Technology of Auto Teller Machine Interface: Accessibility for Bank Customer with Visual Impairments

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Abstract. Auto Teller Machine (ATM) is one of the banking facilities that attract customers with visually impaired to take advantage of banking services. However, there are still some obstacles faced to utilize technology related to ATM, this is because the technology owned by a number of ATMs is not in accordance with the conditions of customers with visual impairments. Therefore, this study aims to determine the ability of customers with visual impairments in operating ATM machines and determine the difficulties experienced when operating them. This research uses a quantitative descriptive research method by using the main research instrument in the form of a questionnaire and supporting data obtained through focus group discussions conducted with a number of respondents selected purposively. The results show that there are several difficulties faced by customers with visual impairments when using ATM facilities provided by banks. These difficulties include difficulty accessing ATM locations, queuing to use ATMs, inserting cards and taking cash out of ATM machines, taking proof of transaction slips, and difficulties when experiencing errors when using ATM machines that are not equipped with security personnel, so they have difficulty reporting the obstacles they face. While the most common difficulties experienced by customers with visually impaired, following the instructions for use listed on the ATM screen, as well as typing on the ATM screen type touch screen.

1. Introduction

One of the banking services that can be considered to provide convenience for customers is the existence of ATM facilities. There are a number of studies that suggest the importance of the position of ATMs as an indicator of excellent service, including that Bank Service and Product indicators which include staff and employees are quite professional, the bank's atmosphere is quite comfortable, the availability of ATMs in several locations, effective transaction processes and efficient, E-Banking services, and ample parking space [1]. ATM is also said to have an influence on a customer's decision to open an account at a particular bank. This is reflected in the statement that the most dominant internal variable in influencing the customer's decision to save at the bank among other the service factor is the indicator on the politeness of employees and facility factors on ATM indicators [2]. Therefore, ATM facilities can be said as one of the attractions for customers to use banking services.

In the banking world, the development of information technology has made companies change their business strategies by placing technology as a key element in the process of product and service innovation, for example, electronic transaction services (e-banking) through ATMs, phone banking and Internet Banking, are new forms of bank service that convert manual transaction services into technology-based transaction services [3]. Therefore, the use of integrated value-added services (such as the availability of ATMs), including part of a reliable factor [4], is included in one of the service product quality factors.
The number and location of ATMs owned by a bank can be categorized as one of the non-financial information considered by customers. Non-financial information which is related, among other things, to: type of service; service procedures; minimum service standards performed by banks to customers; credit application requirements; procedures for submitting suggestions, criticisms, and complaints; report on handling customer complaints; bank locations such as cash offices and ATMs; bank management and staff performance; and fees for various bank services [5]. So that customer assessments of the performance of a bank, tend to also be associated with the existence and functioning of the ATM which is provided for customers. This refers to the opinion which states that the performance assessed in an assessment survey on banking services is the service of staff such as security guards, customer service, and tellers. Physical aspects such as banking hall, convenience, ATM performance, and e-channel services (SMS, mobile banking, internet banking) are also not missing from the assessment [6].

The usefulness of ATM machines is not only used for cash withdrawals [7] but can also be used for transfers. Some ATM machines even provide other additional transaction facilities.

The facilities from the Automatic Teller Machine (ATM), Internet Banking, and service quality have a relationship with the level of customer satisfaction and customer loyalty [8]. This conclusion is in line with the statement, which was obtained from various studies that measure the level of customer satisfaction towards banking services. However, in this research, the study will focus on assessing and mapping the constraints faced by customers with visual impairments, especially in using technological facilities such as ATMs.

This study needs to be done because it needs to be remembered that the results of previous research stated that based on respondents' answers, cash withdrawals, transfers, and ATMs are banking facilities which are stated as the main reasons why customers with visually impairments deal with banking services [9]. As a sequel, this study aims to determine the ability of customers with visual impairments in operating ATM machines and to find out the difficulties they experience when operating them.

2. Method

This research was conducted by collecting data, data collection was carried out by distributing a number of questionnaires to respondents. The selected respondents are customers with visual impairments who already have accounts in a number of banks and have made transactions through ATM machines independently without the help of others. Respondents obtained were 45 people. The next stage is to analyze the data that has been obtained through the frequency distribution and interpret the data that has been illustrated through the graph. Qualitative data collection techniques are carried out by means of focus group discussions to obtain data clarity to illustrate the difficulties faced by customers with visual impairments based on their experience when operating the ATM machine, in order to complete the data needed to draw conclusions.

3. Result and Discussion

Automatic Teller Machine (ATM) is a very important facility for bank account holders to manage their personal finances. ATMs provide an easy way to make cash withdrawals and check balances [10], without having to visit a serviced office. Although there are a number of facilities owned by ATMs that make it easy for customers to use them, there are a number of obstacles faced by customers with visual impairments in using ATMs. The data in Fig. 1 shows the activities that can be carried out, activities that are hesitant to be carried out, and activities that not yet/cannot be done by customers with visual impairments who are respondents of this study when using ATM facilities.
Based on the data obtained, it is known that some respondents answered that the difficulty they faced was when accessing the ATM location, this was due to the stairs that had to be taken to reach the room/cubicle of ATM machines. This makes it difficult for customers with visual impairments, especially if the location of the ATM is the first time they visit because people with visual impairments tend to need time to orient the location first. Another difficulty they experience is when queuing to use an ATM, in this case, customers with visual impairments also experience difficulties due to ignorance of the queue sequence, so that they need help from others to inform their turn to use the ATM. Meanwhile, for taking proof of transaction slip, the difficulty factor lies in the text contained in the slip they are unable to read, this is because the text format is not in the braille format. While the biggest difficulty factor is when experiencing an error when using an ATM machine that is not equipped with security personnel, so they find it difficult to report on the obstacles they face.

Technology is a key element in the process of banking product and service innovation such as the availability of an ATM (Auto Teller Machine), which makes it easy for customers to make cash withdrawals on a 24-hour basis [3]. The ease of taking cash through an ATM that is available 24 hours, makes it easier for customers with visual impairments to make withdrawals or transfer funds. The problem usually lies in accessing ATM locations. For this reason, an assistance program is needed, for example by using wayfinding.

Wayfinding is the process by which a person navigates the environment using an information support system. This facility can help people with visual disabilities to improve their ability to move safely, as well as helping them to detect and avoid obstacles or dangers [11]. This facility can also be used to help people with visual disabilities be able to find the nearest ATM or electronic kiosk independently.

Based on regulations issued by the Financial Services Authority (OJK), which is an institution that regulates several regulations related to banking, it is stated that joint services between Headquarters that provide operational services or PUJK Outlets with a disability-friendly type, among which can be in the form of joint ATM services. Whereas the standard of joint ATM services for banking that is friendly with disabilities includes: providing ATM machines that can talk by giving specific instructions and equipped with audio jacks, as well as providing low-sized ATM machines; provide ATM machine building with friendly structure for consumers with disabilities, such as a ramp that can be used independently and safely for consumers with disabilities, wider and easier to open doors, enough room width to accommodate the mobility of wheelchair users. [12]. Thus, the actual accessibility of ATM
locations has been regulated by regulation, while the implementation of this regulation actually requires supervision by the authorities.

An accessible ATM location is one of the factors considered by customers, especially customers with visual impairments. A study states that the location of an ATM that is easily accessible is a major factor in the selection of banks for the millennial generation in conducting financial transactions [13]. Some customers with visual impairments are known to belong to the millennial group. Another finding related to the use of ATMs by customers with visual impairments is the difficulty encountered while in front of the ATM machine, as illustrated in Figure 2.

![Fig 2. difficulties experienced when operating ATMs](image)

In general, it is known that the most common difficulties experienced by customers with visually impairments when dealing with ATM machines is to access information contained on the ATM screen, enter the pin number on the ATM machine that is not equipped with a button that can help customers with visual impairments, follow instructions for use are listed on the ATM screen, as well as typing on the ATM screen that has a touch screen type.

In fact, there are already some standards that have been set in the framework of disability-friendly services. Financial Service Institutions (PUJK) are encouraged to provide technology-based services, including digital technology, such as ATM cards equipped with leading edges and/or tactile features to facilitate use for consumers with visual impairments [12]. So there has been a solutive effort to help customers with visual impairments when inserting the card into an ATM.

However, the use of ATM machines that use touch screen technology has not been fully controlled by customers with visual impairments, especially if they are not equipped with audio facilities. Therefore, an ongoing evaluation method is needed to test the concepts of making new technology. In general, new findings in the field of technology that utilize speech/audio facilities are expected to produce a more useful service application. Including when consumers are faced with traffic conditions/errors when using various technologies. Namely, the technology that is expected to meet their desires or meet their practical needs [14], including the needs of customers with visual impairments in using banking services, as part of their daily life activities.

Another obstacle faced by customers with visual impairments is when entering the pin. ATMs require users to check their identity before making any type of transaction that can be served by an ATM machine [15]. Therefore, when entering a number to fill in the pin column, this will make it difficult for customers with visual impairments if audio facilities are not available at ATMs using touch screens. This causes dependence on the customer with visual impairment to other parties, to be asked for help.
Lately, there is a new technology that can help to check the identity that can be used as an alternative to pins, namely biometrics. In developing biometric technology, efforts are needed to ensure the protection of personal data and privacy issues. Efforts to deal with privacy-related issues need to be considered in the initial design phase. This is one way to advance the development of biometric technology to be in line with market demands that want to take advantage of the existence of biometrics, which is considered a step forward in verifying identity [16]. Thus, Biometric technology can be used after going through a series of trials to ensure the security and privacy of data owners.

Difficulties experienced by customers with visually impairments when dealing with ATM machines, which are found in this research are when accessing information contained on the ATM screen, entering the pin number on the ATM machine that is not equipped with a marker button that can help customers with visually impairments, following instructions for use are listed on the ATM screen, as well as typing on the touch screen type ATM screen. This is in line with other research which states that there are problems faced by blind customers when using technology such as ATMs. One of them is the use of a touch screen on an ATM machine or a keypad that is not equipped with a marker in Braille or audio output. Although there is a marker symbol on the button or Braille signs on the keypad for tactile recognition, the ATM is still inaccessible if there is no facility to access the information displayed on the screen, for example, information that contains instructions on how to proceed with the transaction [17], which must be followed by customers with visual impairments when using ATMs.

Based on this, the provision of facilities that consider accessibility for customers with visual impairments is a matter of priority if the banking institution intends to provide the best service for customers who experience visual impairments. In addition to facilities that are accessible for customers with visual impairments, an effort to disseminate information about the use of ATMs is also needed. Earlier research stated that ATM usage training for customers was considered unnecessary because basically ATM was considered user-friendly. Unfortunately, this happens in some cases, customers from the elderly community, physically handicapped, or visually impaired have difficulty in operating the equipment [18]. Therefore, various development steps are still needed to improve banking services for customers with visually impaired, including the development of assistive technology programs that can facilitate people with visually impaired, to be able to enjoy various types of public services independently.

In the field of banking technology, there is a need to optimize the application of assistive technology more precisely in order to develop user-friendly ATMs. The application of assistive technology is expected to help the accessibility of customers. So that customers with visual barriers can independently and use ATMs effectively without the need for help from others because there is a possibility that other people can take advantage of the condition of visual barriers experienced by customers. This can lead to insecurity, as well as risking the cash they have [19]. If this can be done, then the dream of people with visual impairments to obtain equal rights in the accessibility of public services can be realized in stages.

4. Conclusions

There are several difficulties faced by customers with visual impairments when using ATM facilities provided by banks. Among other things: difficulty in accessing ATM locations due to the stairs that must be taken to reach the room/cubicle of ATM machines, or choosing an empty ATM machine in an ATM room with the machine position lined up in one room. Meanwhile, when queuing to use an ATM, customers with visual impairments also have difficulty due to the unknowingness of the queue sequence, so that they need help from others to inform their turn to use the ATM. A small proportion of customers with visual impairments expressed difficulties when inserting cards and taking cash out of ATM machines, especially when conditions are full of queues. These conditions tend to add to the panic for customers with visual impairments caused by fears of disrupting the interests of other people who are also queuing to use ATMs.

As for taking a slip of transaction evidence, the difficulty factor lies in the text contained in the slip, because they are unable to read it because the format of the text of the slip is not in braille format. While the biggest difficulty factor is when experiencing errors in using ATM machines that are not equipped with security officers, so they have difficulty reporting the obstacles they face.
It is generally known that the most common difficulties experienced by customers with visual impairments when dealing with ATM machines are accessing information contained on the ATM screen, entering pin numbers on ATM machines that are not equipped with a button that can help customers with visually impairments, following instructions use that is listed on the ATM screen, as well as typing on the touch screen type ATM screen.

References

[1] Junaidi, “Persepsi Masyarakat untuk Memilih dan Tidak Memilih Bank Syariah (Studi Kota Palopo),” *J. Fokus Bisnis*, vol. 14, no. 02, pp. 1–13, 2015.

[2] N. H. Mardika and Raymond, “Analisis Persepsi Masyarakat Dalam Memilih Perbankan Syariah Di Kota Batam,” *SniStek Semin. Nas. Ilmu Sos. dan Teknol.*, pp. 115–120, 2018.

[3] A. Ansori, “Sistem informasi perbankan syari’ah,” *J. Bang.*, vol. 4, no. 1, pp. 183–204, 2018.

[4] P. D. Cahyani, “Tingkat Kepuasan Nasabah Terhadap Kualitas Layanan Perbankan Syariah di Yogyakarta,” *Esensi J. Bisnis dan Manaj.*, vol. 6, no. 2, pp. 151–162, 2016.

[5] R. Yaya, A. Abdurahim, and D. A. Nugraha, “Kesenjangan Harapan Antara Nasabah dan Manajemen terhadap Penyampaian Informasi Keuangan dan Non Keuangan Bank Syariah,” *J. Akunt. dan Investasi*, vol. 8, no. 1, pp. 1–16, 2007.

[6] H. Wijaya, I. S. Beik, and B. Sarton, “Pengaruh Kualitas Layanan Perbankan Terhadap Kepuasan dan Loyalitas Nasabah Bank Syariah XYZ di Jakarta,” *J. Apl. Bisnis dan Manaj.*, vol. 3, no. 3, pp. 417–426, 2017.

[7] P. M. Yusup and E. Saepudin, “Praktik Literasi Informasi Dalam Proses Pembelajaran Sepanjang Hayat,” *J. Kaji. Inf. Perpust.*, vol. 5, no. 1, pp. 79–94, 2017.

[8] Indrayani, C. Wibisono, S. Aritra, and I. Muda, “Customer Satisfaction as Intervening Between Use Automatic Teller Machine ( ATM ), Internet Banking and Quality of Loyalty ( Case in Indonesia ),” *Int. J. Financ. Res.*, vol. 10, no. 6, pp. 54–66, 2019.

[9] H. Hafiar, P. Subekti, Y. Setianti, and K. Komariah, “The First Step Towards the Independence of the Visually Impaired in Entrepreneurship,” *Int. J. Entrep.*, vol. 23, no. Special Issue, pp. 1–7, 2019.

[10] C. Bozhinov, M. Byrne, L. Carswell, M. Guy, and M. Zhivkov, “Building a ‘Talking’ ATM Introduction to HCI,” pp. 1–52.

[11] Mada Assistive Technology Center, “Guide On Accessible Automated Teller Machines/Electronic Kiosks,” 2019.

[12] Otoritas Jasa Keuangan, “Petunjuk Teknis Operasional (PTO) untuk Pelayanan Keuangan kepada Penyandang Disabilitas,” 2018.

[13] A. I. Permata, M. R. Nugroho, E. S. Handoyo, and I. A. Kusuma, “Faktor-faktor Yang Mempengaruhi Pemilihan Bank Pada Generasi Milenial di Jabodetabek,” *Indones. Bus. Rev.*, vol. 1, no. 1, 2018.

[14] G. I. Johnson and L. Coventry, “‘You Talking to Me?’ Exploring Voice in Self-Service User Interfaces,” *Int. J. Hum. Comput. Interact.*, vol. 13, no. 2, pp. 161–186, 2001.

[15] A. Chandran, A. Paulson, A. J. Varghese, and DeenShifaz, “ATM for Visually Challenged People,” *Int. Res. J. Eng. Technol.*, vol. 4, no. 3, pp. 370–375, 2017.

[16] S. Gold, “Biometrics at the ATM – the need for customer,” *Biometric Technol. Today*, no. June, pp. 7–10, 2012.

[17] D. S. Raja, N. Narasimhan, P. D’Intino, V. Maheshwari, and V. Montenegro, “Inclusive Financial Services, For Seniors and Persons with Disabilities: Global Trends in Accessibility Requirements,” Global Initiative for Inclusive Information and Communication Technologies, 2015.

[18] J. M. Manzke, D. H. Egan, D. Felix, and H. Krueger, “What makes an automated teller machine usable by blind users?,” *Ergonomics*, vol. 41, no. 7, pp. 982–999, 1998.

[19] O. J. Omari and O. B. Zachary, “Investigating ATM System Accessibility for People with Visual Impairments,” *IOSR J. Comput. Eng.*, vol. 15, no. 5, pp. 13–18, 2013.