Available Online : https://proceeding.researchsynergypress.com/index.php/cset/index
RSF Conference Series: Engineering and Technology
ISSN 2809-6843 (Online) | 2809-6878 (Print)
Volume 2 Number 1 (2022): 85-94

Factors that Lead to Adoption and Use of Online Bank Account Opening through e-KYC using UTAUT and its Extensions

Gerand Boy O. Elinzano[1], Michelle Renee D. Ching[2]

[1]College of Computer Studies, De La Salle University, Philippines
[2]Center for ICT for Development, College of Computer Studies, De La Salle University, Philippines

Abstract

Financial Inclusion has been determined as one of the factors affecting national development. Bank account opening provides opportunity to more banking services and as such central banks have been supporting the use of Electronic-Know-Your-Customer (e-KYC) even before COVID-19 pandemic. While the benefits of e-KYC for the banks and its customers are clear, the widespread use of such process for account opening is still in its early adoption stage. This research employed a quantitative method by adopting the Unified Theory of Acceptance and Use of Technology as as theoretical foundation and extension constructs and determined the factors affecting the use and adoption of e-KYC for online bank account opening. As a result, facilitating conditions and perceived security were found to be significant factors affecting the intension to use e-KYC. Through this research, it was able to validate the use of the research model in studying e-KYC adoption and provided management key areas leading to e-KYC use that they may focus on.

Keywords: *Financial Inclusion, e-KYC, UTAUT, Perceived Security, Facilitating Conditions*

INTRODUCTION

Financial Inclusion has been determined to be one of the key players for sustainable and equitable national development (Financial Inclusion Steering Committee, 2022). Internationally, cross-country study on digital financial inclusion and economic growth showed significant positive effect between digital financial inclusion and the economy (Shen et al., 2021) or in other articles, referred to as the digital economy (Spence, 2021). A 2019 Financial Inclusion Survey states that 7 in 10 adult Filipinos are financially excluded (Bangko Sentral ng Pilipinas, 2019). BSP recognizes that the first step towards financial inclusion is through account opening (Diokno, 2020). However, the use of e-KYC for online account opening is in the earlier stage in the Philippines

KYC is a process and a principle used by banks to ensure that proper due diligence was performed prior to opening a bank account. E-KYC refers to the electronic means to conduct customer identification and allow online and/or digital verification of the customer's identity (Perlman, 2019). Before the emergence of e-KYC, the process of going physically to the branch is problematic to the bank since it's cost-intensive, time-consuming, and inconvenient for the customers (Zetzsche et al., 2018).

In the Philippines, adoption to mobile and internet banking has been increasing (Guno, 2018). However, even with the advancement of mobile and internet banking and various literature that explains the different factors on adopting it, Philippines still lags in offering e-KYC as evident that only 4 out of 12 domestic banks have e-KYC capability for account opening as shown in Table 1. The two methodologies used by the banks to do e-KYC are video call and selfie verification through mobile and/or internet banking.

Corresponding author
gerand.elinzano@dlsu.edu.ph; michelle.ching@dlsu.edu.ph
DOI : 10.31098/cset.v2i1.508

Table 1.

Private Domestic Banks and e-KYC Availability*

Private Domestic Banks	e-KYC Availability	Methodology
Asia United Bank Corporation	Not Available	
BDO Unibank, Inc.	Available	Video Call
Bank of Philippine Islands	Available	Selfie
China Banking Corporation	Not Available	
East West Banking Corporation	Not Available	
Metropolitan Bank and Trust Company	Not Available	
Philippine National Bank	Not Available	
Philippine Trust Company	Not Available	
Rizal Commercial Banking Corporation	Not Available	
Security Bank Corporation	Available	Video Call
UnionBank of the Philippines	Available	Selfie
United Coconut Planters Bank	Not Available	

**As of November 2021*

As such, this study aims to determine the factors influencing customer adoption and use of Online Account Opening through e-KYC in the context of the Philippines. Doing so would help the banking industry understand the preferences and perceptions of the Filipino consumers in designing their system for online account opening through e-KYC. Guided by the constructs of the Unified Theory of Use and Acceptance of Technology (UTAUT) with additional constructs of Perceived Trust (Alalwan et al., 2017; Chaouali et al., 2016; Gu et al., 2009; Martins et al., 2014; Masrek et al., 2014; Merhi et al., 2019; Oliveira et al., 2014; S. K. Sharma & Sharma, 2019; Suh & Han, 2002), Perceived Security, and Perceived Privacy (Merhi et al., 2019) will help uncover the intention to open an account through e-KYC by Filipino consumers. This is depicted in Figure 1.

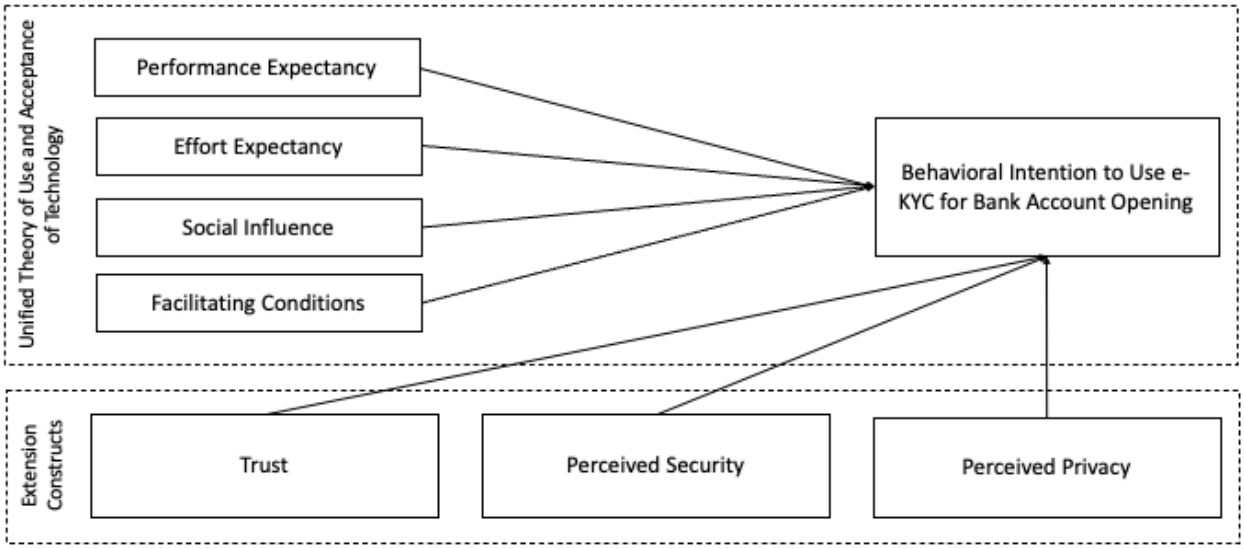

Figure 1. Operational Model

LITERATURE REVIEW

A. Mobile and Internet Banking Adoption

UTAUT provides a theoretical framework in understanding the behavioral intention of use of a technology. The framework shows that Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) are the four core determinants of intention and usage of technology (Venkatesh et al., 2003). The theory also provides assumptions that gender, age, experience, and voluntariness of use moderate the four key constructs stated.

Several studies use UTAUT as the baseline theory in explaining the behavioral intention of use of mobile and internet banking. The studies show varying results when it comes to mobile and internet banking adoptions.

Table 2.

Mobile and Internet Banking Adoption and Use

Authors	PE	EE	SI	FC
(Merhi et al., 2019)	S	NS	NS	NC
(Alalwan et al., 2017)	S	S	NS	S
(Chaouali et al., 2016)	S	S	NS	S
(Oliveira et al., 2014)	S	NS	NS	S
(R. Sharma et al., 2020)	S	S	S	S
(Martins et al., 2014)	S	S	S	NS

Note: S – Significant Relationship; NS – Not Significant Relationship; NC – Not Covered

Among the constructs of UTAUT, PE has been the consistently included as key contributor in behavioral intention to mobile and internet banking. This implies that the aspect to the functionality of mobile banking is a major and significant factor in adoption of such (Alalwan et al., 2017). While PE for mobile and internet banking past studies seem to have significant effect to its adoption and use, the specific technology for e-KYC must then be considered. A study in Korea shows that traditional financial services method is still preferred over biometrics (Kim et al., 2019).

Hypothesis 1 (H1): Performance Expectancy positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

In the study of Alalwan, Chaouali, Sharma, and Martins, it has been concluded that customers perceive mobile and internet banking technology needs less effort and is not difficult to use (Alalwan et al., 2017). Contrary to this, the studies of Merhi and Oliviera did not show a certain level of significance when between EE and intention to use mobile and internet banking (Merhi et al., 2019; Oliveira et al., 2014). For this study, EE will be studied and considered due to contradicting results in the past literatures and additional challenges related to the use of technology itself. Selfie and Virtual Call are the most used method to verify the identity of the customers in e-KYC. However, using such technology also impose challenges and adoption to such is still yet to be further investigated (Cook, 2017; Fauville et al., 2021; Locke, 2017; Perdana & Mokhtar, 2022).

Hypothesis 2 (H2): Effort Expectancy positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

The studies of Sharma and Martins show positive relationship between mobile and internet banking behavioral intention and SI (Martins et al., 2014; R. Sharma et al., 2020). It is then recommended that social media platforms should be maximized in promoting Internet Banking (S. K. Sharma & Sharma, 2019). On the other hand, the studies of Merhi, Alalwan, Chaouali, and Oliviera did not show a certain level

of significance between mobile and internet banking behavioral intention and SI. Informing others of the activities related to mobile banking is being overshadowed by the need to keep transactions confidential and secured (Oliveira et al., 2014). Social influence and biometrics don't have significant relationship in a biometric acceptance study (Lancelot Miltgen et al., 2013). Given contrasting findings on parallel applications and technology use, SI would be investigated in this study.

Hypothesis 3 (H3): Social Influence positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

The studies of Alalwan, Chaouali, Sharma, and Oliveira show positive relationship between mobile and internet banking behavioral intention and FC. In the study of internet banking adoption in Fiji, it was shown that the customer adoption of internet banking is mostly influenced by the resources and support services being available to the customers (R. Sharma et al., 2020). On the other hand, the study conducted by Martins about internet banking adoption shows contrasting view to this claim. The study suggested that the respondents are not concerned about the necessary infrastructure, knowledge, capabilities, etc. related to internet banking (Martins et al., 2014). Use of biometrics or selfie requires a certain infrastructure that support such technology (Kim et al., 2019). Given contrasting findings on parallel applications and technology use, FC would be investigated in this study.

Hypothesis 4 (H4): Facilitating Conditions positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

B. Extension Constructs to UTAUT

As seen in previous studies, UTAUT has been extended to include several other constructs that significantly lead to mobile and internet banking behavioral intention of use. The most noticeable construct that is added is trust, perceived privacy, and perceived security (Alalwan et al., 2017; Chaouali et al., 2016; Gu et al., 2009; Martins et al., 2014; Masrek et al., 2014; Merhi et al., 2019; Oliveira et al., 2014; S. K. Sharma & Sharma, 2019; Suh & Han, 2002).

Trust was found to be a major factor in adopting mobile and internet banking technology (Alalwan et al., 2017; Chaouali et al., 2016; Gu et al., 2009; Masrek et al., 2014; Merhi et al., 2019; Oliveira et al., 2014; S. K. Sharma & Sharma, 2019; Suh & Han, 2002). Masket provided relationship between technology trust and mobile banking satisfaction. In the study, it was concluded that trust have a positive relationship with mobile banking satisfaction, which leads to behavioral intension of use of mobile banking (Masrek et al., 2014). Trust in biometrics should also be looked at. While biometrics provide a better customer experience, there are still trust gaps that must be bridged (Curtis et al., 2021). On biometric payments, trust issues are also being studied (Nilsson, 2021). As such, trust would be one of the extension constructs in this study.

Hypothesis 5 (H5): Perceived Trust positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

Merhi included perceived security and perceived privacy as constructs in mobile and internet banking adoption. Given that sensitive information is to be transmitted in online banking, the perceived security, which is the degree of belief and trust in a web channel to transmit sensitive information (Salisbury et al., 2001), is important to be considered (Merhi et al., 2019). The perceived security is found to be the most significant factor in England when it comes to mobile banking. Several banking use cases for biometric authentication already exist (Biometric Technology Today, 2016) given its proven reliability in terms of securing banking customers across channels and its enhanced convenience (Goode, 2018; Normalini & Ramayah, 2012; Tassabehji & Kamala, 2012). However, most of these use cases fall under the use of fingerprint to authenticate. Fingerprint authentication is also found to be more secured in terms of user perception compared to facial recognition (Kruzikova et al., 2022). More so, use cases mentioned are for authentication rather than identity verification. As such, perceived security and privacy must be included in this study.

Hypothesis 6 (H6): Perceived Security positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

Hypothesis 7 (H7): Perceived Privacy positively impacts the intention to use Online Bank Account Opening through e-KYC via selfie or video call customer identification.

RESEARCH METHODOLOGY

A. Data Gathering

An online survey was sent and shared from February 1 – 5, 2022. All survey questions came from the past literatures with modifications to fit the specific study. All items are measured using seven-point Likert Scales, like how the studies were also conducted (Alalwan et al., 2017; Chaouali et al., 2016; Hanif & Lallie, 2021; Martins et al., 2014; Oliveira et al., 2014; R. Sharma et al., 2020; S. K. Sharma & Sharma, 2019; Venkatesh et al., 2012).

B. Quantitative Statistical Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity was used to validate the adequacy of sampling. Loading, Composite Reliability, Cronbach Alpha, Average Variance Extracted (AVE), and Discriminant Validity were used for Model Measurement (Alalwan et al., 2017; Hanif & Lallie, 2021; Martins et al., 2014). ANOVA and regression analysis were conducted for hypothesis testing (Akinnuwesi et al., 2022).

FINDINGS AND DISCUSSION

A. Participant Demographics

Table 2 shows the demographics of the 182 survey participants. In terms of gender, male and female are adequately represented and are within +/- 50% of the total respondents. Most of the participants are within 20 – 36 years old, which is 80% of the respondents. 17% of the respondents are in the range of 37 – 52 years old while 3% of the respondents are in the range of 53 – 70 years old. 80% of the respondents are college graduates while 19% is a post-graduate degree holder. 97% of the respondents have an experience when it comes to opening a bank account.

Table 3.

Demographics of Survey Participants

Variable	Level	N	(%)
Gender	Female	86	47%
	Male	96	53%
Age	18 – 19	1	1%
	20 – 36	146	80%
	37 – 52	30	17%
	53 – 70	5	3%
Educational Attainment	Secondary/High School	1	1%
	College	146	80%
	Post-Graduate Studies	35	19%
Experience in Opening an Account	Has Experience	177	97%
	Has No Experience	5	3%

B. Confirmation of Sample Size Adequacy

The KMO is 0.858 and the significance (p) value is 0.00000. This is considered as "meritorious" since the value is in the range of 0.80s. This is also considered consistent since the value is > 0.70 (Hair et al., 2009) and can already be used for analysis since minimum value acceptable is 0.60 (Tabachnick et al., 2007).

The p value of 0.00000 passed the significance test, which is $p < 0.001$ (Field, 2013). This means that the sample size is already adequate and may be used in the study.

C. Indicator Loading

Loading[1] values are greater than 0.708 (Hair et al., 2019) . This means that the model has an acceptable reliability (Hanif & Lallie, 2021). All values are also above 0.50 which indicates good measurement of latent constructs (Hulland, 1999).

D. Internal Consistency

All Composite Reliability measured are > 0.6 which is acceptable (Bagozzi & Yi, 1988). More so, all are also > 0.7 which means that there is an adequate consistency (Gefen et al., 2000). Likewise, the Cronbach Alpha measured are all > 0.6 which is acceptable and has shown good internal consistency (Nunnally Bernstein Ira H., 1994; Nunnally & Nunnaly, 1978). If the Average Variance Extracted is > 0.5, constructs are said to be convergent (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). The calculation shows that all AVE are > 0.5. This demonstrates high convergent validity (Hanif & Lallie, 2021).

E. Hypothesis Testing

The R^2 measured in the regression analysis indicates that 70% of the variance of the dependent variable is due and explained by the independent variable. The 70% R^2 value indicates that explanatory power of the model is substantial (R. Sharma et al., 2020) , where weak is at 19%, moderate is at 33%, and substantial is at 67% (Chin et al., 2008). To add, the result also is greater than the minimum commended value of 40% (Straub et al., 2002).

The p-value in the ANOVA indicates that the group independent variable can reliably predict the dependent variable (Akinnuwesi et al., 2022) given that $p < 0.01$ (Siegel & Wagner, 2022).

Table 3 shows the summary of the hypothesis testing. The hypothesis testing results show that at 95% level of significance where $p < 0.05$ and $T > 1.96$ (Hanif & Lallie, 2021), only facilitating conditions and perceived security are significant factors contributing to the behavioral intention of use e-KYC for online bank account opening.

Table 4.

Hypothesis Testing Results

Hypothesis	Path	Path Coefficient	p-value	T-Statistics	Comments
H1	PE → BI	0.1152	0.1875	1.3232	Reject
H2	EE → BI	-0.0496	0.6638	-0.4355	Reject
H3	SI → BI	0.0849	0.1780	1.3524	Reject
H4	FC → BI	0.3066	0.0021	3.1207	Accept
H5	PT → BI	0.1622	0.0803	1.7593	Reject
H6	PS → BI	0.3517	0.0025	3.0672	Accept
H7	PP → BI	0.2074	0.0651	1.8562	Reject

F. Analysis of Results

The use of mobile and internet banking in the Philippines has grown significantly during pandemic as such (Agcaoili, 2020; Reyes, 2020), adoption and use of such technology to perform banking business has already starting to be a norm.

Performance expectancy is found to be not significant in this study. Since main technology, which is mobile and internet banking, has been intensively used, its ability to perform well has already been intensively experienced. In a close interview with one of the respondents, she mentioned that online banking is already a new normal.

[1] *Calculated using SMARTPLS Student Version. 100 samples were included vs 182 samples in regression.*

Effort expectancy is found to be not significant in this study. With digitization and increased adoption to mobile and internet banking, e-KYC is indeed seen to be a more efficient in terms of account opening. In a close interview with one of the participants, the effort expectancy is already given. Instead of going to the bank, it's far a lot easier to just sit down and do a selfie to open an account.

Social Influence is found to be non-significant in this study. A study on social influence on consumer financial product preference shows that social influence is just becoming significant when choosing products that are unfamiliar (Anabo et al., 2019). As such, given that 97% of the respondents have already opened an account and bank account opening is not new, social influence is indeed not a major contributor in behavioral intention of use of e-KYC for account opening.

Facilitating Conditions is found to be significant in this study. While mobile and internet banking adoption has been increasing, the use of selfie and/or videocall is relatively new to the customers. One of the respondents even asked how it will be done just in case it will be pervasively implemented. Necessary knowledge and technical know-how of this new technology for selfie and videocall is a factor for intention of use.

Perceived Trust is found to be non-significant in this study. Trust is inherently part of performance expectation in financial applications. In an interview with one of the survey respondents, it was found that trust is already known to be inherent in financial transactions, especially now that it's already the new normal. Most of all financial transactions are really meant to be done online and so, respondents do already have a positive perspective about trust. Central bank's support on e-KYC also added to the factors contributing to trust, based on the interview conducted.

Perceived Security is found to be significant in this study. Recently, news about unauthorized fund transfer of 700 bank clients in the Philippines came out (Rappler, 2022). This then provide an explanation as to why most respondents see security as a factor that can influence their intention to use e-KYC.

Perceived Privacy is also found to be not significant in this study. A 2017 survey says that privacy is important to 85% of the Filipinos. In that the same survey, it was found that banks rank third as the most trusted institution with respect to privacy, next to schools and clinics (Bueza. Michael, 2017). As such, given the high-regards of Filipinos on how banks value privacy, such may not necessarily be significant factor in using e-KYC for online bank account opening.

CONCLUSION AND FURTHER RESEACH

This study sought to determine the factors affecting adoption and use of e-KYC in the Philippines using UTAUT constructs and its extensions as the theoretical foundation. The objective was met through building a theoretical research model and validating the correlation between intention to use e-KYC in online account opening and UTAUT constructs and its extensions. It was found facilitating conditions and perceived security contribute significantly to the intension to use e-KYC for online account opening.

This study provides foundational basis for the study of e-KYC in th. In an interview with one of the survey respondents, it was then considered to check the experience and age as contributor in the adoption of e-KYC. Specifically, the respondent mentioned that she trusts online transactions, but her mother still prefers to go to the bank for her financial transactions. These two are indeed part of UTAUT as moderators of the constructs. Experience and/or work background is also something that must be considered. According to the survey respondent, IT people may easily trust digital transactions as they understand how it works.

REFERENCES

Agcaoili, L. (2020). *Digital banking grows sharply during lockdown*.

Akinnuwesi, B. A., Uzoka, F.-M. E., Fashoto, S. G., Mbunge, E., Odumabo, A., Amusa, O. O., Okpeku, M., & Owolabi, O. (2022). A modified UTAUT model for the acceptance and use of digital technology for

tackling COVID-19. *Sustainable Operations and Computers*, *3*, 118–135. https://doi.org/10.1016/J.SUSOC.2021.12.001

Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, *37*(3), 99–110. https://doi.org/10.1016/j.ijinfomgt.2017.01.002

Anabo, F. D., De, D., & Centeno, G. (2019). Social Influence on Consumer Financial Product Preferences. In *Philippine Management Review* (Vol. 26).

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94. https://doi.org/10.1007/BF02723327

Bangko Sentral ng Pilipinas. (2019). *Financial Inclusion Survey*.

Biometric Technology Today. (2016). HSBC launches mobile facial recognition authentication for business customers. *Biometric Technology Today*, *2016*(10), 12. https://doi.org/10.1016/S0969-4765(16)30160-6

Bueza. Michael. (2017). *Most Filipinos value rights to their personal data – survey*. Rappler.

Chaouali, W., ben Yahia, I., & Souiden, N. (2016). The interplay of counter-conformity motivation, social influence, and trust in customers' intention to adopt Internet banking services: The case of an emerging country. *Journal of Retailing and Consumer Services*, *28*, 209–218. https://doi.org/10.1016/j.jretconser.2015.10.007

Chin, W. W., Peterson, R. A., & Brown, S. P. (2008). Structural Equation Modeling in Marketing: Some Practical Reminders. *Journal of Marketing Theory and Practice*, *16*(4), 287–298. https://doi.org/10.2753/MTP1069-6679160402

Cook, S. (2017). Selfie banking: is it a reality? *Biometric Technology Today*, *2017*(3), 9–11. https://doi.org/10.1016/S0969-4765(17)30056-5

Curtis, S., Belli, D., Alanoca, S., Bora, A., Miailhe, N., & Lannquist, Y. (2021). Bridging the trust gaps in biometrics. *Biometric Technology Today*, *2021*(3), 5–8. https://doi.org/10.1016/S0969-4765(21)00035-7

Diokno. (2020). *Digitization Developments and Initiatives*.

Fauville, G., Luo, M., Queiroz, A. C. M., Bailenson, J. N., & Hancock, J. (2021). Zoom Exhaustion & Fatigue Scale. *Computers in Human Behavior Reports*, *4*, 100119. https://doi.org/10.1016/J.CHBR.2021.100119

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. sage.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.2307/3151312

Gefen, D., Straub, D., & Robinson, J. M. (2000). The Relative Importance of Perceived Ease of Use in IS Adoption: A Study of E-Commerce Adoption. In *Journal of the Association for Information Systems* (Vol. 1).

Goode, A. (2018). Biometrics for banking: best practices and barriers to adoption. *Biometric Technology Today*, *2018*(10), 5–7. https://doi.org/10.1016/S0969-4765(18)30156-5

Gu, J. C., Lee, S. C., & Suh, Y. H. (2009). Determinants of behavioral intention to mobile banking. *Expert Systems with Applications*, *36*(9), 11605–11616. https://doi.org/10.1016/j.eswa.2009.03.024

Guno, N. v. (2018). More Filipinos embrace mobile banking for convenience with bill payments, money transfer—survey . *Inquirer.Net*.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados*. Bookman editora.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hanif, Y., & Lallie, H. S. (2021). Security factors on the intention to use mobile banking applications in the UK older generation (55+). A mixed-method study using modified UTAUT and MTAM - with perceived cyber security, risk, and trust. *Technology in Society*, *67*. https://doi.org/10.1016/j.techsoc.2021.101693

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal*, *20*(2), 195–204. https://doi.org/https://doi.org/10.1002/(SICI)1097-0266(199902)20:2<195::AID-SMJ13>3.0.CO;2-7

Kim, M., Kim, S., & Kim, J. (2019). Can mobile and biometric payments replace cards in the Korean offline payments market? Consumer preference analysis for payment systems using a discrete choice model. *Telematics and Informatics*, *38*, 46–58. https://doi.org/10.1016/J.TELE.2019.02.003

Kruzikova, A., Knapova, L., Smahel, D., Dedkova, L., & Matyas, V. (2022). Usable and secure? User perception of four authentication methods for mobile banking. *Computers & Security*, *115*, 102603. https://doi.org/10.1016/J.COSE.2022.102603

Lancelot Miltgen, C., Popovič, A., & Oliveira, T. (2013). Determinants of end-user acceptance of biometrics: Integrating the "Big 3" of technology acceptance with privacy context. *Decision Support Systems*, *56*(1), 103–114. https://doi.org/10.1016/J.DSS.2013.05.010

Locke, C. (2017). Why financial services should accelerate biometrics adoption. *Biometric Technology Today*, *2017*(1), 7–9. https://doi.org/10.1016/S0969-4765(17)30014-0

Martins, C., Oliveira, T., & Popovič, A. (2014). Understanding the internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, *34*(1), 1–13. https://doi.org/10.1016/j.ijinfomgt.2013.06.002

Masrek, M. N., Mohamed, I. S., Daud, N. M., & Omar, N. (2014). Technology Trust and Mobile Banking Satisfaction: A Case of Malaysian Consumers. *Procedia - Social and Behavioral Sciences*, *129*, 53–58. https://doi.org/10.1016/j.sbspro.2014.03.647

Merhi, M., Hone, K., & Tarhini, A. (2019). A cross-cultural study of the intention to use mobile banking between Lebanese and British consumers: Extending UTAUT2 with security, privacy and trust. *Technology in Society*, *59*. https://doi.org/10.1016/j.techsoc.2019.101151

Nilsson, H. (2021). Trust issues? The need to secure contactless biometric payment cards. *Biometric Technology Today*, *2021*(1), 5–8. https://doi.org/10.1016/S0969-4765(21)00009-6

Normalini, M. K., & Ramayah, T. (2012). Biometrics Technologies Implementation in Internet Banking Reduce Security Issues? *Procedia - Social and Behavioral Sciences*, *65*, 364–369. https://doi.org/10.1016/J.SBSPRO.2012.11.135

Nunnally Bernstein Ira H., J. C. (1994). *Psychometric theory*. McGraw-Hill.

Nunnally, J. C., & Nunnaly, J. C. (1978). *Psychometric Theory*. McGraw-Hill. https://books.google.com.ph/books?id=WE59AAAAMAAJ

Oliveira, T., Faria, M., Thomas, M. A., & Popovič, A. (2014). Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM. *International Journal of Information Management*, *34*(5), 689–703. https://doi.org/10.1016/j.ijinfomgt.2014.06.004

Perdana, A., & Mokhtar, I. A. (2022). Seniors' adoption of digital devices and virtual event platforms in Singapore during Covid-19. *Technology in Society*, *68*, 101817. https://doi.org/10.1016/J.TECHSOC.2021.101817

Perlman, L. (2019). *Focus Note: The Use of eKYC for Customer Identity and Verification and AML*. www.dfsobservatory.comElectroniccopyavailableat:https://ssrn.com/abstract=3370665

Rappler. (2022). *5 arrested over BDO hacking incident – NBI*.

Reyes, R. (2020). *Younger generations to boost PHL mobile banking*.

Salisbury, W. D., Pearson, R. A., Pearson, A. W., & Miller, D. W. (2001). Perceived security and World Wide Web purchase intention. *Industrial Management & Data Systems*, *101*(4), 165–177. https://doi.org/10.1108/02635570110390071

Sharma, R., Singh, G., & Sharma, S. (2020). Modelling internet banking adoption in Fiji: A developing country perspective. *International Journal of Information Management*, *53*. https://doi.org/10.1016/j.ijinfomgt.2020.102116

Sharma, S. K., & Sharma, M. (2019). Examining the role of trust and quality dimensions in the actual usage of mobile banking services: An empirical investigation. *International Journal of Information Management*, *44*, 65–75. https://doi.org/10.1016/j.ijinfomgt.2018.09.013

Shen, Y., Hu, W., & Hueng, C. J. (2021). Digital Financial Inclusion and Economic Growth: A Cross-country Study. *Procedia Computer Science*, *187*, 218–223. https://doi.org/10.1016/j.procs.2021.04.054

Siegel, A. F., & Wagner, M. R. (2022). ANOVA: Testing for Differences Among Many Samples and Much More. *Practical Business Statistics*, 485–510. https://doi.org/10.1016/B978-0-12-820025-4.00015-4

Spence, M. (2021). Government and economics in the digital economy. *Journal of Government and Economics*, *3*, 100020. https://doi.org/10.1016/J.JGE.2021.100020

Straub, D., Loch, K., Evaristo, R., Karahanna, E., & Srite, M. (2002). Toward a Theory-Based Measurement of Culture. *Journal of Global Information Management*, *10*(1), 13–23. https://doi.org/10.4018/jgim.2002010102

Suh, B., & Han, I. (2002). E ffect of trust on customer acceptance of Internet banking. In *Electronic Commerce Research and Applications* (Vol. 1). www.elsevier.com/locate/ecra

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). pearson Boston, MA.

Tassabehji, R., & Kamala, M. A. (2012). Evaluating biometrics for online banking: The case for usability. *International Journal of Information Management*, *32*(5), 489–494. https://doi.org/10.1016/J.IJINFOMGT.2012.07.001

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. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y. L., & 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. https://doi.org/10.2307/41410412

Zetzsche, D. A., Buckley, R. P., & Arner, D. W. (2018). Digital ID and AML/CDD/KYC Utilities for Financial Inclusion, Integrity and Competition. *Journal of Economic Transformation*.