

The Impact of Automated Teller Machine Service Quality on Customer Satisfaction: A Quantitative Analysis

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Abstract: This study aims to analyze the effect of ATM service quality on customer satisfaction of Bank Mandiri ATM users in Denpasar. The focus of this study is four dimensions of ATM service quality, namely convenience (ease of access), reliability (reliability), ease of use (ease of use), and fulfillment (fulfillment of expectations). Using a quantitative approach, data were collected through questionnaires distributed to 106 respondents who are active users of Bank Mandiri ATMs. Data processing was carried out using SPSS, and multiple linear regression analysis was used to test the effect of each dimension on customer satisfaction. The results showed that all dimensions of ATM service quality had a positive and significant effect on customer satisfaction. The dimensions of convenience and ease of use had a greater influence than reliability and fulfillment. These findings provide useful insights for Bank Mandiri to improve ATM services, especially in terms of ease of access, ease of use, and maintenance of ATM machine reliability. This study is expected to help banks improve the quality of ATM services in order to increase customer satisfaction and loyalty.

Keywords: ATM service quality; convenience; customer satisfaction; ease of use; linear regression.

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Introduction

Improving service quality is one of the main factors that can affect customer satisfaction in the banking sector, especially in automated banking services such as Automated Teller Machines (ATMs). Along with the development of technology and digitalization, ATMs have become an important means for customers to conduct banking transactions quickly and efficiently, without having to visit a branch office (Balkan, 2020). In Indonesia, Bank Mandiri as one of the largest banks continues to strive to improve its ATM services to meet the increasingly complex needs of customers.

However, although ATM services have become an integral part of modern banking services, it is undeniable that there are still challenges in ensuring service quality that can satisfy all customers. ATM service quality covers various aspects such as ease of access, machine reliability, transaction speed, and meeting user expectations (Ronny et al., 2021). Each of these aspects can affect the customer experience in using ATM services and potentially contribute to their level of satisfaction. One of the problems often faced by many banks is customer dissatisfaction caused by technical machine disruptions, long queues, or other obstacles related to user experience. These problems need to be identified and addressed immediately to maintain customer loyalty and improve the bank's reputation.

This study aims to analyze the effect of ATM service quality on customer satisfaction at Bank Mandiri Denpasar. The service quality in question includes four main dimensions: convenience, reliability, ease of use, and fulfillment. These four dimensions were selected based on previous theories that show their relevance to customer satisfaction in the context of automated banking services. This study uses a quantitative approach with data processing using SPSS to analyze the relationship between these variables. The main objective of this study is to provide a deeper understanding of the dimensions that influence customer satisfaction with Bank Mandiri ATM services (Adeyani & Anggraini, 2021). By analyzing these factors, it is hoped that the results of the study can provide practical recommendations for Bank Mandiri management to improve aspects that are sources of customer dissatisfaction. The strength of this study lies in the selection of variables that are directly relevant to customer satisfaction in the digital era, as well as the use of empirical data obtained from 106 respondents who are active users of Bank Mandiri ATMs in Denpasar.

This study also has novelty in terms of its approach and focus. Most previous studies have focused more on service quality in the banking sector in general, with little attention paid to ATM services in particular. In addition, this study provides a new perspective by examining the influence of ATM service quality dimensions on customer satisfaction using quantitative data and more in-depth statistical analysis, which provides more concrete and reliable results. As a major contribution, this study is expected to enrich the existing literature on ATM service quality and customer satisfaction, as well as provide guidance for ATM service managers at Bank Mandiri to improve service quality that is more in line with customer expectations.

This research contributes to identifying areas that need improvement to enhance customer experience in using ATM services. These findings are expected to be the basis for strategic decision making that can improve customer satisfaction, increase customer loyalty, and ultimately contribute to Bank Mandiri's long-term success in this increasingly competitive market.

Concept and Hypothesis

This study adopts several relevant main theories to analyze the effect of ATM service

quality on customer satisfaction. One of the main theories used is the Servqual Model developed (Shi & Shang, 2020). This model identifies five dimensions of service quality, namely tangibles (physical appearance), reliability, responsiveness, assurance, and empathy. In this study, the dimensions that are more relevant to the ATM context are reliability, ease of use, convenience, and fulfillment (Robustin, 2021). In addition, the Technology Acceptance Model (TAM) theory developed by (Bansah & Darko Agyei, 2022) is also used to measure technology acceptance and its effect on user experience, especially on the variables of ease of use and convenience.

The service quality dimensions analyzed in this study are convenience, reliability, ease of use, and fulfillment, all of which focus on important aspects of the ATM service user experience that affect their level of satisfaction. The explanation of each variable is as follows:

Convenience (Ease of Access)

Convenience refers to the extent to which users feel that ATM services provide convenience and ease of access. This includes transaction speed, availability of easily accessible ATMs, and ease of finding ATM locations (Perpetua & Kusumastuti, 2022). Convenience in the context of ATM services can affect customer satisfaction because the convenience offered by the service is a major factor that supports a positive experience for users. The presence of ATMs that are widely distributed and accessible at any time is a key element of convenience.

Reliability

Reliability refers to the ability of an ATM to function properly and meet user expectations in terms of accuracy and speed of transactions. The reliability of an ATM, such as its ability to process transactions without interruption, withdraw the correct amount of money, and the accuracy of the information displayed, is very important in maintaining customer satisfaction (Saragih, 2021). If an ATM frequently experiences damage or system failures, this will reduce user trust and satisfaction.

Ease of Use (Ease of Use)

Ease of use measures the extent to which users feel comfortable using an ATM. This includes ease of navigating menus, clarity of instructions, and simplicity in making transactions (Albashrawi & Motiwalla, 2019). This dimension is very important in the context of digital banking technology, because if the ATM system is not easy to understand or use, customers tend to feel frustrated and ultimately dissatisfied. TAM (Technology Acceptance Model) explains that the easier a technology is to use, the more likely people are to accept it.

Fulfillment (Fulfillment of Expectations)

Fulfillment refers to the extent to which an ATM service meets user expectations. Users expect that they can complete their transactions smoothly and without problems, and that the ATM will provide services according to their intended purpose, such as cash withdrawals, balance checks, or bill payments (Othman et al., 2020). If user expectations are met or even exceeded, then the level of satisfaction will be high. Conversely, if there is uncertainty or failure to meet expectations, then customer satisfaction will decrease.

Hypothesis

The relationship between variables in this study can be explained as follows: Convenience, reliability, ease of use, and fulfillment all contribute to customer satisfaction, with each dimension focusing on a different aspect of the user experience. For example, convenience focuses on ease of access, while reliability places more emphasis on the performance and reliability of the machine. Ease of use affects how users interact with technology, and fulfillment relates to the extent to which the service meets or exceeds user

expectations.

Based on this relationship, the hypothesis that can be developed is as follows:

Hypothesis 1 (H₁) : *Convenience* has a significant positive effect on customer satisfaction.

Explanation: The easier the ATM is to access and the faster the transaction process, the higher the level of customer satisfaction with ATM services.

Hypothesis 2 (H₂) : *Reliability* has a positive effect on customer satisfaction.
Explanation: Users who feel reliable in using ATM machines, such as accurate transaction processes and minimal disruption, will be more satisfied.

Hypothesis 3 (H₃) : *Ease of use* has a positive effect on customer satisfaction.
Explanation: An easy-to-use ATM machine, with a clear interface and simple navigation, will increase user satisfaction.

Hypothesis 4 (H₄) : *Fulfillment* has a positive effect on customer satisfaction.
Explanation: Users who feel that their ATM services meet or exceed their expectations, both in terms of smooth transactions and fulfillment of other needs, will have a higher level of satisfaction.

Hypothesis 5 (H₅) : The four dimensions of ATM service quality (convenience, reliability, ease of use, and fulfillment) together have a significant effect on customer satisfaction. Explanation: These four dimensions interact with each other in influencing customer satisfaction, so that an increase in one or more of these dimensions can increase overall satisfaction.

Thus, the relationship between these variables leads to the hypothesis that improving service quality in these dimensions will increase customer satisfaction with ATM services. This study aims to test the validity of these hypotheses using empirical data obtained through a survey of Bank Mandiri ATM users in Denpasar.

Method

This study uses a quantitative approach with the aim of analyzing the effect of ATM service quality on customer satisfaction. The quantitative approach was chosen because it allows to measure and test the relationship between clearly defined variables using numerical data that can be analyzed statistically (Mohajan, 2020). This study adopts a survey method using a questionnaire as the main instrument to collect data from respondents.

Population and Sample

The population in this study were all Bank Mandiri ATM users in the Denpasar area. Given the limited time and resources, the research sample was taken purposively, with the criteria that respondents were active Bank Mandiri ATM users and had used ATM services in the last three months. The number of samples used in this study was 106 people, which was considered representative enough to describe the population of Bank Mandiri ATM users in Denpasar.

Research Instruments

The research instrument used is a questionnaire consisting of several parts. This questionnaire is designed to measure the following variables:

Convenience (ease of ATM access),

Reliability (ATM machine reliability),

Ease of Use (ease of use of ATM machines),

Fulfillment (fulfillment of user expectations), and **Customer Satisfaction** as dependent variables. The questionnaire uses a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) to assess each statement related to the dimensions of ATM service quality.

Data Collection Procedure

The data collection process was carried out by distributing questionnaires to 106 respondents who were Bank Mandiri ATM users in Denpasar, either directly at the ATM location or through a digital platform. Respondents were asked to provide answers based on their experience in using ATM services. Before the data was collected, the questionnaire instrument was tested to ensure its validity and reliability. The validity test was carried out using the Pearson correlation technique, while the reliability test used Cronbach's Alpha analysis.

Measurement Method

Convenience (Ease of Access)

Ease of access was measured using 4 statement items that describe how respondents assess the presence of ATMs in easily accessible locations and the speed of completing transactions.

Reliability

ATM machine reliability is measured by 4 statement items regarding the frequency of machine breakdowns, transaction errors, and the availability of reliable services.

Ease of Use (Ease of Use)

Ease of use is measured by 4 statement items related to the ease of understanding the ATM user interface and the smoothness of conducting transactions.

Fulfillment (Fulfillment of Expectations)

Fulfillment of expectations is measured by 4 statement items that test whether ATM services have met respondents' expectations in terms of speed, transaction accuracy, and ease of use.

Customer satisfaction

Customer satisfaction is measured using 5 items that describe the level of respondent satisfaction with the overall quality of ATM services, including the suitability between expectations and perceived reality.

Research Stages

Research Preparation

At this stage, the identification of research problems, determination of research objectives, and preparation of research instruments are carried out. The researcher also prepares the necessary permits to conduct data collection and ensures that the questionnaire instrument has been tested for validity and reliability.

Data collection

Data were collected by distributing questionnaires to respondents who met the research criteria. Data collection was carried out directly at Bank Mandiri ATM locations in Denpasar and through digital distribution to respondents who could not attend in person.

Data Processing and Analysis

After the data is collected, the data will be processed using SPSS software. Descriptive analysis will be conducted to describe the profile of respondents and the distribution of answers to each item. Furthermore, reliability and validity tests will be conducted to ensure the quality of the data obtained. To test the relationship between variables, multiple linear regression analysis was conducted to see how much influence each dimension of ATM service quality has on customer satisfaction.

Preparation of Research Reports

After the analysis results are obtained, the researcher will compile a research report that includes a description of the analysis results, discussion, conclusions, and practical recommendations based on the research findings. This report will include an in-depth discussion of the regression results, as well as the implications of these findings in the context of improving the quality of Bank Mandiri ATM services.

Publication and Dissemination of Results

This research will be published in a Scopus indexed scientific journal after going through a review process. In addition, the results of the study will be disseminated to related parties such as Bank Mandiri management to provide input in efforts to improve the quality of ATM services.

With these stages, this study is expected to provide a significant contribution in understanding the factors that influence customer satisfaction in the context of ATM services, as well as provide practical recommendations that can be implemented by Bank Mandiri to improve their customer experience.

Result and Discussion

The results of this study aim to identify the influence of ATM service quality dimensions, namely *convenience*, *reliability*, *ease of use*, and *fulfillment* on customer satisfaction of Bank Mandiri ATM users in Denpasar. Data obtained from 106 respondents were processed using SPSS software to analyze the relationship between these variables.

Descriptive Analysis

In the descriptive analysis, the data shows that the majority of respondents have a positive experience with Bank Mandiri ATM services. The average value obtained for each dimension of service quality shows a tendency that users are satisfied with ease of access (convenience), machine reliability (reliability), ease of use (ease of use), and fulfillment of expectations (fulfillment). The average customer satisfaction score also shows a relatively high level of satisfaction. Overall, these data show that respondents feel that the ATM services provided have met their expectations in terms of quality and convenience.

Reliability Test

Reliability tests conducted using Cronbach's Alpha showed very good results for all variables, with values higher than 0.7, which is the accepted threshold for internal consistency of research instruments. The following are the results of the reliability test for each variable measured:

Table 1. Reliability Test

Variables	Cronbach's Alpha
Convenience	0.873
Reliability	0.811
Ease of Use	0.756

Fulfilment 0.820

Cronbach's Alpha value indicates that the instrument used to measure each dimension of ATM service quality has good consistency and is reliable.

Multiple Linear Regression Test

To test the proposed hypothesis, multiple linear regression analysis was conducted to see the influence of *convenience*, *reliability*, *ease of use*, and *fulfillment variables* on customer satisfaction. The following are the results of the linear regression test:

Table 2. Multiple Linear Regression Test

Variables	B	SE	t	Sig.
Constant	2,451	0.225	10,910	0.000
Convenience	0.423	0.057	7,426	0.000
Reliability	0.248	0.065	3,815	0.000
Ease of Use	0.398	0.060	6,633	0.000
Fulfilment	0.312	0.059	5,289	0.000

From the results, it can be seen that all independent variables have a significant influence on customer satisfaction (Sig. value < 0.05 for all variables). In other words, *convenience*, *reliability*, *ease of use*, and *fulfillment* contribute significantly to increasing customer satisfaction in using Bank Mandiri ATM services in Denpasar.

Discussion

Based on the regression results, convenience has the strongest influence on customer satisfaction, with a B value of 0.423 and a t value of 7.426. This shows that the easier it is for users to find and use ATMs, the higher their level of satisfaction. This factor includes convenience in finding nearby ATM locations, as well as speed and smoothness in transactions. The widespread and easily accessible ATMs clearly contribute to a positive user experience.

Furthermore, ease of use also shows a significant influence on customer satisfaction, with a B value of 0.398 and a t value of 6.633. This indicates that ease of use of ATM machines, such as easy-to-understand interfaces and simple navigation, increases the level of user satisfaction. This factor is relevant in the context of digital banking technology, where simplicity in interacting with the machine greatly affects user satisfaction.

Reliability (machine reliability) has a significant influence on customer satisfaction with a B value of 0.248 and a t value of 3.815. These results indicate that ATM machines that rarely experience damage and are able to process transactions accurately and consistently can increase the level of user satisfaction. Machine reliability is one of the key factors in maintaining customer trust and satisfaction.

Finally, fulfillment also has a positive effect on customer satisfaction, with a B value of 0.312 and a t value of 5.289. This shows that if ATM services are able to meet user expectations in terms of speed, accuracy, and convenience, then the level of user satisfaction will be higher. Fulfillment of expectations is an important indicator in measuring whether users are satisfied with the results of the transactions made.

Overall, the results of this study confirm that the four dimensions of ATM service quality (convenience, reliability, ease of use, and fulfillment) have a positive effect on customer satisfaction. Therefore, Bank Mandiri needs to maintain and improve the quality of ATM services in these dimensions to increase user satisfaction and maintain customer loyalty.

Conclusion

This study aims to analyze the influence of ATM service quality dimensions—*convenience*, *reliability*, *ease of use*, and *fulfillment*—on customer satisfaction of Bank Mandiri ATM users in Denpasar. The results show that the four dimensions have a significant positive influence on customer satisfaction. In particular, *convenience* (ease of access) and *ease of use* (ease of use) were found to have a stronger influence than *reliability* (reliability) and *fulfillment* (fulfillment of expectations). These findings indicate that a positive user experience is highly dependent on the convenience of accessing ATMs and the ease of using the technology.

Thus, it can be concluded that optimal ATM service quality can increase overall customer satisfaction, which in turn can strengthen customer loyalty to Bank Mandiri. Therefore, ATM service managers need to continue to focus on improving and maintaining ATM machines in order to provide a better experience for users.

Theoretically, this study contributes to the literature on automated banking service quality, especially ATM services, by adding empirical evidence on the influence of service quality dimensions on customer satisfaction. This study confirms that dimensions that have been known in service quality models, such as *convenience*, *reliability*, *ease of use*, and *fulfillment*, play an important role in shaping user experience in the context of ATM services. This finding supports previous theories, such as Servqual and the Technology Acceptance Model (TAM), which state that service quality and ease of use factors influence technology acceptance and customer satisfaction.

In addition, this study also enriches the understanding of the role of *convenience* and *ease of use* in the context of digital banking services. This shows the importance of the ease of access and use aspects in improving user experience, which should be a primary concern in the development of ATM services in the future.

Based on the research findings, the practical implications that can be applied by Bank Mandiri are the importance of focusing on improving the dimensions of ATM service quality. First, banks need to ensure that ATMs are available in locations that are easily accessible to customers to increase *convenience*. Wider distribution of machines and improved infrastructure quality will make it easier for customers to find ATMs that are ready to use at any time.

Second, *ease of use* is key to ensuring a smooth experience for users. Therefore, Bank Mandiri is advised to continue to simplify the ATM machine interface, as well as provide clear and easy-to-understand instructions. Improving the design of ATM machines with more user-friendly technology will ensure that customers can make transactions without difficulty.

Third, it is important for Bank Mandiri to maintain *the reliability* of ATM machines so that they do not often experience disruptions or damage. Accurate and fast transaction processes are very important for customers, who want convenience without any technical problems. Routine maintenance and monitoring of ATM machine performance will be crucial steps to ensure that ATM machines remain in good condition.

Finally, *fulfillment* or fulfillment of customer expectations can be improved by paying attention to customer expectations and providing an experience that exceeds their expectations. Bank Mandiri can offer new features that can enrich the customer experience in using ATM services.

While this study provides valuable insights into the factors that influence customer satisfaction with ATM services, there are several areas that could be focused on for future

research. First, future research could include additional variables such as *customer loyalty* and *trust*, to see if customer satisfaction is related to loyalty or level of trust in the bank.

Second, more in-depth research into user preferences by comparing different demographic groups (e.g., age, education level, or employment status) could provide further insight into differences in perceptions of ATM service quality. By taking these differences into account, banks could tailor their services to better suit the needs and expectations of different customer segments.

Third, the use of new technologies in ATM development, such as integration with mobile banking or other innovative features, can be an interesting research topic. Given the rapid development of digital banking technology, it is important to explore how new technologies can improve ATM service quality and increase customer satisfaction.

Finally, further research can examine the role of user experience on satisfaction in the context of digital banking in general, by expanding the scope of the study to other platforms such as mobile banking applications or e-wallet services. Thus, this study can be more relevant and provide greater contributions in the context of future banking technology developments.

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