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Analysis of The Influence of System Quality, Information Quality, Service Quality on Net Benefits in The Finance Billing Management System (FBMS)

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Abstract. The information system applied at BP Batam is the Finance Billing Management System (FBMS). FBMS manages financial reports from budgeting, receipts, and expenditures. This study examines how the quality of the system, information, and service influence user satisfaction and how user satisfaction impacts the net benefits of implementing the FBMS application at BP Batam. This research model adopts the DeLone and McLean IS success model. This research uses quantitative research. The population in this study were employees of BP Batam with a sampling technique using a nonprobability sampling method. The sample used was 60 FBMS users. The findings indicate that user satisfaction is influenced by system, information, and service quality, which in turn influences net benefit.

Keywords: system quality, information quality, service quality, user satisfaction, net benefit, DeLone and McLean IS success model

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Introduction

An information system is a container for a series of information combined into a single unit in technology. As technology develops, the influence of information systems is experiencing rapid growth (Munawir, 2018). Information systems are not only used within the scope of business; their use has spread to government.

The portrait of the National Electronic-Based Government System does not meet the approved target 2020 in the excellent predicate category, with an index of 2.6 or more. However, the information system is expected to improve the quality of the information produced. The government began using information systems to record all its financial reports during its development. One government agency that uses information systems to record financial reports is BP Batam.

BP Batam is a government agency regulated in PP Number 6 of 2011 concerning Financial Management in Batam Business Entities. BP Batam has used an electronic financial transaction system called Finance Billing Management Systems (FBMS) since 2012. The FBMS information system aims to make the financial transaction process transparent, effective, and accountable, contributing to good governance.

The FBMS system is an information system that handles financial management at BP Batam. It covers various aspects, such as budgeting, receipts, expenses, and financial reports. The system has been integrated into every work unit at BP Batam and has effectively managed all financial activities required by the Batam Business Board. However, despite its successful implementation, the FBMS information system has never been evaluated for its level of success. This is a significant concern as system success is crucial for company operations. Therefore, assessing the system's success is necessary and forms the basis of this research.

Berna Yazici (2016) examined internal user satisfaction and acceptance of the E-Just system by 8,840 respondents who worked in justice services in Turkey. The variables used are information quality, system quality, service quality, design quality, trust, anxiety, internal user satisfaction, perceived user-friendliness, and perceived usefulness. The results state that design quality positively and significantly affects users' perceived ease of use. User satisfaction is greatly influenced by the quality of information, system, and service. On the other hand, perceived usefulness is greatly influenced by user convenience.

Puspitarini (2018) surveyed 119 users of the Accrual Planning and Financial Information System (SIRKA). The variables used are system quality, quality information, quality service, user satisfaction, and net benefit. The research results prove that information and system quality positively and significantly affect user satisfaction and net benefit. The impact of service quality on user satisfaction and net benefits is insignificant and negative. In contrast, user satisfaction significantly and positively affects net benefits.

Tulodo (2019) investigated the impact of a Care Application on employee performance by surveying 50 users. System quality, perceived usefulness, information quality, individual performance, and user satisfaction are the variables used. His research revealed that the quality of the system did not have a significant positive effect on user satisfaction. However, the quality of information and its perceived usefulness considerably positively impacted user satisfaction. Moreover, user satisfaction and overall satisfaction had a significant and positive effect on individual performance.

This research uses the DeLone and McLean (2003), which has proven successful in measuring the success of information systems. DeLone and McLean (2003) updated their research model to make it more perfect, first, namely combining organizational impact and individual impact and becoming a net benefit; second, adding the service quality variable; third, namely adding the intention to use variable to the use variable to measure user satisfaction, fourth, namely adding the feedback from net benefit to the use and user satisfaction variables. There are 2 (two) reasons behind its removal of the desire to use a variable (intention to use) on the user variable (use), namely: first, this research is a replication of previous research. Second, the FBMS system must be used by BP Batam employees in order to improve employee performance at work. This research seeks to understand the level of success in the FBMS system by examining the relationship between variables used in the DeLone and McLean (2003) information system success model.

This research replicates the work of Fathoni, Indah, and Suharso (2017). The first difference between this research and previous research is that the previous researcher examined the KRS—Online system at the University of Muhammadiyah Malang. In contrast, this research examined the FBMS system at BP Batam. The second difference is that the sample used in previous research was students from the 2012 and 2013 classes. This research uses a sample of FBMS

system users at BP Batam based on predetermined characteristics.

Literature review

DeLone and McLean IS Success Model

Researchers have widely used the success of information, and it has been proven to provide beneficial contributions to the understanding of information systems (Munawir, 2018). The DeLone and Mclean model became known in 1992, which states that the success of an information system cannot be seen from one measure but rather from many interrelated measures in forming the success of the information system model. DeLone and McLean 's IS Success model is summarized into 6 (six) parts: system quality, information quality, use, user satisfaction, individual impact, and organizational impact.

The success of DeLone and McLean's (2003) IS Success Model in information systems has undergone a perfect update as proven by their research, first, namely combining individual impact and organizational impact into net benefits; second, namely adding variables service quality; third, namely adding the intention to use variable to the use variable to measure user satisfaction, fourth, namely adding the feedback from the net benefit variable to the use and user satisfaction variables.

Research hypothesis

DeLone and Mclean (1992) defined information system quality as the quality supported by a system, which includes hardware, software, policies, and procedures. This quality should provide the information required by users and should be easy to access, easy to use, and highly reliable. Davis's research results (1989) also support this, stating that ease of technology is essential for an individual's intentions to use technology.

Tajuddin et al. (2019) state that measuring user satisfaction helps determine the gap between users' expectations and the actual quality of the system they receive rather than assessing the system's functional capabilities. The quality of the system determines user decisions to use information systems. Adequate system quality, of course, will influence the satisfaction of users of the information system. Thus, system quality has a relationship with user satisfaction.

Research conducted by Prasojo and Pratomo (2015) found that system quality positively and significantly affects user satisfaction variables. Hudin and Riana (2016) also support this conclusion.

H1: System quality affects user satisfaction on FBMS

Munawir (2018) states that information results from data processing, which is entered into the system and will produce output in the form of information. The more quality information is inputted, the higher user satisfaction can be. Davis (1989) also states that ease of use of technology is a significant consideration for individuals' intention to use technology. Tajuddin et al. (2019) use user satisfaction to measure the magnitude of the gap between users' expectations and the actual quality of the system received rather than measuring the functional capabilities of information systems.

The better the system quality, the higher the quality of information produced, which influences user satisfaction with the information system. The findings of Rudini's study conducted in 2015 indicate that user satisfaction variables are positively and significantly influenced by the quality of information. Mangun Buana and Wirawati (2018) also support this research and state that information quality positively and significantly affects user satisfaction variables.

H2: Information quality affects user satisfaction on FBMS

Customers can only evaluate service quality, which is a benefit that a business can offer. Customers have the right to evaluate the quality of the service they receive from a company as a reward for the money they spend. This evaluation compensates for the expenses they incur. Thus, sound quality is seen from the provider's point of view or perception.

Service quality regarding information systems consists of hardware, software, procedures, and decisions that can provide the information needed by users, such as ease of use, ease of access, and system reliability. Davis (1989) also states that ease of use of technology is a significant consideration for individuals' intention to use technology. User satisfaction is a measure used to identify the difference between users' expectations and the actual quality of the system they receive. It is not a measure of the functional capabilities of information systems (Tajuddin et al., 2019). The quality of service can be determined by how satisfied the user is with the

service provided. Poor service quality directly indicates a link between the quality of service and user satisfaction when it does not meet the user's expectations.

The study by Nurhayati, Fauziah, and Halimatusadiah (2016) has established that service quality factors positively and significantly influence user satisfaction. Berna Yazici (2016) supports this research, stating that the study's results significantly and positively affect user satisfaction variables through service quality.

H3: Service quality affects user satisfaction on FBMS

Davis (1989) states that ease of use of technology is a significant consideration for individual intention to use technology. User satisfaction measures the gap between expectations and the quality of the system received, not its functional capabilities (Tajuddin et al., 2019). Meanwhile, net benefits are the perceived benefits of individual and organizational impact in implementing information systems (Davis, 1989).

User satisfaction significantly impacts the sustainability of the system used; the more users use the system, the higher user satisfaction is expected to be, which is expected to contribute net benefits to government agencies or companies. Net benefits have a relationship with user satisfaction. If only some feel satisfied with the system used, it will not be considered sustainable.

DeLone and McLean (1992) also state that individual impact indicates that information systems provide a better understanding of users when making decisions and change the perception of individuals and organizations regarding the importance of information systems. Net benefits are a combination of individual and organizational impact as an increase in information systems that affect not only individuals or organizations but as a whole (Seddon, 1997).

Research by Fathoni, Indah, and Suharso (2017) proved that user satisfaction positively and significantly affects the net benefit variable. Tulodo (2019) states that user satisfaction positively and significantly affects the net benefits variable. According to Puspitarini (2018), user satisfaction has a positive and significant relationship with net benefits, which means that when customers are happy with a product or service, it enhances the net benefits component.

H4: User satisfaction affects net benefits on FBMS.

Figure 1 presents the conceptual model of the study.

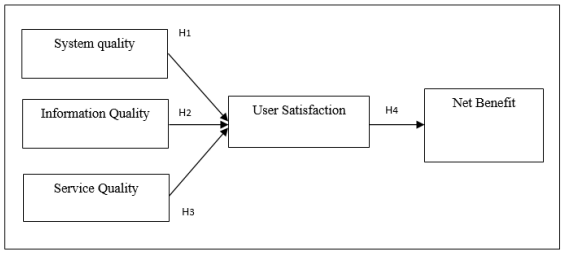

Fig. 1. Conceptual model

Methodology

This research is a type of quantitative research that uses data collection techniques through a questionnaire adapted from Fathoni, Indah, and Suharso (2017), with a rating scale consisting of 1 to 4, where the number 1 indicates strongly disagree, and number 4 indicates strongly agree. The questionnaire will go through validity and reliability tests to ensure accuracy. The population of this study consists of 150 employees of BP Batam who use the FBMS application. The sampling technique used in this study was the Slovin formula. This formula is used to calculate the sample size (n) required for a given population size (N) and margin of error (e). The formula is computed as $n = N / (1+Ne^2)$. In this research, the population size was 150 employees, and the margin of error tolerance was set at 10%. Therefore, the sample size required for the study was 60 employees. Data analysis will use multiple regression methods to answer hypotheses H1, H2, and H3. Meanwhile, to answer hypothesis H4, we will use the simple regression analysis method. In addition, this study will test classical assumptions, including normality, multicollinearity, and heteroscedasticity tests, to ensure the validity of the analysis conducted.

Finding

Demographic Analysis

Table 1 displays the demographic characteristics. Based on the table, most respondents are male, with a 53% percentage. Regarding age, 58% of respondents are in the age range of 30-40 years. Finally, based on work experience, 82% of respondents have work experience of more than four years.

Table 1
Summary of Respondent Demographic Statistics

Category	Profile	Frequency	Percentage
Gender	Male	32	53
	Female	28	47
Age	< 30	6	10
	30-40	35	58
	> 41	19	32
Experience	< 1	6	10
	2-3	5	8
	> 4	49	82

Validity and Reliability Test Results

The validity test evaluates the questionnaire's effectiveness given to respondents. One of the techniques used in assessing the validity of questionnaire questions is product moment and Pearson correlation, where if the calculated correlation coefficient (r) exceeds the value listed in the table, the question is considered valid (Ghozali, 2016). In a sample of 60 respondents, the r table value is 0.250. Based on the statistical test results, each question in the system quality, information quality, service quality, user satisfaction, and net benefit variable indicators has a r value more significant than the r table, indicating that each question is considered valid.

Reliability tests assess an instrument's consistency or stability over time. The instrument is reliable if its Cronbach alpha value exceeds 0.6 (Ghozali, 2016). Based on the results of statistical tests, each question in the system quality, information quality, service quality, user satisfaction, and net benefit variables meets the reliability criteria with an alpha Cronbach value that exceeds 0.60, indicating the consistency of the questions in the instrument.

Classical Assumption Test Results

The normality test evaluates whether the observed data follows a normal distribution, an essential assumption in many parametric statistical analyses. The One-Sample Kolmogrov-Smirnov test was used to assess the normality of the data. Data is said to be normally distributed if the significance value (Asymp. sig: 2-tailed) of the test is more significant than 0.05. The normality test results in this study indicate that the data for system quality, information quality, and service quality on user satisfaction and the variable of user satisfaction on net benefits meet the assumption of normal distribution.

The purpose of the multicollinearity test is to detect any issues related to multicollinearity that may exist between independent variables. This problem can distort the results of regression analysis. The tolerance and VIF values are used as indicators. If the tolerance value is more significant than 0.1 or the VIF is less than 10, then multicollinearity is not indicated. In the context of this study, each variable fulfills these criteria, indicating that there is no multicollinearity problem.

The heteroscedasticity test aims to check whether the residual variance in the regression model is not constant. This test may affect the interpretation of the regression results. Detection is done through graphical analysis, specifically by using a scatterplot of the predicted value (ZPRED) and the residual value (SRESID). An irregular or unclear pattern on the scatterplot indicates the absence of heteroscedasticity. In the context of this study, the graphical analysis results show no indication of heteroscedasticity because the points on the scatterplot are evenly distributed and do not form a consistent pattern.

Linear regression test results

Table 2 shows the simple linear regression test results to answer hypotheses H1, H2, and H3, while Table 3 shows the simple linear regression test results to answer hypothesis H4.

Table 2
Multiple Linear Regression Test Results (H1, H2, H3)

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	Result
	Beta	Std.Error	Beta	T		
Constant	9,594	1,432		6,697	0,000	
System Quality	0,062	0,024	0,305	2,634	0,011	Supported
Information Quality	0,099	0,045	0,255	2,199	0,032	Supported
Service Quality	0,115	0,046	0,288	2,480	0,016	Supported
Dependent Variable: User Satisfaction; R = 0,499, R^2 = 0,249, Adjusted R Square = 0,209						

Table 3
Simple Linear Regression Test Results (H4)

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	Result
	Beta	Std.Error	Beta	T		
Constant	2,209	6,026		0,367	0,715	
User Satisfaction	3,774	0,419	0,815	9,008	0,000	Supported
Dependent Variable: Net Benefit; R = 0,814; R2 = 0,662; Adjusted R Square = 0,637						

Based on Table 2, hypotheses H1, H2, and H3 are supported because of the Sig. Value is less than 0.05. The adjusted R square value is 0.209 or 20.9%. The system quality, information quality, and service quality variables account for 20.9% of the variance in user satisfaction, with other variables explaining the remaining 79.1%.

Table 3 supports hypothesis H4 as the Sig. Value is less than 0.05. The adjusted R square value is 0.637 or 63.7%. This result means that the user satisfaction variable can explain the effect of the net benefit variable by 63.7%, while other variables explain the remaining 36.3%.

Discussion

Hypothesis 1 (H1) is proven based on the regression analysis results. This result shows that system quality has a significant effect on user satisfaction. According to DeLone and Mclean (1992), information system quality refers to the quality of various elements such as hardware, software, policies, and procedures that provide the information users need, including ease of use, accessibility, and system reliability. Davis (1989) also revealed that ease of use of technology is an essential factor in individual intention to adopt technology. User satisfaction is a measure of how well a system meets the expectations of its users. It is not just about the technical functionality of the system but also about how well it aligns with the users' needs and preferences. According to Tajuddin et al. (2019), user satisfaction is an essential aspect of evaluating the quality of an information system. Previous research findings also support the idea that system quality influences user satisfaction, as shown by Prasojo and Pratomo (2015), Hudin and Riana (2016) and Idkhan and Idris (2023). Therefore, the higher the quality of the system used, the higher the level of user satisfaction. Thus, system quality is vital in determining user satisfaction in information systems.

The second hypothesis (H2) is confirmed based on the regression analysis results. This result means that information quality has a significant impact on user satisfaction. Munawir (2018) describes information as the result of a data process that is entered into the system and produces output in the form of information. Good information quality can increase user satisfaction. Davis (1989) also emphasizes that ease of use of technology is an essential factor in individual decisions to adopt technology. User satisfaction measures the extent of the gap between expectations and the reality of system quality received by users, not just the technical functions of information systems (Tajuddin et al., 2019). Previous research, such as that conducted by Rudini (2015), Mangun Buana and Wirawati (2018) and Apsari and Astika (2020), shows that information quality influences user satisfaction. Therefore, the higher the quality of information used, the higher the level of user satisfaction. Conversely, if the quality of information meets user expectations, user satisfaction will remain high. Thus, information quality is key in determining user satisfaction with information systems.

The third hypothesis (H3) is proven based on the regression analysis results. This result means that service quality has a significant influence on user satisfaction. According to DeLone and McLean (1992), information system service quality includes various aspects such as hardware, software, procedures, and decisions that provide the information users need, including ease of use, accessibility, and system reliability. Davis (1989) also emphasizes that ease of use of technology is an essential consideration in individual decisions to adopt technology. Tajuddin et al. (2019) used user satisfaction to measure the extent of the gap between users' expectations and the reality of the system quality they received, focusing on more than just the technical functions of information systems. Previous research, such as that conducted by Nurhayati, Fauziah, and Halimatusadiah (2016), Berna Yazici (2016), and Camizán and Edelia (2023), shows that service quality positively and significantly affects user satisfaction. Therefore, the higher the quality of service used, the higher the level of user satisfaction. If users are satisfied with the services provided, the service quality is considered good; conversely, it is considered poor if it does not meet user expectations. Thus, service quality is vital in determining user satisfaction with information systems.

The fourth hypothesis (H4) is confirmed based on the regression analysis results. This result means that user satisfaction has a significant impact on net benefits. Davis (1989) emphasizes that ease of technology is a critical factor in an individual's decision to use technology. Tajuddin et al. (2019) evaluate user satisfaction by measuring the gap between users' expectations and the actual quality of the system they receive, focusing on its functional capabilities and overall quality. DeLone and McLean (1992) also show that individual impact indicates that information systems provide users with a better understanding of decision-making and change individual or organizational perceptions about the importance of information systems. Net benefits combine individual and organizational impact, which are improvements from information systems that affect individuals or organizations (Seddon, 1997). Previous research, such as that conducted by Fathoni, Indah, Suharso (2017), Tulodo (2019), Puspitarini (2018), and Rahayu, Sudarno, and Komardi (2023), shows that user satisfaction has a significant impact on net benefits. Therefore, the more users who are satisfied with the system, the higher the net benefits that can be provided to government agencies or companies. Conversely, if few users feel dissatisfied with the system used, it is a consideration for the sustainability of the system. Thus, user satisfaction significantly influences the net benefits of using the system.

Conclusion

This study aims to identify whether there is an influence between system quality, information quality, service quality, user satisfaction, and net benefits. Based on the results of regression analysis, all hypotheses are supported. However, this study has some limitations that need improvement and development for future research. One of the limitations is the limited population and samples, so the conclusions of this study cannot be generally applied to assess the successful use of the FBMS system in BP Batam. It is recommended that future research expands the research sample to include all units and employs more accurate sampling techniques to enhance the representation of the sample from the relevant population. In addition, it is also suggested that research variables such as usage intention, actual usage, and perceived usefulness be added. Overhauling or developing the research model by considering the use of Structural Equation Modeling (SEM) models may be a valuable step in strengthening the analysis of the relationships between variables in this study. Besides, BP Batam should prioritize continuously improving the FBMS application's system, information, and service quality. It means regularly assessing system performance, ensuring the accuracy and timeliness of information provided through the application, and providing excellent user support. By focusing on these aspects, BP Batam can maximize user satisfaction and achieve the intended net benefits of the FBMS application.

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