Australian Journal of Basic and Applied Sciences

2021 November; 15(11): pages 21-29
https://doi.org/10.22587/ajbas.2021.15.11.3

ORIGINAL ARTICLE AENSI PUBLICATIONS

Automatic Teller Machine Accessibility for Visually Impaired People: The Egyptian Context

[1]Ahmed Hassan, [1]Rasha Abd El Aziz, [2]Meer Hamza

[1]BIS, CMT, AASTMT, Alexandria, Egypt
[2]CCIT, AASTMT, Alexandria, Egypt

Correspondence Author: Ahmed Hassan, BIS, CMT, Alexandria, Egypt
Email: ahmed.abdelsamie@aast.edu

Received date: 23 September 2021, Accepted date: 28 November 2021

Cite as: Ahmed Hassan, Rasha Abd El Aziz, Meer Hamza., 2021. Automatic Teller Machine Accessibility for Visually Impaired People: The Egyptian Context. Australian Journal of Basic and Applied Sciences, 15(11): 21-29. DOI: 10.22587/ajbas.2021.15.11.3.

ABSTRACT

Although the number of disabled people is over 1 billion, comprising around 15% of the total population worldwide, with 253 million having visual impairment, still, services provided to disabled people in general and to those with visual disability in particular is understudied and requires further investigation; especially in the Egyptian context. ATMs are widely used all over Egypt and is becoming more and more utilized. Yet, ATMs are not accessible, and bank staff do not have the required ability or awareness to deal with visually impaired clients.
Thus, the study at hand investigates the challenges facing visually impaired people and the reasons preventing them from accessing ATMs, together with the key dimensions affecting ATM accessibility. A survey was conducted, where structured questionnaires were distributed over people with visual impairment, of which 426 responses were returned and considered valid. Data was statistically analyzed using structured equation modelling.
Research findings reveal that ease of use, facilitating conditions, efficiency, price value and reliability were proven to have a significant impact on ATM accessibility. This derived conclusion is considered a guiding line to decision makers at banks and governmental representatives..

Keywords: ATM, e-banking, accessibility, visual impairment, financial exclusion

INTRODUCTION

People with vision impairments have difficulty performing even the most basic everyday duties. Technology can sometimes exacerbate existing limitations rather than continuously delivering a solution in such situations. There are several reasons and obstacles, the most significant of which are a lack of standards for accessible interfaces and the range of requirements brought on by the extensive range of needs. The most important concern is for people with visual impairment to maintain daily privacy. When using a device in public, for example, ordinary people might mask the vision lines between curious passers-by and the screen. But the, visually impaired people can't check a photo before sharing it online to make ensure it doesn't include any sensitive information (Hussien and Abd El Aziz, 2017).

Approximately 1 billion people are disabled in some way. Most impaired people are in developing countries, with almost 80% (WHO, 2018). According to the Egyptian ministry (Raja, 2015), around 37 million Egyptian internet users (Abood et al., 2015; Hussien and Abd El-Aziz, 2019). In developing countries in general, particularly Egypt, e-banking is fast expanding, with bank clients conducting e-transactions (Llanto, 2015; Poushter, 2016). However, due to the Egyptian banking sector (Abd El Aziz et al., 2018), visually impaired clients cannot have their bank account or utilize internet banking. As a result, they rely on family or friends to transact. Although ATMs are considered widely accepted and used in Egypt, the visually impaired still encounter numerous use problems.

1.1. Research problem

Managing one's finances is a necessary component of independence and a daily chore. Managing finances is critical to keep their privacy and independence (Hassan et al., 2020). Although financial services are now used for various settlements, it is still considered not accessible for those visually impaired. Many people will be unable to access essential services due to a lack of accessible banking alternatives. Privacy could be jeopardized as well. For example, users may be forced to rely on third parties to manage their banking services, and thus putting them at greater risk of identity theft.

Even though the technology exists, and banks offer services online. Yet, ATMs are still inaccessible, and employees have little training or experience dealing with blind or visually impaired customers. ATMs also lack the necessary equipment for those with vision impairments to utilize them. As a result, most banks in Egypt refuse to interact with blind or visually impaired people, effectively excluding them from the financial system and risking their privacy. Several scholars have looked into the digital divide, but visually impaired people in Egypt have not been recognized in this regard. To be accessible to all prospective consumers, banks must pay attention to those visually impaired by considering the users' human characteristics, abilities, competencies, and functional capacities. Unfortunately, however, the barriers to e-banking for those with visual disabilities remain undiscovered (Okonji and Ogwezzy 2018).

As such, the purpose of this study is to examine the range of obstacles that visually impaired people have when using ATMs in Egypt and the factors that contribute to the visually impaired and their ability to have a bank account independently. Additionally, the study tries to determine the primary characteristics affecting ATM accessibility. Finally, the project aims to construct a prototype ATM system accessible to all.

2. LITERATURE REVIEW

Visual impairment is a vision impairment that impacts educational achievement even after treatment. It can range from impaired eyesight to no vision (Zitkus et al., 2016). Those with no vision are considered blind and are the subject of this study, as is the viewpoint of visually impaired individuals, where around 85% live in developing countries (WHO, 2018). They have classified into the following categories: difficulty to see images precisely, loss of visual field, failure to spot subtle differences in the level of brightness or are sensitive to light (Ahmed et al., 2017).

As a result of the negligible attention paid to visually impaired people in Egypt, there isn't an up-to-date exact number of those impaired. Around 10.7% of the total population in Egypt are disabled (SIS, 2017). In addition, there is a general lack of understanding concerning visually impaired persons and their care in Egypt. Due to a lack of information, many parents of visually impaired children may mistakenly refer to their child as blind, apart from the lack of technology-based courses that are tutored at schools that might assist students with visual disabilities in their scholastic pursuits (Marshall et al. 2009).

2.1 Electronic banking accessibility

The World Wide Web Consortium (2008) primarily provides Internet accessibility standards - an international group makes various suggestions to guarantee that websites are accessible to individuals with impairments (Laukkanen, 2016). The World Wide Web Consortium's (W3C) recommendations address the accessibility and usability of websites for individuals with disabilities (Raja et al., 2015). In many developed countries, ethical issues for making websites accessible are of great concern. In these countries, various factors eliminate the exclusion of people with disabilities from accessing financial services.

2.2 Automatic Teller Machine Accessibility

ATMs are computerized electronic telecommunications equipment that securely enables bank customers to access their bank accounts. ATMs accept deposits and cash withdrawals. Customers can also use ATMs to do various other financial tasks, including checking their balance, paying bills, changing their PIN, and requesting a mini statement. Numerous banks have installed talking ATMs in Turkey, Canada, Australia, the USA and UK (Ulldemolins et al., 2012). ATMs that talk give audio instructions, allowing visually impaired individuals to operate the machine independently (RNIB, 2012). Auditory information is transmitted privately. The customer receives information via audio or a text-to-speech application. In the United States of America, the court stipulated that braille signs and voice guidance should be provided to help visually impaired people. When establishing or changing ATMs, owners should adhere to the given requirements. The Australian Bankers' Association and the Indian Bankers' Association enacted broad ATM accessibility rules that address accessibility, emphasizing disabled consumers (Gupta, 2014). On the other hand, many corporate organizations in developing nations have yet to comply with W3C requirements, and many persons with disabilities continue to struggle with internet access (Chigona et al., 2009; Venkatesh and Sykes, 2013).

The BNP Pariba bank created the "An Accessible Bank for All" program to assist clients that are disabled in conducting banking operations in the most convenient manner possible. Certain accessibility features are built into the software that runs on their ATMs. Since 2010, all BNP Pariba's ATMs users have been allowed to make voice-assisted withdrawals.

2.3 Challenges of those visually impaired

Individuals with visual disabilities are disadvantaged when it comes to e-banking. They even incur additional expenditures due to the central bank's higher administrative charges for currency deposits and withdrawals. These benefits are not available to those with visual disabilities because they lack access to technology-enhanced financial transaction platforms (Warren, 2007; Wentz et al., 2018). When creating an e-banking channel, it must be guaranteed that it is accessible without excluding any category. Banking facilitated by ICT can include people with various requirements and preferences. For example, ATMs with voice output or Braille writing can aid those with various disabilities and limited literacy and language problems (G3ict, 2015).

Screen readers are considered software that analyses the information of a computer's screen and converts them to a format that is not digital. This could be provided in voice via speakers or braille, or both. It enables blind people to hear instead of seeing what's on the screen (Edwards and Launikonis, 2008).

3. RESEARCH DESIGN

This study determines the barriers that the visually impaired confront in Egyptian banking and the key drivers of ATM accessibility. A survey strategy is a technique that will be applied in this research. A random sample is drawn to represent the Egyptian visually impaired. This technique is deemed appropriate since it permits rapid data collection and the rapid identification of significant responses. The research employs a mixed-methods approach, combining quantitative and qualitative methodologies to capitalize on the strengths of both (Sekaran and Bougie, 2016). This is understandable because qualitative research enables a more in-depth and nuanced grasp of the issue. On the other hand, quantitative analysis allows greater freedom to generalize results and data manipulation.

Questionnaires are deemed appropriate to survey people with visual impairment and collect data for statistical analysis (Creswell, 2012). Additionally, focus groups are beneficial for eliciting specific information about the group's emotions and views (Jackson and Bazeley, 2019). Although testing users for accessibility via experiments is an expensive and time-consuming process, experiments are regarded as the most effective way for detecting accessibility concerns (Brajnik et al., 2010). Finally, conclusions and recommendations about e-banking accessibility are developed using statistical and interpretive analyses in conjunction with the examined literature.

3.1 The research variables

Efficiency: Based on the UTAUT, efficiency has a positive impact on ATM use (Bhatiasevi, 2016; Martins et al., 2014).
Ease of Use: Users develop a sense of connection with accessible technologies (Alalwan et al., 2017; Shareef et al., 2017; Liebana-Cabanillas et al., 2017).
Facilitating conditions: refers to the belief in infrastructure that facilitates using the system and numerous studies demonstrated that FC has a beneficial effect on usage (Dwivedi et al., 2017A; Rana et al., 2016; Yu, 2012; Shaikh and Karjaluoto, 2015).
Price value (PV): Users usually compare the price paid to the discounts received for continued use (Baabdullah, 2018). However, in the case of ATMs, consumers will become significantly less willing to continue using the technology if the service providers increase their prices (Njenga and Ndlovu, 2012
Reliability: Reliability has a significant impact on technology use (Peters et al., 2016; Zhou, 2011; Upadhyay and Jahanyan, 2016).
ATM Accessibility: Yoon and Steege (2013) define ATM accessibility/usability as factors that positively affect ATM (Hasbullah et al., 2016).

4. RESEARCH FRAMEWORK AND HYPOTHESES

The research framework and hypotheses development are illustrated in this section. Figure 1 depicts the ATM accessibility framework adopted in the Egyptian context. Research hypotheses were devised and shown as follows:
H1: Efficiency has a positive impact on ATM Accessibility
H2: Ease of Use has a positive impact on ATM Accessibility
H3: Facilitating Conditions has a positive impact on ATM Accessibility
H4: Price has a positive impact on ATM Accessibility
H5: Reliability has a positive impact on ATM Accessibility

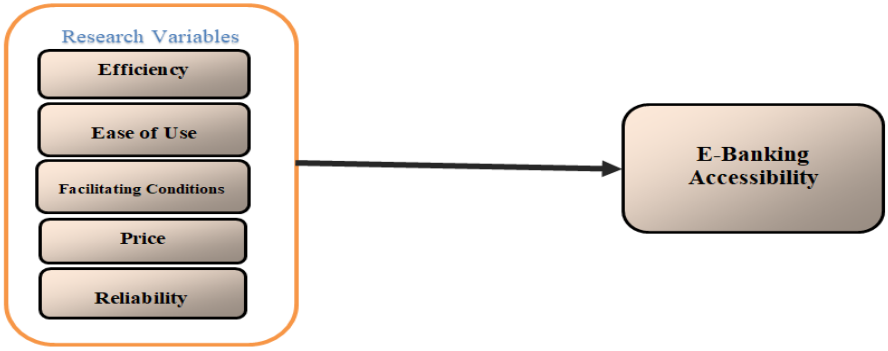

Figure 1: Research Framework

This section illustrates the descriptive analysis of the research variables. Correlation and SEM are used to test the hypothesis using SPSS and AMOS. This section measures the effect of the research variables on accessibility according to ATMs.

4.1 Descriptive Analysis of the Research Variables

Table 1 illustrates the mean values and standard deviation for the constructs

Table 1: Mean and Standard Deviation for Constructs

	N	Mean	Std. Deviation	Frequency				
				1	2	3	4	5
Efficiency	426	3.6831	.53185	0	4	137	275	10
Ease of use	426	3.5423	.56929	0	2	205	205	14
Facilitating Conditions	426	3.7441	.53821	0	2	124	281	19
Price value	426	3.5915	.55078	0	1	184	229	12
Reliability	426	3.7230	.57663	0	3	137	261	25
Accessibility	426	4.0540	.63201	0	0	74	255	97

4.2 Normality Testing for the Research Variables

Table 2 illustrates the informal test of normality, where the skewness and kurtosis values are all within the acceptable range.

Table 2: Informal Test of normality

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Efficiency	426	-.489	.118	-.195	.236
Ease of use	426	.295	.118	-.721	.236
Facilitating Conditions	426	-.294	.118	-.035	.236
Price value	426	.099	.118	-.881	.236
Reliability	426	-.117	.118	-.174	.236
Accessibility	426	-.043	.118	-.493	.236

Table 3 illustrates the fit indices and thresholds for the measurement model

Table 3: Fit Indices and Thresholds for Measurement Model

Measure	Results	Threshold
Chi-square/df	4.157	< 2 excellent; < 3 good; < 5 sometimes permissible
P-value	0.000	> 0.05
GFI	0.954	> 0.80
AGFI	0.883	> 0.80
NFI	0.957	> 0.80
TLI	0.929	> 0.85
CFI	0.966	> 0.80
RMR	0.009	< 0.09
RMSEA	0.086	< 0.10

Figure 2 illustrates the confirmatory factor analysis and factor loadings are on arrows showing good loadings > 0.4

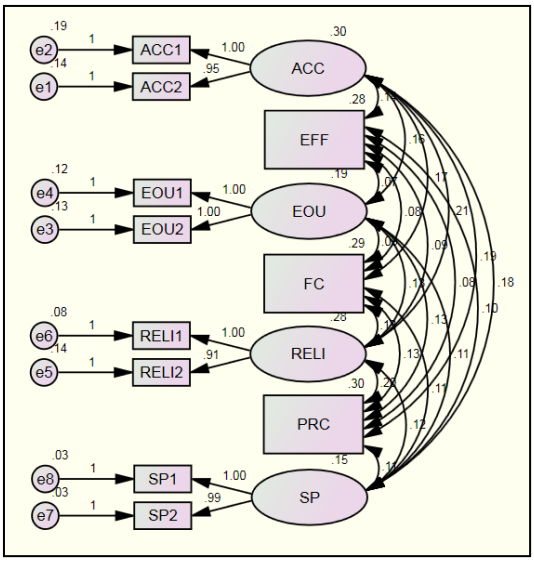

Figure 2: CFA for the Measurement Model

Table 4 shows that all factor loadings (FL) are greater than or equal to 0.40, implying that the constructs under study have adequate validity. Also, all the P-values < 0.05.

Table 4: Item Loading after Confirmatory Factor Analysis

			Estimate	S.E.	C.R.	P
ACC2	<---	ACC	.948	.057	16.764	***
ACC1	<---	ACC	1.000			
EOU2	<---	EOU	.997	.080	12.509	***
EOU1	<---	EOU	1.000			
RELI2	<---	RELI	.908	.056	16.256	***
RELI1	<---	RELI	1.000			
SP2	<---	SP	.985	.038	25.888	***
SP1	<---	SP	1.000			

4.3 Testing Research Hypotheses

Table 5 illustrates the correlation between variables. P-values are less than 0.05 and correlation coefficients are 0.471, 0.572, 0.525, 0.577, and 0.596.

Table 5: Correlation Matrix between Research Variables and Accessibility

		1.	2.	3.	4.	5.	6.
1. Efficiency	Spearman Correlation	1					
	Sig. (2-tailed)						
	N	426					
2. Ease of use	Spearman Correlation	.266**	1				
	Sig. (2-tailed)	.000					
	N	426	426				
3. Facilitating Conditions	Spearman Correlation	.291**	.362**	1			
	Sig. (2-tailed)	.000	.000				
	N	426	426	426			
4. Price value	Spearman Correlation	.280**	.498**	.440**	1		
	Sig. (2-tailed)	.000	.000	.000			
	N	426	426	426	426		
5. Reliability	Spearman Correlation	.289**	.480**	.408**	.628**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
	N	426	426	426	426	426	
6. Accessibility	Spearman Correlation	.471**	.572**	.525**	.577**	.596**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	426	426	426	426	426	426

Table 6 illustrates structural equation modeling analysis. Estimate values are 0.354, 0.231, 0.226, 0.213, and 0.184, P-values < 0.05. Furthermore, $R^2 = 0.699$, revealing that 69.9 % of the Accessibility variation could be represented by the research model.

Table 6: SEM Analysis of Research Variables on Accessibility

			Estimate	P	R^2
Accessibility	<---	Efficiency	.354	***	
Accessibility	<---	Ease of use	.231	***	
Accessibility	<---	Facilitating Conditions	.226	***	.699
Accessibility	<---	Price value	.213	***	
Accessibility	<---	Reliability	.184	***	

CMIN/DF = 3.284, GFI = 0.982, CFI = 0.982, AGFI= 0.928, and RMSEA = 0.073 are all within range. The SEM model conducted for the effect of the Research Variables on Accessibility is demonstrated in Figure 3.

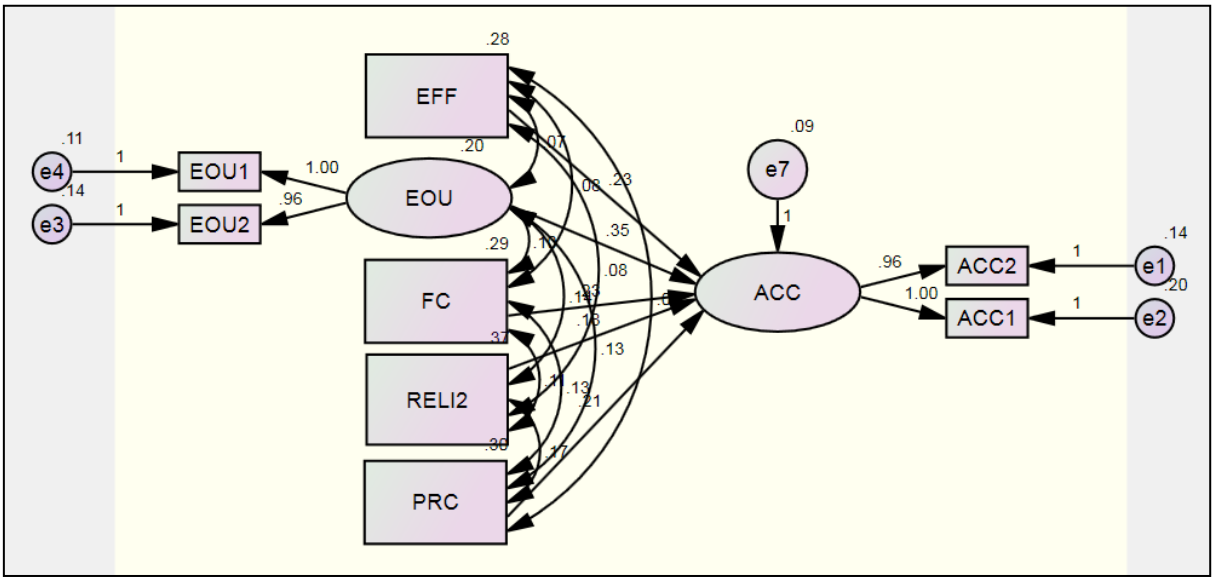

Figure 3: SEM for Research Variables on **Accessibility**

The research findings show a positive impact between Efficiency, Ease of Use, Facilitating Conditions, Price Value, Reliability and Accessibility (P-value < 0.05). Therefore, all previously mentioned hypotheses are fully supported.

4. CONCLUSION

Individuals with visual disabilities have faced numerous obstacles in several sectors. The banking industry, in particular, has posed numerous difficulties for those with visual impairment. This research examines the challenges that face people with visual disabilities and the factors that prevent them from independently utilizing E-banking services, particularly ATMs, which infringe on their privacy. Additionally, the study identifies the major constructs that influence ATM accessibility.

Based on the study results, visually impaired people have many accessibility challenges when dealing with ATMs, such as they cannot see the ATM commands and do not have an alternative way to deal with the ATM. Accordingly, this study recommends making all Egyptian ATMs more accessible by making all ATM commands (such as deposit money, withdraw money, balance enquiry) read aloud by text to speech engine. Also, the study suggests implementing a mobile application that enables those visually impaired to use the ATM through their mobile reader and NFC connection. This study paves the way for both academics and decision-makers to realize the problem at hand, thus providing guidelines to reduce the gap and enhance financial inclusion.

5. REFERENCES

Abd El Aziz, R., (2012), ATM Usage: A Stakeholder Analysis the Egyptian context, 14 March 2012, LAP LAMBERT Academic Publishing, ISBN-10: 384840835X, ISBN-13: 978-3848408351.

Abd El Aziz, R., Beeson, I., and Hussein, M. I. (2018), "A Soft Systems Methodology Based Analysis of the ATM System in Egypt", International Journal of Computer and Information Technology (ISSN: 2279 – 0764) Vol. 7, No. 4, pp. 176 – 183.

ABOOD, M., ZDENEK, R. & KALI, K. 2015. What can we do to help? Adopting age-friendly banking to improve financial well-being for older adults. Federal Reserve Bank of San Francisco.

AHMED, T., HOYLE, R., SHAFFER, P., CONNELLY, K., CRANDALL, D. & KAPADIA, A. 2017. Understanding Physical Safety, Security, and Privacy Concerns of People with Visual Impairments. IEEE Internet Computing.

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, 99-110.

Alalwan, A. A., Dwivedi, Y. K. and Williams, M. D. 2014. Examining Factors Affecting Customer Intention and Adoption of Internet Banking in Jordan. UKAIS, 2014. 3.

ALAM, S. S. & YASIN, N. M. 2010. An investigation into the antecedents of customer satisfaction of online shopping. Journal of Marketing Development and Competitiveness, 5, 71-78.

AL-SUKKAR, A. S. 2005. The application of information systems in the Jordanian banking sector: a study of the acceptance of the internet.

BAABDULLAH, A. M. 2018. Factors influencing adoption of mobile social network games (M-SNGs): the role of awareness. Information Systems Frontiers, 1-17.

BARNES, S. J. & VIDGEN, R. T. 2002. An integrative approach to the assessment of e-commerce quality. J. Electron. Commerce Res., 3, 114-127.

BHATIA, E. N. 2014. Optical character recognition techniques: a review. International Journal of advanced research in computer science and software engineering, 4.

BRAJNIK, G., YESILADA, Y. & HARPER, S. Testability and validity of WCAG 2.0: the expertise effect. Proceedings of the 12th international ACM SIGACCESS conference on Computers and accessibility, 2010. 43-50.

CASALÓ, L. V., FLAVIÁN, C. & GUINALÍU, M. 2008. The role of satisfaction and website usability in developing customer loyalty and positive word-of-mouth in the e-banking services. International Journal of bank marketing.

CHIGONA, W., BEUKES, D., VALLY, J. & TANNER, M. 2009. Can mobile internet help alleviate social exclusion in developing countries? The Electronic Journal of Information Systems in Developing Countries, 36, 1-16.

CRESWELL, J. W. 2012. Educational research: Planning, conducting, and evaluating quantitative, Prentice Hall Upper Saddle River, NJ.

DWIVEDI, Y. K., RANA, N. P., JANSSEN, M., LAL, B., WILLIAMS, M. D. & CLEMENT, M. 2017. An empirical validation of a unified model of electronic government adoption (UMEGA). Government Information Quarterly, 34, 211-230.

EDWARDS, J. N. & LAUNIKONIS, B. S. 2008. The accessibility and interconnectivity of the tubular system network in toad skeletal muscle. The Journal of physiology, 586, 5077-5089.

GALLAGHER, B. A. M., MURPHY, E. & FENNELL, A. 2012. Ageing, vision impairment and digital inclusion in Ireland. The Journal of Community Informatics, 8, 1712-1744.

GUPTA, V. 2014. Making microfinance accessible to persons with disabilities: awareness and attitudes among Indian microfinance institutions. Center for financial inclusion, Accion, USA.

HASBULLAH, N. A., OSMAN, A., ABDULLAH, S., SALAHUDDIN, S. N., RAMLEE, N. F. & SOHA, H. M. 2016. The relationship of attitude, subjective norm and website usability on consumer intention to purchase online: An evidence of Malaysian youth. Procedia Economics and Finance, 35, 493-502.

Hassan, A., Abd El Aziz, R. and Hamza, M. (2020), 'The Exclusion of People with Visual Disability from Digital Banking Services in the Digitalization Era', Journal of Electronic Banking Systems, ISSN: 2165-9982.

Hussien, M, I. and Abd El-Aziz, R. (2019), 'System Dynamics Modeling and Simulation for E-Banking: The Egyptian Context'. In Martin Garcia, Juan (Ed.), Modeling the Economy: Money and Finances. Selected Papers on System Dynamics Collection, (pp. 70 - 84). KDP Publishers, ISBN: 9781687003133.

Hussien, M., I., and Abd El Aziz, R. (2017), 'System Dynamics Modeling and Simulation for E-Banking: The Egyptian Context', IBIMA Business Review Journal, Vol. 2017, pp. 1-17. DOI: 10.5171/2017. 904520. ISSN: 1947-3788.

Jackson, K. & Bazeley, P. 2019. Qualitative data analysis with Nvivo, SAGE Publications Limited.

KHALFAN, A. M. & ALSHAWAF, A. 2004. Adoption and implementation problems of e-banking: A study of the managerial perspective of the banking industry in Oman. Journal of Global Information Technology Management, 7, 47-64.

LAUKKANEN, T. & LAURONEN, J. 2005. Consumer value creation in mobile banking services. International Journal of mobile Communications, 3, 325-338.

LAUKKANEN, T. 2016. Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the Internet and mobile banking. Journal of Business Research, 69, 2432-2439.

Laukkanen, T. J. B. P. M. J. 2007. Internet vs mobile banking: comparing customer value perceptions. 13, 788-797.

LEE, Y.-K., PARK, J.-H., CHUNG, N. & BLAKENEY, A. 2012. A unified perspective on the factors influencing usage intention toward mobile financial services. Journal of Business Research, 65, 1590-1599.

LLANTO, G. 2015. Financial inclusion, education, and regulation in the Philippines.

MARSHALL, C. A. & KENDALL, E. 2009. Disabilities: Insights from across fields and around the world, ABC-CLIO.

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, 1-13.

Njenga, K. and Ndlovu, S. On rational choice, risk and utility in mobile banking. 2012 e-Leadership Conference on Sustainable e-Government and e-Business Innovations (E-Leadership), 2012. IEEE, 1-9.

OKONJI, P. E. & OGWEZZY, D. C. 2018. Financial inclusion: perceptions of visually impaired older Nigerians. Journal of Enabling Technologies.

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, 689-703.

OZTURK, A. B., BILGIHAN, A., NUSAIR, K. & OKUMUS, F. 2016. What keeps the mobile hotel booking users loyal? Investigating the roles of self-efficacy, compatibility, perceived ease of use, and perceived convenience. International Journal of Information Management, 36, 1350-1359.

PETERS, T., IŞıK, Ö., TONA, O. & POPOVIČ, A. 2016. How system quality influences mobile BI use: The mediating role of engagement. International Journal of Information Management, 36, 773-783.

POUSHTER, J. 2016. Smartphone ownership and internet usage continues to climb in emerging economies. Pew Research Center, 22, 1-44.

Raja, D.S., Narasimhan, N., D'lntino, P., Maheshwari, V. and Montenegro, V. (2015). "Inclusive financial services for seniors and persons with disabilities: global trends in accessibility requirements", A G3ict Best Practices White Paper Series, Aberdeen, available at: www.microfinancegateway.org/library/inclusive- financial-services-seniors-and-persons-disabilities-global-trends-accessibility

RALETING, T. & NEL, J. 2011. Determinants of low-income non-users' attitude towards WIG mobile phone banking: Evidence from South Africa. African Journal of Business Management, 5, 212.

RANA, N. P., DWIVEDI, Y. K., WILLIAMS, M. D. & WEERAKKODY, V. 2016. Adoption of online public grievance redressal system in India: Toward developing a unified view. Computers in Human Behavior, 59, 265-282.

RNIB (2012). "Make money talk: why banks should provide accessible and talking ATMs to assist bling and partially sighted customers", Newcastle, available at: www.rnib.org.uk/sites/default/files/Make%20money%20talk%20Campaign%20report.pdf (accessed 25 march 2020).

SCHIERHOLZ, R. & LAUKKANEN, T. 2007. Internet vs mobile banking: comparing customer value perceptions. Business process management journal.

SEKARAN, U. & BOUGIE, R. 2016. Research methods for business: A skill building approach, John Wiley & Sons.

SHAIKH, A. A. & KARJALUOTO, H. 2015. Mobile banking adoption: A literature review. Telematics and informatics, 32, 129-142.

SHAREEF, M. A., DWIVEDI, Y. K., KUMAR, V. & KUMAR, U. 2017. Content design of advertisement for consumer exposure: Mobile marketing through short messaging service. International Journal of Information Management, 37, 257-268.

SHERGILL, G. S. & CHEN, Z. 2005. WEB-BASED SHOPPING: CONSUMERS'ATTITUDES TOWARDS ONLINE SHOPPING IN NEW ZEALAND. Journal of electronic commerce research, 6, 78.

State information service (2017) online, available at: https://www.sis.gov.eg/Story/9?lang=en-us/, Last accessed: [10 October 2021].

Tilse, C., Setterlund, D., Wilson, J. and Roseman, L. (2007). "Managing the Financial Assets of Older People: Balancing Independence and Protection", British Journal of Social Work. Oxford University Press.

ULLDEMOLINS, A. R., LANSINGH, V. C., VALENCIA, L. G., CARTER, M. J. & ECKERT, K. A. 2012. Social inequalities in blindness and visual impairment: a review of social determinants. Indian Journal of ophthalmology, 60, 368.

UPADHYAY, P. & JAHANYAN, S. 2016. Analyzing user perspective on the factors affecting use intention of mobile based transfer payment. Internet Research.

VENKATESH, V. & SYKES, T. A. 2013. Digital divide initiative success in developing countries: A longitudinal field study in a village in India. Information Systems Research, 24, 239-260.

VENKATESH, V., MORRIS, M. G., DAVIS, G. B. & DAVIS, F. D. 2003. User acceptance of information technology: Toward a unified view. MIS quarterly, 425-478.

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, 157-178.

WARREN, M. 2007. The digital vicious cycle: Links between social disadvantage and digital exclusion in rural areas. Telecommunications Policy, 31, 374-388.

WENTZ, B. & TRESSLER, K. 2017. Exploring the accessibility of banking and finance systems for blind users. First Monday, 22.

Wentz, B., Jaeger, P.T. and Bertot, J.C., (2015). Accessibility for persons with disabilities and the inclusive future of libraries. Emerald Group Publishing.

WENTZ, B., PHAM, D., FEASER, E., SMITH, D., SMITH, J. and WILSON, A. J. U. A. I. T. I. S. (2018). Documenting the accessibility of 100 US bank and finance websites. 1-10.

World Health Organization 2018, available at: http://www.who.int/mediacentre/factsheets/fs282/en/ Last accessed: [10 October 2021].

YOON, H. S. & STEEGE, L. M. B. 2013. Development of a quantitative model of the impact of customers' personality and perceptions on Internet banking use. Computers in Human Behavior, 29, 1133-1141.

YU, C.-S. 2012. Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT model. Journal of electronic commerce research, 13, 104.

Zhou, T. J. I. R. 2011. An empirical examination of initial trust in mobile banking. 21, 527-540.

ZHOU, T., LU, Y. & WANG, B. 2010. Integrating TTF and UTAUT to explain mobile banking user adoption. Computers in human behavior, 26, 760-767.

ZITKUS, E., BRIGATTO, A. C., FERRARI, A. L. M., BONFIM, G. H., CARVALHO FILHO, I. F., REIS, T. D., MEDOLA, F. O. & PASCHOARELLI, L. C. Accessibility and usability of websites intended for people with disabilities: a preliminary study. International Conference of Design, User Experience, and Usability, 2016. Springer, 678-688.

Yousafzai, S., & Yani-de-Soriano, M. (2012). Understanding customer-specific factors underpinning internet banking adoption. International Journal of bank marketing, 30(1), 60-81.