid
Performance Expectancy	PE1	0.859	> 0.5	Valid
	PE2	0.712		Valid
	PE3	0.613		Valid
	PE4	0.673		Valid
Social Influence	SI1	0.710	> 0.5	Valid
	SI2	0.689		Valid
	SI3	0.709		Valid
	SI4	0.633		Valid
Facilitate Condition	FC1	0.775	> 0.5	Valid
	FC2	0.547		Valid
	FC3	0.537		Valid
Behavioral Intention	BI1	0.858	> 0.5	Valid
	BI2	0.644		Valid
	BI3	0.626		Valid
Using Behavioral	UB1	0.846	> 0.5	Valid
	UB2	0.565		Valid

Note: data processed

SPSS statistical software was utilized to evaluate the construct validity and reliability of the measurement instrument. The AVE was calculated to evaluate the convergent validity. Hair et al. (2010) explained that for a good measurement indicator, factor loadings must be at least 0.5 and preferably 0.7. Meanwhile, the minimum threshold for construct reliability should be 0.7, and the average variance extracted for each construct should equal or exceed 0.5. Table 2 and Table 3 shows the results of factor loadings, construct reliability, and average variance, which proves adequate evidence of validity and reliability. The data shows that all indicators have factor loadings exceeding 0.5, while construct reliability figures exceed the recommended level of 0.7

Table 3. Reliability Test

Variable	CR	Cut off	Result
Effort Expectancy	0.7792	> 0.7	Reliable
Performance Expectancy	0.8041		Reliable
Social Influence	0.7862		Reliable
Facilitate Condition	0.7764		Reliable
Behavioral Intention	0.8049		Reliable
Using Behavioral	0.8120		Reliable

Source: data processed

After evaluating the reliability and validity of the measurement model, the next step in this study is to test the research hypotheses using the structural model. The adequacy (goodness) of the structural model is tested using the coefficient of determination (R²) and the t-value of the path coefficients. R square is also known as the coefficient of determination which explains how far the dependent data can be explained by the independent data. R square is between 0 - 1 with the provisions that the closer to number one, the better. The rule of thumb that is used to classify R² scores is 0.75 (substantial), 0.50 (moderate), and 0.25 (weak). Table 4 shows the value of R² is 53.9%, which means that variables of effort expectancy, performance expectancy, social influence, gen z, and gender can explain the behavioral intention indicator as 53.9%, and the other has been explained by other variables.

Table 4. Goodness of Fit and R2

Goodness of Fit Index	Cut-off Value	Research Model	Result
Significant probability	≥ 0.05	0.058	Fit
RMSEA	≤ 0.08	0.034	Fit
GFI	≥ 0.90	0.895	Marginal Fit
AGFI	≥ 0.90	0.861	Marginal Fit
CMIN/DF	≤ 2.0	1.182	Fit
TLI	≥ 0.90	0.973	Fit
CFI	≥ 0.90	0.977	Fit
R2		0.539	

Source: data processed

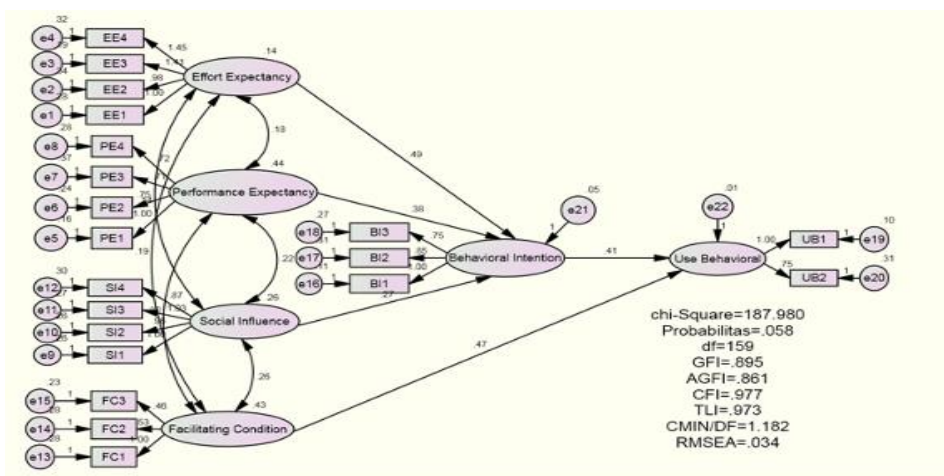
The structural model was conducted to test three hypotheses proposed in this study. According to Hair et al (2010) the hypotheses are proven if the indicators have a p-value of 0.05, and the T-Statistic (t-value) should be greater than 1.96 for a significance level of 5%. We also considered generation differences and gender as dummy variables to see how it impacts behavioral intention.

Table 5. Hypothesis Testing

Variables		Estimate	Std Error	C.R.	P	Hypothesis
Behavioral Intention	<--- Effort Expectancy	0.486	0.216	2.252	0.024	Significant Positive
Behavioral Intention	<--- Performance Expectancy	0.375	0.098	3.848	0.000	Significant Positive
Behavioral Intention	<--- Social Influence	0.268	0.126	2.123	0.034	Significant Positive
Using Behavioral	<--- Behavioral Intention	0.408	0.132	3.090	0.002	Significant Positive
Using Behavioral	<--- Facilitating Condition	0.467	0.124	3.771	0.000	Significant Positive

Source: data processed

Table 5 and Figure 1, the statistical result of every path in the research model indicated that all three hypotheses were supported. Effort expectancy, performance expectancy, and social influence have a positive impact on behavioral intention. Facilitating conditions are positively impacted on use behavior too. As explained by Giovanis et al (2019) the customer will have more intention to use the technology if it is facilitating a good condition, i.e. a technology which is simple to use. Clearly, the study's findings indicate that as facilitation conditions improve, people will tend to use mobile banking rather than use cash. This finding aligned with the research conducted by Borasi & Khan (2020) that predicted to expand the mobile banking user nearly 30% from 2020 to 2027 due to intensifying competition, especially in facility improvement.



Source: data processed

Figure 1. Structural Modelling Analysis

Moreover, [Table 6](#) shows that variable gender has a t-value of less than 1.96 and a p-value of more than 0.05, meaning gender does not influence behavioral intention. The Genz variable impacts behavioral intention (p-value 0.034; t-value 2.14). However, the result shows that gen z has a lower behavioral intention than non-Genz (genX and baby boomers). The reason is that generation z has no regular income, so it has been driven to less mobile and internet banking activities. This finding aligned with research conducted by [Santosa et al \(2021\)](#) that showed non-Genz generation (genX and baby boomers) have more intention in using mobile banking during pandemic COVID-19.

Table 6. Independent Sample T-Test

Indicator	Age Classification	N	Mean	Prob
Effort	Gen-Z	117	14.42	0.846
Expectancy	Non-Gen-Z	41	14.54	0.856
Performance	Gen-Z	117	17.38	0.599
Expectancy	Non-Gen-Z	41	17.07	0.621
Social Influence	Gen-Z	117	15.12	0.118
	Non-Gen-Z	41	14.15	0.115
Facilitate	Gen-Z	117	11.30	0.831
Condition	Non-Gen-Z	41	11.39	0.839
Behavior	Gen-Z	117	11.48	0.398
Intention	Non-Gen-Z	41	11.90	0.421
Using Behavioral	Gen-Z	117	6.92	0.012
	Non-Gen-Z	41	7.83	0.016

Source: data processed

This paper sought to provide a further understanding of issues surrounding the acceptance of internet and mobile banking in the COVID-19 pandemic using the UTAUT model. Based on the analysis above, this study supports the previous research conducted by [Venkatesh et al \(2003\)](#) and [Giovani et al \(2019\)](#). It supports the argument that the three variables in the UTAUT model, namely: Effort Expectancy, Performance Expectancy, and Social Influence, have a direct influence on Behavioral Intention. The results from this study suggest that the Performance Expectancy and Social Influence variables significantly affect the Behavioral Intention to utilize the internet and mobile banking amid the COVID-19 pandemic. The increasing number of the internet and mobile banking users is critical from an economic perspective. The more people use the technology it will impact the economic viability of a technological application. The results of this study proved that the COVID-19 pandemic impacts how the banking customer intention to utilize the internet and mobile banking. Furthermore, it means that the larger number of users will create the social base that can influence and promote the spreading of internet and mobile banking customers in the future. This research also supports the study conducted by [Silva et al \(2023\)](#) where the digital solution's adoption would have a long-term effect and continues after the coronavirus pandemic. This study is relevant with the previous research conducted by [Sitanggan \(2020\)](#) which discover that Indonesia's bank institutions, such as BNI and BCA, increased online banking activity during the pandemic by more than 56% and 28%, respectively. It proved that the COVID-19 pandemic has accelerated online banking penetration in Indonesia. The changing consumer behavior in the banking sector will likely change the banks' business model. As mentioned by [Barquin et al \(2019\)](#) one of the most impacted banking industry dimensions is distribution channels, such as sales in the bank branch and direct sales. According to [Juniper Research \(2020\)](#) changes in customer behavior may lead to a shift in the branch concept from conventional transactions to high-value operations. Customers' shifting preferences are unlikely to return to pre-outbreak norms ([Ghosh, 2022](#)). Based on this finding, the bank institutions might adapt to the new environment and create a strategy in the middle of uncertainty.

5. Conclusion

The current research evaluates the consumers' behavioral intention to utilize the internet and mobile banking. Amid the COVID-19 pandemic, most recent studies have explored the initial adoption of contactless FinTech systems. Therefore, this study applied the UTAUT model, which provided significant results to explain the technology adoption during the pandemic. We proposed three variables, Effort Expectancy, Performance Expectancy, and Social Influence to investigate the behavioral intention of Indonesian customers in utilizing the internet and mobile banking during the COVID-19 pandemic. The results showed that Effort Expectancy, Performance Expectancy and

Social Influence variables significantly influence Indonesian consumers' behavioral intention to utilize the internet and mobile banking amid the COVID-19 pandemic. This study also found that Facilitating Conditions are positively impacted on use behavior of internet and mobile banking. In addition, our model was able to explain 53.9% of the variance in behavioral intention. Furthermore, the study also found that gender does not influence behavioral intention. Meanwhile, gen z has a lower behavioral intention than non-Genz (millennials) in utilizing the internet and mobile banking during the COVID-19 pandemic.

Like most of studies, the present study has some limitations. This paper used only the three variables of the UTAUT model. It also did not consider the effect of the moderating variables presented in the original UTAUT model. As a result, the researchers suggest that future studies include more participants from diverse backgrounds to provide more accurate data and conclusions. Due to the numerous factors that determine research environments, this study suggests that more variables be included in future research to enhance the variance explained by the predictors.

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Declarations

- Author contribution** : F.P developed the theoretical formalism. AN.FA performed the analytic calculations. Both F.P and AN.FA. authors contributed to the data analysis and the final version of the manuscript.
- Funding statement** : This research did not receive funding from any other party or funding agency
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- Additional information** : No additional information is available for this paper.

References

- Abbad, M. (2021). Using the UTAUT model to understand students' usage of e-learning systems in developing countries. *Education and Information Technologies*, 26(10). doi: [10.1007/s10639-021-10573-5](https://doi.org/10.1007/s10639-021-10573-5)
- Adapa, S., & Roy, S. K. (2017). Consumers' post-adoption behaviour towards Internet banking: empirical evidence from Australia. *Behaviour & Information Technology*, 36(9), 970–983. doi: [10.1080/0144929X.2017.1319498](https://doi.org/10.1080/0144929X.2017.1319498)
- Afshan, S., & Sharif, A. (2016). Acceptance of mobile banking framework in Pakistan. *Telematics and Informatics*, 33(2), 370–387. doi: [10.1016/j.tele.2015.09.005](https://doi.org/10.1016/j.tele.2015.09.005)
- Aji, H. M., Berakon, I., & Husin, M. M. (2020). COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia. *Cogent Business & Management*, 7(1), 1–16. doi: [10.1080/23311975.2020.1804181](https://doi.org/10.1080/23311975.2020.1804181)
- Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology*, 22(5), 453–474. doi: [10.1016/0022-1031\(86\)90045-4](https://doi.org/10.1016/0022-1031(86)90045-4)
- Alalwan, A. A., Dwiyeidi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: extending UTAUT with trust. *International Journal of Information Management*, 37(3), 99–110. doi: [10.1016/j.ijinfomgt.2017.01.002](https://doi.org/10.1016/j.ijinfomgt.2017.01.002)

- Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Kizgin, H., & Patil, P. (2019). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. *International Journal of Information Management*, 44, 38–52. doi: [10.1016/j.ijinfomgt.2018.09.002](https://doi.org/10.1016/j.ijinfomgt.2018.09.002)
- Barquin, S., de Gantès, G., Vinayak, & Shrikhande, D. (2019). *Digital banking in Indonesia: Building loyalty and generating growth*. [https://www.mckinsey.com/~media/McKinsey/Industries/Financial Services/Our Insights/Digital banking in Indonesia Building loyalty and generating growth/Digital-banking-in-Indonesia-final.ashx](https://www.mckinsey.com/~media/McKinsey/Industries/Financial%20Services/Our%20Insights/Digital%20banking%20in%20Indonesia%20Building%20loyalty%20and%20generating%20growth/Digital-banking-in-Indonesia-final.ashx)
- Barua, Z., & Barua, A. (2021). Acceptance and usage of mhealth technologies amid covid-19 pandemic in a developing country: the utaut combined with situational constraint and health consciousness. *Journal of Enabling Technologies*, 15(1), 1–22. doi: [10.1108/JET-08-2020-0030](https://doi.org/10.1108/JET-08-2020-0030)
- Bazarbash, M., Moeller, J., Griffin, N. N., Villanova, H. C., Chhabra, E., Fan, Y., & Shirono, K. (2020). *Mobile money in the COVID-19 pandemic* (Special Series on COVID-19).
- Bhatiasevi, V. (2015). An extended UTAUT model to explain the adoption of mobile banking. *Information Development*, 32(4), 799–814. doi: [10.1177/0266666915570764](https://doi.org/10.1177/0266666915570764)
- Borasi, P., & Khan, S. (2020). *Mobile Payment Market Size, Share, Competitive Landscape and Trend Analysis Report, by Payment Type, Transaction Mode*. Allied Market Research.
- Choudrie, J., Junior, C. O., McKenna, B., & Ritchter, S. (2018). Understanding and conceptualising the adoption, use and diffusion of mobile banking in older adults: A research agenda and conceptual framework. *Journal of Business Research*, 88, 449–465. doi: [10.1016/j.jbusres.2017.11.029](https://doi.org/10.1016/j.jbusres.2017.11.029)
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of online banking. *MIS Quarterly*, 13(3), 319–340. doi: [10.2307/249008](https://doi.org/10.2307/249008)
- de Kerviler, G., Demoulin, N. T. ., & Zidda, P. (2016). Adoption of in-store mobile payment: Are perceived risk and convenience the only drivers? *Journal of Retailing and Customer Service*, 31, 334–344. doi: [10.1016/j.jretconser.2016.04.011](https://doi.org/10.1016/j.jretconser.2016.04.011)
- Dwiyedi, Y. K., Rana, N. P., & Jeyaraj, A. (2019). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a Revised Theoretical Model. *Information Systems Frontiers*, 21(4), 719–734. doi: [10.1007/s10796-017-9774-y](https://doi.org/10.1007/s10796-017-9774-y)
- Farah, M. F., Hasni, M. J. S., & Abbas, A. K. (2018). Mobile-banking adoption: Empirical evidence from the banking sector in Pakistan. *International Journal of Bank Marketing*, 36(7), 1386–1413. doi: [10.1108/IJBM-10-2017-0215](https://doi.org/10.1108/IJBM-10-2017-0215)
- Fishbein, M., & Ajzen, I. (1972). Attitudes and Opinions. *Annual Review of Psychology*, 23, 487–544. doi: [10.1146/annurev.ps.23.020172.002415](https://doi.org/10.1146/annurev.ps.23.020172.002415)
- Fonchamyo, D. C. (2013). Customer Perception of E-Banking Adoption in Cameroon: An Empirical Assessment of an Extended TAM. *International Journal of Economics and Finance*, 5(1), 166–176.
- Ghosh, S. (2022). COVID-19 and Bank Behaviour Evidence from India. *Economic and Political Weekly*, 57(35), 18–21.
- Giovanis, A., Assimakopoulos, C., & Sarmaniotis, C. (2019). Adoption of mobile self-service retail banking technologies: The role of technology, social, channel and personal factors. *International Journal of Retail & Distribution Management*, 47(9), 894–914. doi: [10.1108/IJRDM-05-2018-0089](https://doi.org/10.1108/IJRDM-05-2018-0089)
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson.
- Hoe, L. K. (2020). *COVID-19: Opportunities and Challenges for Digital Banks*. <https://www.pwc.com/my/en/perspective/digital/200408-pwc-blog-covid-19-opportunities->

challenges-digital-banks.html

- Islam, M. S., Karia, N., Khaleel, M., Fauzi, F. B. A., Soliman, M. M., Khalid, J., & Mamun, M. A. (2019). Intention to adopt mobile banking in Bangladesh: An empirical study of emerging economy. *International Journal of Business Information Systems*, 31(1), 136–151. doi: [10.1504/IJBIS.2019.099530](https://doi.org/10.1504/IJBIS.2019.099530)
- Juniper Research. (2020). *Digital banking users to exceed 3.6 Billion globally by 2024, as digital-only banks catalyze market.*
- Karjaluoto, H., Mattila, M., & Pentto, T. (2002). Factors underlying attitude formation towards online banking in Finland. *International Journal of Banking Marketing*, 20(6), 261–272. doi: [10.1108/02652320210446724](https://doi.org/10.1108/02652320210446724)
- Kasri, R. A., Indrastomo, B. S., Hendranastiti, N. D., & Prasetyo, M. B. (2022). Digital payment and banking stability in emerging economy with dual banking system. *Heliyon*, 8(11). doi: [10.1016/j.heliyon.2022.e11198](https://doi.org/10.1016/j.heliyon.2022.e11198)
- Liébana-Cabanillas, F., Muñoz-Leiva, F., & Sánchez-Fernández, J. (2018). A global approach to the analysis of user behavior in mobile payment systems in the new electronic environment. *Service Business*, 12(1), 25–64. doi: [10.1007/s11628-017-0336-7](https://doi.org/10.1007/s11628-017-0336-7)
- Marinković, V., & Kalinić, Z. (2020). Understanding Consumers' Continuance Intention and Word of Mouth in Mobile Commerce Based on Extended UTAUT Model. In *Impact of Mobile Services on Business Development and E-Commerce* (pp. 108–125). doi: [10.4018/978-1-7998-0050-7.ch006](https://doi.org/10.4018/978-1-7998-0050-7.ch006)
- Napitulu, D., Yacub, R., & Putra, A. (2021). Factor influencing of telehealth acceptance during covid-19 outbreak: extending UTAUT model. *International Journal of Intelligent Engineering and Systems*, 14(3), 267–281. doi: [10.22266/ijies2021.0630.23](https://doi.org/10.22266/ijies2021.0630.23)
- Puriwat, W., & Tripopsakul, S. (2021). Understanding food delivery mobile application technology adoption: a utaut model integrating perceived fear of covid-19. *Emerging Science Journal*, 5, 94–104. doi: [10.28991/esj-2021-SPER-08](https://doi.org/10.28991/esj-2021-SPER-08)
- Rahi, S., Khan, M. M., & Alghizzawi, M. (2020). Factors influencing the adoption of telemedicine health services during COVID-19 pandemic crisis: An integrative research model. *Enterprise Information Systems*, 15(6), 769–793. doi: [10.1080/17517575.2020.1850872](https://doi.org/10.1080/17517575.2020.1850872)
- Rueter, T. (2020). *Will consumers stick with contactless payments?*
- Santosa, A. D., Taufik, N., Prabowo, F. H. E., & Rahmawati, M. (2021). Continuance intention of baby boomer and X generation as new users of digital payment during COVID-19 pandemic using UTAUT2. *Journal of Financial Services Marketing*, 26(4), 259–273. doi: [10.1057/s41264-021-00104-1](https://doi.org/10.1057/s41264-021-00104-1)
- Sarel, D., & Marmorstein, H. (2003). Marketing online banking to the indifferent consumer: a longitudinal analysis of banks' actions. *Journal of Financial Services Marketing*, 8(3), 231–243. doi: [10.1057/palgrave.fsm.4770122](https://doi.org/10.1057/palgrave.fsm.4770122)
- Shaikh, A. A., Glavee-Geo, R., & Karjaluoto, H. (2018). How relevant are risk perceptions, effort, and performance expectancy in mobile banking adoption? *International Journal of E-Business Research*, 14(2), 39–60. doi: [10.4018/IJEBR.2018040103](https://doi.org/10.4018/IJEBR.2018040103)
- Silva, T. C., de Souza, S. R. S., Guerra, S. M., & Tabak, B. M. (2023). COVID-19 and bank branch lending: The moderating effect of digitalization. *Journal of Banking and Finance*, 152. doi: [10.1016/j.jbankfin.2023.106869](https://doi.org/10.1016/j.jbankfin.2023.106869)
- Singhal, D., & Padhmanabhanm, V. (2008). A study on consumer perception towards internet banking: Identifying major contributing factors. *The Journal of Nepalese Business Studies*, 5(1), 101–111. doi: [10.3126/jnbs.v5i1.2088](https://doi.org/10.3126/jnbs.v5i1.2088)
- Sitanggan, M. L. S. (2020). Makin digandrungi nasabah, bank-bank menambah fitur mobile banking. *Kontan.Co.Id*. <https://keuangan.kontan.co.id/news/makin-digandrungi-nasabah-bank-bank->

menambah-fitur-mobile-banking

- Srivastava, K. S. (2007). Customer's perception on usage of internet banking. *Innovative Marketing*, 3(4), 67–73.
- Suresh, K. R., & Latha, K. L. (2021). Consumer empowerment by adapting e-commerce - Indian rural consumers online shopping behaviour analysis. *Journal of Management (JOM)*, 8(3).
- Szumski, O. (2022). Comparative analyses of digital payment methods from the pre and post COVID-19 perspective. *Procedia Computer Science*, 4660–4669. doi: [10.1016/j.procs.2022.09.530](https://doi.org/10.1016/j.procs.2022.09.530)
- Tan, E., & Lau, J. (2016). Behavioural intention to adopt mobile banking among the millennial generation. *Young Consumers*, 17(1), 18–31. doi: [10.1108/YC-07-2015-00537](https://doi.org/10.1108/YC-07-2015-00537)
- Thornton, J., & White, L. (2001). Customer orientations and usage of financial distribution channels. *Journal of Service Marketing*, 15(3), 168–185. doi: [10.1108/08876040110392461](https://doi.org/10.1108/08876040110392461)
- Tut, D. (2023). FinTech and the COVID-19 Pandemic: Evidence from Electronic Payment Systems. *Emerging Markets Review*, 54. doi: [10.1016/j.ememar.2023.100999](https://doi.org/10.1016/j.ememar.2023.100999)
- Venkatesh, V., Morris, M. G., & Ackerman, P. L. (2000). A longitudinal field investigation of gender differences in individual technology adoption decision-making processes. *Organizational Behavior and Human Decision Processes*, 83(1), 33–60. doi: [10.1006/obhd.2000.2896](https://doi.org/10.1006/obhd.2000.2896)
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. doi: [10.2307/30036540](https://doi.org/10.2307/30036540)
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157–178. doi: [10.2307/41410412](https://doi.org/10.2307/41410412)
- Wang, W. T., Ou, W. M., & Chen, W. Y. (2019). The impact of inertia and user satisfaction on the continuance intentions to use mobile communication applications: A mobile service quality perspective. *International Journal of Information Management*, 44, 178–193. doi: [10.1016/j.ijinfomgt.2018.10.011](https://doi.org/10.1016/j.ijinfomgt.2018.10.011)
- Williamson, G. D. (2006). Enhanced authentication in online banking. *Journal of Economic Crime Management*, 4(2), 1–42.
- yStats GmbH, & Co. KG. (2020). *Global Online Payment Methods 2020 and COVID-19's Impact*.
- Yu, C. S. (2012). Factors affecting individuals to adopt mobile banking: empirical evidence from the UTAUT model. *Journal of Electronic Commerce Research*, 13(2), 104–121.
- Zhao, Y., & Bacao, F. (2021). How does the pandemic facilitate mobile payment? An investigation on users' perspective under the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 18(3). doi: [10.3390/ijerph18031016](https://doi.org/10.3390/ijerph18031016)