The Influence of E-Service Quality on Customer Satisfaction of Digital Customer Service Machine Users at PT Bank Central Asia, Tbk KCP A. Rivai

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Abstract

This study was conducted to determine the influence of *e-service quality* dimensions, namely *efficiency, fulfilment, system availability, privacy, responsiveness,* and *contact,* on customer satisfaction among users of *digital customer service* machines at PT Bank Central Asia, Tbk KCP A. Rivai. The population in this study consisted of all customers who used digital *customer service* machines at PT Bank Central Asia, Tbk KCP A Rivai, totaling 4,703. The sample used in this study consisted of 151 respondents using the Slovin formula. The results of the multiple linear regression analysis showed that *efficiency, fulfillment, system availability, privacy, responsiveness,* and *contact* had a positive and significant effect on customer satisfaction. *Efficiency* is expected to increase the number of digital customer service machines in several branch offices and sub-branch offices, allowing them to have multiple digital *customer service* machines. *Fulfillment* is expected to review the items displayed on the customer transaction screen, including the fees incurred for each customer transaction. *System availability* is expected to increase the number of units, thereby improving the efficiency of service usage for customers. *Privacy* is expected to maintain the confidentiality of customer personal data and not share it without the customer's consent. *Responsiveness* is expected to maintain the readiness and availability of *call centre* services so that customers can contact *the call centre* at any time. *Contact* is expected to educate and socialise customers regarding the various options available for contacting *the call centre.*

Keywords

contact;
customer satisfaction;
efficiency;
e-service quality;
fulfillment;
responsiveness;
system availability;
privacy;

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Contents

1   Introduction

The rapid development of digital technology in the era of the Industrial Revolution 4.0 has encouraged various sectors to transform, including the banking sector. Banking, as one of the backbones of the national economy, plays a strategic role in supporting the smooth running of economic activities, both as a financial intermediary and as a provider of payment systems (Kim & Yang, 2025) . To enhance competitiveness and meet the growing expectations of customers, the banking sector is required to continuously innovate, particularly in providing digital-based services that are fast, efficient, secure, and easily accessible. Recognising this urgency, the Financial Services Authority (OJK) issued OJK Regulation No. 12/POJK.03/2018 on the Provision of Digital Banking Services by Commercial Banks, which aims to encourage the use of information technology to expand and improve the quality of banking services (Ramadhan & Purwandari, 2023) .

PT Bank Central Asia Tbk (BCA), as one of the largest private banks in Indonesia, is an example of a financial institution that has optimised its digitalisation. Since its establishment in 1955 and its transformation into a foreign exchange bank in 1977, BCA has consistently demonstrated significant growth through network expansion, product innovation, and service modernisation (Ramadhan & Purwandari, 2023) . One of the digital transformations implemented by BCA is the launch of its Digital *Customer Service* (CS) in April 2019. This technology-based service innovation was designed to provide customers with convenient self-service options for various banking transactions that were previously only available through conventional tellers, such as replacing ATM cards using an e-KTP and various other services. The presence of the Digital CS service not only streamlines daily transaction processes but also serves as an indicator of BCA's success in implementing cutting-edge technology to enhance the overall customer experience (Novitasari et al., 2021) .

Table 1
Number of Accounts and Number of ATM Cards at BCA from 2020 to 2024

Year	Number of Accounts	Number of ATM Cards
2020	24.49 million	22.53 million
2021	28.50 million	24.58 million
2022	34.68 million	30.55 million
2023	38.26 million	33.82 million
2024	41.32 million	36.40 million

Source: (www.bca.co.id, 2025)

The Digital CS Machine allows customers to print ATM cards without having to meet directly with *customer service* officers. This feature includes printing new cards (first time), replacing lost or damaged cards, migrating to chip cards, changing card types, forgetting PINs, and printing digital cards into physical cards. In addition, the Digital CS Machine also supports *e-Banking* service registration, such as BCA *mobile*, Klik BCA Individual, and SMS BCA. With an attractive interface, *user-friendly* design*, adequate transaction speed, and high-speed internet connectivity, this machine is designed to simplify customers' access to managing their banking needs, particularly those related to non-cash services.

The digitalisation era requires banks to continue innovating in providing the best services for their customers. PT Bank Central Asia, Tbk (BCA) has developed a concept for a more efficient banking branch model of the future, using technology and digital machines that can be used independently by customers. With the development of technologies such as the Digital CS machine, BCA can improve operational efficiency while meeting customer expectations for convenience and speed of service. This transformation not only supports customer growth but also strengthens customer loyalty towards BCA as one of the leading banking institutions in Indonesia.

In line with the growth in the number of BCA customers, which reached more than 41 million accounts as of December 2024, or more than double in the last five years, BCA needs to conduct a comprehensive evaluation of the extent to which the quality of digital services contributes to customer satisfaction (BCA, 2025) . This growth demonstrates the success of BCA's innovation strategy, particularly in the development of digital services and the expansion of customer-oriented products in the digital era. The quality of electronic services (*e-service quality)* is a crucial aspect that directly influences customer experience and satisfaction when interacting with banking services (Nurhadi et al., 2022). The concept *of e-service quality* itself refers to the extent to which a digital platform is able to facilitate the entire service process, such as transactions, account management, and problem resolution, efficiently and effectively without significant obstacles (Suhartanto et al., 2019).

The main focus of this study is to analyse the influence *of e-service quality* on customer satisfaction levels among customers using digital *customer service* (CS) machines at PT Bank Central Asia, Tbk KCP A. Rivai. The Digital CS machine that is the object of this study is one of the leading technological innovations specifically developed by BCA to provide convenience, comfort, and efficiency in various banking transactions without having to go through a longer process with conventional tellers. The ease-of-use aspect, which is one of the main dimensions in this study, includes several important factors such as the clarity of instructions provided by the system, the speed of access in responding to user commands, intuitive and easy-to-understand navigation, and a user-friendly and visually appealing interface. All these factors significantly contribute to shaping customers' perceptions of the quality of digital services they receive. The findings of this study are expected to provide strategic insights and practical recommendations for BCA in its efforts to develop more effective, adaptive, and customer-centric digital service innovations that enhance the customer experience in the long term (Chen, 2012).

The first Digital CS Machine was launched in April 2019 and is now available at nearly 1,200 locations across Indonesia. Its presence provides a practical solution for customers who wish to avoid long queues or service time constraints at branches. The machine is available 24 hours a day, 7 days a week, at specific locations, offering customers greater flexibility in terms of timing. Unlike ATMs, which are more focused on cash transactions and use VSAT (*Very Small Aperture Terminal)* networks or telephone lines, the Digital CS machine is supported by a modern internet network that enables more complex and responsive services. With the various conveniences and flexibility offered, evaluating the quality of electronic services (*e-service quality)* is a crucial aspect in ensuring an optimal user experience (Zavareh et al., 2012).

E-service quality (quality of electronic services) is the primary indicator in evaluating the success of digital CS machines. *E-service quality* is an extension of a website's ability to provide shopping, purchasing, and distribution facilities effectively and efficiently (Chase et al., 2007) . Several important factors that influence *e-service quality,* such as *efficiency, fulfilment, system availability, privacy, responsiveness,* and *contact,* play a very important role in determining the quality of *digital banking* services to customers. The use of digital technology provides significant opportunities for banks to enhance service quality and customer experience, but it also presents challenges related to system reliability and data security. To ensure that *e-service quality* is maintained and provides the best experience for customers, BCA has incorporated an assessment of digital machines into its *Banking Service Quality* (BSQ) evaluation.

Banking Service Quality (BSQ) refers to the level of service excellence provided by a bank to its customers, covering various aspects such as reliability, responsiveness, and empathy (Parasuraman, Zeithaml, & Berry, 1988). BSQ assessment at PT Bank Central Asia, Tbk is influenced by service quality, including digital services. One of the main aspects of BCA's digital services is the Digital CS Machine, which is one of the most widely used automated machines by customers. Therefore, the quality of digital services (*e-service quality)* from the Digital CS Machine is an important factor in BSQ evaluation. In recent years, BSQ scores have fluctuated, as

indicated by, with increases, stagnation, and decreases. These inconsistent changes have become a concern for BCA management, as they can impact customer satisfaction and loyalty.

2 Materials and Methods

The population in this study is all customers who use the Digital *customer service* machine at PT Bank Central Asia, Tbk KCP A Rivai. Based on internal data from BCA, in 2024, PT Bank Central Asia, Tbk KCP A Rivai had 4,703 customers. To determine the research sample, the following calculation was used:

$$n = \frac{4.703}{1 + 4.703\,(0.08)^2}$$
$$n = 151,22$$

Based on calculations using the Slovin formula, the sample size for this study was 151.22, which was rounded to 151. Based on calculations using the Slovin formula, this was done to simplify data processing to This study used the Slovin formula because, in sample selection, the number must be representative so that the research results can be generalised, and the calculations do not require a sample size table, but can be done using a simple calculation formula.

Data collection in the form of questionnaires as research instruments must meet two criteria, namely validity and reliability. For this reason, before the questionnaires are distributed, it is necessary to conduct validity and reliability tests on the questionnaires. All independent and dependent variables will be analysed using *the* SPSS (*Statistical Package for the Social Sciences*) IBM SPSS Version 25 application program*.*

3 Results and Discussions

Normality Test Results

Table of Normality Test Results

Table 2
One-Sample Kolmogorov-Smirnov Test

		Unstandardised Residual
N		15
Normal Parameters	Mean	.000000
	Standard Deviation	.99227713
Most Extreme Difference	Absolute	.127
	Positive	.097
	Negative	-.127
Kolmogorov-Smirnov Z		.127
Asymp. Sig. (two-tailed)		.192

Data Source: Processed from Questionnaire, 2025

Based on the normality test results in the table, it can be seen that the data is normally distributed. This is indicated by the *Kolmogorov-Smirnov* test, which shows a significance level of 0.192, which is above 0.05.

Results of Multiple Linear Regression Analysis

Table 3
Multiple Linear Regression Analysis Results

Model	Coefficients			
	Unstandardized Coefficients		Standardized Coefficients	
1	B	Std. Error	Beta	Sig
Constant	3.466	.379		
E-Service Quality	.483	.260	.431	.

Data Source: Processed from Questionnaire, 2025

Based on the table, the results of the multiple linear regression analysis can be expressed by the following equation:

$$Y = 3,466 + 0,483X_1 + e$$

The above linear regression equation can be explained as follows:
1) The constant value shows a positive value of 3.466. This indicates that customer satisfaction is considered to be unaffected by *e-service quality*, with the customer satisfaction variable value being 3.466.
2) The regression coefficient value of the *e-service quality* variable (X1) is 0.483 with a value of t_{hitung} of 4.089, indicating a positive influence on customer satisfaction. This suggests that the higher the *e-service quality* (X1) implemented, the more positive the impact, resulting in higher customer satisfaction among users of the *digital customer service* machine at PT Bank Central Asia, Tbk KCP A. Rivai.

Results of the Correlation Coefficient (r) and Determination Coefficient (R^2) Test

Table 4
Correlation Coefficient (r) and Determination Coefficient (R^2) Test Results

Model Summary^b				
Model	**R**	**R Square**	**Adjusted R Square**	**Standard Error of the Estimate**
1	.814	.643	.602	.99895

Data Source: Processed from Questionnaire, 2025

Based on *the model summary output* in the table, the results of the correlation coefficient test (r) show that the magnitude of the influence of the *e-service quality* variable on customer satisfaction is 0.814 or 81.4%. The R-squared value (R^2) is 0.643 or 64.3%, which is used to assess how *e-service quality* influences customer satisfaction among users of the *digital customer service* machine at PT Bank Central Asia, Tbk KCP A. Rivai. This figure indicates that the *e-service quality* variable shows which factors can influence customer satisfaction, accounting for 64.3%, while the remaining 35.7% is influenced by other factors.

Hypothesis Testing
F-Test Results

The F-test in this study was conducted to identify whether the regression equation model was suitable or unsuitable for explaining the effect of independent variables on the dependent variable. Based on the test results and data processing, the following test results were obtained:

Table 5
F Test Results

Model		Sum of Squares	df	Mean Square	F	Sig.
		ANNOVA[b]				
1	Regression	71.937	2	22.969	72.971	**.000**
	Residual	47,692	148	.998		
	Total	109,630	150			

Data Source: Processed from Questionnaire, 2025

Based on the results in the table, a significance value of 0.000 was obtained because the significance value of 0.000 is less than 0.05, so it can be said that the linear regression model obtained is suitable for explaining the effect of *e-service quality* on customer satisfaction of digital customer service machine users at PT Bank Central Asia, Tbk KCP A. Rivai.

T-Test Results

The t-test aims to determine the extent to which independent variables individually influence the dependent variable. This study uses a significance level of 5% or α = 0.05. The results of the t-test can be seen in the table below:

Table 6
t-Test Results

Model		Unstandardised Coefficients		Standardised Coefficients	
		Coefficients			
1		B	Std. Error	Beta	Sig
	Constant	3.466	.379		
	E-service Quality (X1)	.483	.260	.431	.

Data Source: Processed from Questionnaire, 2025

Based on the results of the analysis in the table, the following can be explained:
 1)   The *e-service quality* variable (X1) has a beta value of 0.483 with a significance value of 0.000, which is less than 0.05. This indicates that the *e-service quality* variable (X1) has a positive and significant influence on the satisfaction of users of *digital customer service* machines at PT Bank Central Asia, Tbk KCP A. Rivai. This proves that the first hypothesis on the *e-service quality* (X1) variable is positive and significant and can be accepted.

Discussion

The Influence of E-Service Quality on Customer Satisfaction of Digital Customer Service Machine Users at PT Bank Central Asia, Tbk KCP A. Rivai

Research results Ighomereho & Afolabi (2023); Ginting (2023); Yuan et al. (2020); Singh (2019); Hammoud et al. (2018); Nyoni et al. (2017) indicate that *e-service quality* has a positive and significant effect on customer satisfaction. The results of the study from Ferdani et al. (2020) Also, also show the same results, namely that *service quality* has a positive and significant influence on customer satisfaction. Meanwhile, different results are shown in the study from Candra & Juliani (2018) indicating that *e-service quality* has no significant influence on *customer satisfaction*.

The Influence of Efficiency on Customer Satisfaction of Digital Customer Service Machine Users at PT Bank Central Asia, Tbk KCP A. Rivai

The results of this study indicate that the CS Digital machine indicator that can be easily accessed at branches shows the lowest value. Based on direct interviews with several respondents who are BCA bank customers, the use of digital CS machines, especially at branch offices, is limited in number. At branch offices, only one machine is available, which still causes queues despite the efficient use of the machines, resulting in faster service times compared to handling services through customer service.

    Respondents' responses to transaction indicators using the Digital CS Machine can be done quickly and show the highest scores. Respondents said that the efficiency of the digital CS machine is already very good. Customers said that the process of handling customer needs is faster compared to customer service, where customer service requires a queue number and waiting in line, but using the digital CS service is faster and there is less queuing (Udo et al., 2010).

The Impact of Fulfilment on Customer Satisfaction of Digital Customer Service Machine Users at PT Bank Central Asia, Tbk KCP A. Rivai

The results of this study indicate that the CS Digital machine indicator always displays the desired items (such as card limits, card fees, etc.) with the lowest values. This shows that some respondents still require other types of services in the display and use of the digital CS machine. Customers said that the digital CS machine is quite efficient to use, making them feel comfortable and able to meet their needs without having to go through customer service.

    Respondents' responses to the CS Digital machine indicator helped meet customer needs in card replacement, card printing, E-Banking registration, etc. in accordance with the promise, showing the highest score. Some customers stated that the digital CS machine is very helpful in meeting their needs, as they can use it to fulfil various requirements. Typically, when using customer service, customers have to wait in long queues, especially during peak hours when there are many customers and a limited number of customer service representatives, resulting in prolonged waiting times.

The Effect of System Availability on Customer Satisfaction of Digital Customer Service Machine Users at PT Bank Central Asia, Tbk KCP A. Rivai

The results of this study indicate that the CS Digital machine indicator is always available at the branch for card replacement transactions, card printing, etc., showing the lowest value. This indicates that the customers who were respondents in this study said that there were not enough CS Digital machines available. With a large number of customers every day, more machines need to be added to meet customer needs. Additionally, customers have complained that during peak hours, some CS Digital machines are malfunctioning and unable to operate properly. This results in customers being redirected to customer service, which prolongs the efficiency of the service process (Isnaini et al., 2021).

    Respondents' responses to the CS Digital machine indicator never *crashing* showed the highest score. This indicates that the digital CS machine has also experienced crashes, which occurred due to unstable internet connections, power outages, and system-wide problems.

The Influence of Privacy on Customer Satisfaction of Digital Customer Service Machine Users at PT Bank Central Asia, Tbk KCP A. Rivai

The results of this study indicate that the indicator of customer personal data not *being shared* with other parties shows the lowest value. With the launch of this digital customer service machine, several customers interviewed by the author said that they still had doubts about the storage of customer data, as they were afraid that their personal data could be hacked and leaked.

    Respondents' responses to customer transaction information indicators through digital CS machines were securely maintained, showing the highest scores. Digital CS machines are still relatively new in BCA banking services, and employees provide guidance and give full confidence to customers who have used these digital

CS machines ( ) so that they can trust that their information and personal data are secure and will not be leaked.

The Impact of Responsiveness on Customer Satisfaction Among Users of Digital Customer Service Machines at PT Bank Central Asia, Tbk KCP A. Rivai

The results of this study indicate that the BCA *call centre* (Halo BCA) indicator for providing clear instructions/information when transaction problems occur through the digital CS machine received the lowest score. Some customers complained that they were unable to find a solution when using the Halo BCA *call centre* service. Some customers who are unfamiliar with digital services still find it difficult to understand. The customer service that can be selected to provide 24/7 service, including holidays, is only available through the Halo BCA *call centre*.

Respondents' responses to the indicator of customer ease in contacting *the* BCA *call centre* (Halo BCA) showed the highest score. Based on the responses of respondents who are BCA bank customers, they stated that it was easy to contact the Halo BCA *call centre*, as they were able to connect directly to *customer* service when they called.

The Impact of Contact on Customer Satisfaction Among Users of Digital Customer Service at PT Bank Central Asia, Tbk KCP A. Rivai

The results of this study indicate that the *call centre* service indicator (Halo BCA) is always available, showing the lowest value. This indicates that at certain times, especially at night, the Halo BCA *call centre* service is not very quick to answer compared to during operating hours (morning-afternoon). Respondents' responses to the indicator BCA provides *call centre* services (Halo BCA), showed the highest score. Bank BCA provides a wide range of services to facilitate its customers in conducting transactions and handling complaints. This shows that Bank BCA provides the best service to all its customers so that Bank BCA customers can comfortably and safely conduct their financial transactions. Additionally, Bank BCA offers a wide range of services to meet all customer needs, both *online* and offline, with the best possible service.

4 Conclusion

Efficiency, fulfilment, system availability, privacy, responsiveness, and *contact* have a positive and significant impact on customer satisfaction among users of the digital *customer service* machine at PT Bank Central Asia, Tbk KCP A. Rivai.

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