



The Application of Delone and Mclean Framework to Analyze the Relationship Between Customer Satisfaction and User Experience of Mobile Application

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Abstract

This study aims to determine how much user satisfaction is based on the influence of the user experience of e-commerce applications using the modified DeLone & McLean model by adding perceived utilitarian and perceived hedonic variables as the main dimensions representing the IT user experience. The population of this research is users of e-commerce applications as buyers using the purposive sampling technique. While data analysis uses the PLS-SEM approach with the help of SmartPLS. The study's findings show that while perceived utilitarianism and service quality have little bearing on user satisfaction, perceived hedonistic behavior, system quality, and information quality do. Three of the many hypotheses that were put forth and rejected were: the influence of service quality on user contentment and use, and the influence of perceived utilitarianism on user satisfaction.

Keywords: E-commerce, User Satisfaction, User Experience, Delone & Mclean, PLS-SEM.

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1. Introduction

The public is now beginning to place a high demand on the development of business in cyberspace in the form of online stores or online buying and selling operations (e-commerce). Electronic commerce, or simply "e-commerce," is the practice of carrying out commercial transactions online using internet-enabled devices and internet-based media [1]. Because it enables interactions between consumers and sellers and makes it simpler for purchasers who don't want to travel to purchase an item, e-commerce is thought to be very profitable for its users. The creation of an online marketplace where businesses can engage in B2B e-commerce and other e-business activities is one type of e-commerce. E-marketplaces can be said to be the second wave of e-commerce and expand the combination of consumer businesses (B2B, C2B, and C2C) into B2B [2]. The core offering of e-marketplaces is to facilitate trade by bringing buyers and sellers together in accordance with their demands.

Indonesia has the fastest-growing e-commerce industry in the entire world. In 2019, it is anticipated that the Indonesian e-commerce market would grow by 31% to US\$ 3.8 billion, driven by strong population and economic growth as well as a rise in the variety of goods being sold by e-commerce businesses. In keeping with this, Indonesia's e-commerce industry is expanding quickly every day, resulting in an intensifying level of rivalry between e-commerce businesses. Players in the e-commerce industry compete not only for customers but also for application installations, website visits, staff, and social media followers. This comparison can be seen in the map of e-commerce competition in quarter 1 (Q1) and quarter 2 (Q2) of 2019 (iPrice Group, 2019). The current technological era's extensive use of smartphones has also caused the e-commerce industry to start adapting and developing into mobile commerce (M-Commerce). People who already engage in online purchasing are starting to shift from desktop to mobile due to the flexibility of smartphones that can satisfy human requirements. This was what later became an opportunity for Shopee to emerge as a pioneer of mobile marketplaces in Southeast Asia [3]. Shopee is one of the most popular marketplace applications (iPrice Group, 2019). According to the CEO of the application, Chris Feng, this company is just one of many that capitalize on e-commerce business potential by energizing the mobile marketplace segment with their mobile app to ease the purchasing and selling of goods and services via mobile devices [4]. Applications are accessible on iOS (App Store) and Android (Google Play) smartphones. However, as a marketplace that enlivens the mobile segment, it has a big challenge competing with many other previous e-commerce sites such as Tokopedia, Bukalapak, Lazada, and others. Along with the fast and

diverse growth of e-commerce, it has resulted in an upsurge in rivalry; to succeed in this competition, e-commerce firms and marketplace operators must be able to satisfy their users [5].

User satisfaction is still a top priority in the world of e-commerce and is crucial to the success of the industry. According to past researchers' findings, user satisfaction is widely regarded as the most crucial indicator of a system's performance [6]. Then again, to continue to fulfill user satisfaction, something more than just functionality is needed in this technology, namely the involvement of the user experience, which places more emphasis on the feelings of fun and enjoyment of the technology [7]. Christin Djuarto, Head of Business Development at Shopee, claimed that the company primarily concentrates on customer experience. Here, e-commerce provides a one-stop mobile experience with a variety of features to enhance the user experience. However, in practice, functionalities and applications continue to have issues. This is demonstrated by complaints that users of mobile applications have posted on the Google Play Store and the App Store [8].

Applications frequently experience system and service quality issues as a result of user complaints. Although user satisfaction increases as service quality does, this is not always the case. Additionally, user happiness is positively and significantly impacted by service quality [9]. On the other hand, if an information system has good system quality and can satisfy its users, it can be trusted [10]. System quality, service quality, and information quality are the characteristics that are the key focus to support users or consumers when purchasing on an e-commerce site because they will further boost user happiness, as well as having the most significant impact on users' ability to get the best experience, which is directly proportional to their satisfaction if an application or system has good facilities in terms of system quality, service quality, and also the quality of information provided to users [11][12]. Therefore, the planners and developers need to increase the quality of the application, including service quality, system quality, and information quality, so that the implementation of application features can provide more benefits and in order to maximize these features and the performance of the application [13]. Of course, by paying attention and taking the user experience into account [14]. Because the development of these features will be in vain if they cannot provide benefits and a pleasant experience to the users who use them, then, by looking from the perspective of user experience, you can directly find out someone's response resulting from using a system, product, or service [15][16]. In addition, organizers and developers need to consider user experience from a user experience perspective because, from that perspective, users will evaluate the value they might get from a business. Perceived value from users, namely perceived utilitarian value and hedonic value, is an important element in online shopping and, at the same time, becomes the main dimension that represents the IT user experience [17][18]. Perceived value is a determining component of user happiness and has a considerable positive impact on it, according to various research [19][20]. For this reason, in this case, user experience is an important thing to consider when implementing or developing features and improving the performance of an application.

2. Research Methods

This study uses a quantitative approach, hence a process for gathering and analyzing data is required. Purposive sampling was the sampling method employed in this study. The population in this study is the entire number of students. In this study, reached and exceeded the minimum number of samples required, namely 396 samples, so that it could be said that this study met the requirements. data collection using observation, literature study, and questionnaires. The D&M E-Commerce Success Model, created by Delone and Mclean in 2004 as the fundamental research model, is the model that was employed in this study based on the literature review that was conducted. The software that supports this research includes Ms. Word, which is used for writing reports, to assist in processing demographic data for researchers using Ms. Excel, Mendeley Desktop for writing references in research reports, and SmartPLS version 3.2.8, which is used to help process data resulting from distributing questionnaires. Additionally, the PLS-SEM approach is the data analysis technique used in this work.

3. Results and Discussion

Based on gender, it is known that of the 423 respondents, the majority were female (267 respondents, or 63%), and the rest were male (167 respondents, or 37%). Most of them were dominated by respondents from the Faculty of Science and Technology, with as many as 60 respondents (14%). Meanwhile, the least number of respondents were respondents from the Faculty of Da'wah and Communication Sciences, with a total of 15 respondents (4%). that as many as 220 respondents (52%) had good experience using the application and as many as 113 respondents (27%) had very good experience using the application; the remaining 90 respondents (21%) had quite good experience using the application; and there were no respondents who had bad experiences (0%). 212 respondents (50%) use applications with a range of 1-3 times per month, 84 respondents (20%) use applications with a range of 4-6 times per month, 75 respondents (18%) use applications with a range of more than 10 times per month, and as many as 52 respondents (12%) use the application with a range of 7-10 times per month.

Based on the structural analysis of the model's t-test findings, it shows that H1, namely the relationship $IQ \rightarrow U$ is accepted. It can be said that information quality (IQ) has an influence on use (U). In addition, it is also proven by the results of the path coefficient (β) of 0.413, which means that the hypothesis $IQ \rightarrow U$ has a significant positive

effect. It can be said that accuracy, relevance to needs, completeness, timeliness, and understandability, which are part of the information quality indicators, are able to influence and have a significant relationship to the variable use. The findings of this hypothesis are in line with those of several research, which show that information quality (IQ) significantly and favorably affects utilization (U), which means that good quality information will produce useful information for users and will have a positive impact on their use of it.

Based on the structural analysis of the model's t-test findings, it shows that H2, namely the $IQ \rightarrow US$ relationship, is accepted. It can be said that information quality (IQ) has an influence on user satisfaction (U). In addition, it is also proven by the results of the path coefficient (β) of 0.134, which means that the hypothesis $IQ \rightarrow U$ has a significant positive effect. It can be said that accuracy, relevance to needs, completeness, timeliness, and understandability, which are part of the information quality indicators, are able to influence and have a significant relationship to the variable user satisfaction. The results of this hypothesis are consistent with several other studies that state that information quality (IQ) has a positive and significant effect on user satisfaction (US), which means that good-quality information will produce useful information for users so that they will feel satisfied in terms of the information quality generated by the system.

Based on the structural analysis of the model's t-test findings, it shows that H3, namely the $SQ \rightarrow PU$ relationship, is accepted. It can be said that system quality (SQ) has an influence on perceived utilitarianism (PU). In addition, it is also proven by the results of the path coefficient (β) of 0.582, which means that the hypothesis $SQ \rightarrow PU$ has a significant positive effect. Then it is also supported by the f^2 value of this hypothesis, which has a large influence value, and q^2 , which has a medium influence value. It can be said that the system quality indicator section, which consists of reliability, response time, security, and ease felt by users in using the application system, is able to influence and have a significant relationship to perceived utilitarian variables. The results of this hypothesis are consistent with several other studies that state that system quality (SQ) has a positive and significant effect on perceived utility (PU), which means that a system is reliable if it has good system quality and is able to provide benefits to its users.

Based on the structural analysis of the model's t-test findings, it shows that H4, namely the $SQ \rightarrow PH$ relationship, is accepted. It can be said that system quality (SQ) has an influence on perceived hedonicity (PH). In addition, it is also proven by the results of the path coefficient (β) value of 0.619, which means that the $SQ \rightarrow PH$ hypothesis has a significant positive effect. Then it is also supported by the f^2 value of this hypothesis, which has a large influence value, and q^2 , which has a medium influence value. It can be said that the system quality indicator part, which consists of reliability, response time, security, and ease felt by users in using the application system, is able to influence and have a significant relationship to the perceived hedonic variable. The results of this hypothesis are consistent with several other studies that state that system quality (SQ) has a positive and significant effect on perceived hedonicity (PH). a pleasant experience for users in using this technology so as to foster a sense of pleasure and satisfaction.

Based on the results of the t-test on the structural analysis of the model, it shows that H5, namely the $SQ \rightarrow U$ relationship, is accepted. It can be said that system quality (SQ) has an influence on use (U). In addition, it is also proven by the results of the path coefficient (β) of 0.312, which means that the $SQ \rightarrow U$ hypothesis has a significant positive effect. It can be said that the system quality indicator section, which consists of reliability, response time, security, and ease felt by users in using the application system, is able to influence and have a significant relationship to the use variable. The results of this hypothesis are in accordance with the results of several studies that state that system quality (SQ) has a positive and significant effect on use (U), which means that an increase in system quality will have an impact on increasing system use.

Based on the results of the t-test on the structural analysis of the model, it shows that H6, namely the $SQ \rightarrow US$ relationship, is accepted. It can be said that system quality (SQ) has an influence on user satisfaction (US). In addition, it is also proven by the results of the path coefficient (β) of 0.195, which means that the $SQ \rightarrow US$ hypothesis has a significant positive effect. It can be said that the system quality indicator section, which consists of reliability, response time, security, and ease felt by users in using the application system, is able to influence and have a significant relationship to the variable user satisfaction. The results of this hypothesis are consistent with the results of several studies, which state that system quality (SQ) has a positive and significant effect on user satisfaction (US). It can be interpreted that system quality is proportional to the level of satisfaction felt by users with the technical and functional performance of the system.

Based on the results of the t-test on the structural analysis of the model, it shows that H7, namely the $SERVQ \rightarrow PU$ relationship, is accepted. It can be said that service quality (SERVQ) has an influence on perceived utilitarianism (PU). In addition, it is also proven by the results of the path coefficient (β) of 0.123, which means that the $SERVQ \rightarrow PU$ hypothesis has a significant positive influence. It can be said that responsiveness, assurance, and empathy, which are part of service quality indicators, are able to influence and have a significant relationship to perceived utilitarian variables. The results of this hypothesis are consistent with research conducted by previous researcher, which states that service quality (SERVQ) has a significant positive effect on perceived utilitarian (PU), which means that good service quality directly influences and provides value benefits for users.

Based on the results of the t-test on the structural analysis of the model, it shows that H8, namely the SERVQ → PH relationship, is accepted. It can be said that service quality (SERVQ) has an influence on perceived hedonicity (PH). In addition, it is also proven by the results of the path coefficient (β) value of 0.134, which means that the SERVQ → PH hypothesis has a significant positive effect. It can be said that responsiveness, assurance, and empathy, which are part of service quality indicators, are able to influence and have a significant relationship to perceived hedonic variables. The results of this hypothesis are in accordance with previous research, which states that service quality (SERVQ) has a significant positive effect on perceived hedonic (PH), which means that good service quality, as expected, will give the impression of a pleasant experience for users.

Based on the results of the t-test on the structural analysis of the model, it shows that H9, namely the SERVQ → U relationship, is rejected. It can be said that service quality (SERVQ) has no influence on use (U). In addition, it is also proven by the results of the path coefficient (β) value of 0.010, which means that the SERVQ → U hypothesis has an insignificant relationship, and based on the f^2 and q^2 values, this hypothesis also has a small effect value. It can be said that responsiveness, assurance, and empathy, which are part of the service quality indicators, do not significantly influence use. Then it is known that based on the values of the three indicators in service quality, there is a responsiveness indicator that has the smallest value in the path coefficient test with a value of 0.875, so the value of this indicator represents the service quality variable with its relationship to use, which is declared rejected. The quality of service produced does not affect someone's use of technology. It is appropriate that service quality (SERVQ) not affect use (U).

Based on the results of the t-test on the structural analysis of the model, it shows that H10, namely the SERVQ → US relationship, is rejected. It can be said that service quality (SERVQ) has no influence on user satisfaction (US). In addition, it is also proven by the results of the path coefficient (β) of 0.011, which means that the SERVQ → US hypothesis has an insignificant relationship, and based on the f^2 and q^2 values, this hypothesis also has a small effect value. It can be said that responsiveness, assurance, and empathy, which are part of the service quality indicators, do not significantly influence user satisfaction. Then it is known that based on the values of the three indicators of service quality, there is a responsiveness indicator that has the smallest value on the path coefficient test with a value of 0.875, so the value of this indicator represents the service quality variable with its relationship to user satisfaction, which is declared rejected. Application users tend to think that the service support provided does not affect user satisfaction when using this application because the services provided are considered unsatisfactory for users, so it does not affect user satisfaction. Service quality (SERVQ) does not affect user satisfaction (US).

Based on the results of the t-test on the structural analysis of the model, it shows that H11, namely the relationship PU → US is rejected. It can be said that perceived utilitarianism (PU) has no effect on use (U). In addition, it is also proven by the results of the path coefficient (β) value of 0.042, which means that the PU → US hypothesis has an insignificant relationship, and based on the f^2 and q^2 values, this hypothesis also has a small effect value. It can be said that usefulness, efficiency, and productivity, which are part of the perceived utilitarian indicators, do not have a significant effect on user satisfaction. Then it is known that based on the values of the three indicators on perceived utilitarian, there is a productivity indicator that has the smallest value on the path coefficient test with a value of 0.834, so the value of this indicator represents the perceived utilitarian variable with its relationship to user satisfaction, which is declared rejected. The benefits felt by users are still unsatisfactory, but users are more satisfied with the hedonic value or pleasure they feel in using technology. A high level of user satisfaction is found in information technology that gives a pleasant impression to users when they use it, so that the use of technology is not only focused on functionality (utilitarianism) but can foster a sense of pleasure and satisfaction for users. The results of this hypothesis state that utilitarianism has no significant effect on user satisfaction.

Based on the results of the t-test on the structural analysis of the model, it shows that H12, namely the relationship PH → US is accepted. It can be said that perceived hedonicity (PH) has an influence on user satisfaction (US). In addition, it is also proven by the results of the path coefficient (β) value of 0.304, which means that the PH → US hypothesis has a significant positive effect. It can be said that enjoyable experience, attractiveness, and novelty, which are part of the perceived hedonic indicators, are able to influence and have a significant relationship to the variable user satisfaction. The results of this hypothesis state that perceived hedonic (PH) has a significant positive effect on user satisfaction (US), which means that the pleasant experience that users feel with a system will affect user satisfaction. A pleasurable experience increases online shopping satisfaction, so customers spend more time browsing other items.

Based on the results of the t-test on the structural analysis of the model, it shows that H13, namely the U → US relationship, is accepted. It can be said that use (U) has an influence on user satisfaction (US). In addition, it is also proven by the results of the path coefficient (β) of 0.276, which means that the hypothesis U → US has a significant positive effect. It can be said that daily use, nature of use, and intention to reuse, which are part of this use indicator, are able to influence and have a significant relationship to the variable user satisfaction. The results of this hypothesis state that use (U) has a positive and significant effect on user satisfaction (US). Usage must precede user satisfaction so that a good user experience will lead to increased user satisfaction.

Based on the results of the t-test on the structural analysis of the model, it shows that H14, namely the $U \rightarrow NB$ relationship, is accepted. It can be said that use (U) has an influence on net benefits (NB). In addition, it is also proven by the results of the path coefficient (β) value of 0.266, which means that the hypothesis $U \rightarrow NB$ has a significant positive effect. It can be said that daily use, nature of use, and intention to reuse, which are part of this use indicator, are able to influence and have a significant relationship to the net benefits variable. The results of this hypothesis state that use (U) has a positive and significant effect on net benefits (NB). So it can be said that the use of a system will produce benefits.

Based on the results of the t-test on the structural analysis of the model, it shows that H15, namely the $US \rightarrow NB$ relationship, is accepted. It can be said that user satisfaction (US) has an influence on net benefits (NB). In addition, it is also proven by the results of the path coefficient (β) value of 0.511, which means that the $US \rightarrow NB$ hypothesis has a significant positive effect, and based on the f^2 value, this hypothesis has an influence value at the intermediate level. It can be said that the performance level of the application that is appropriate, meets expectations, is able to make someone repurchase through the application, and intends to invite other people to make purchases using the application are things that affect the net benefits variable. So, when the user is satisfied with the application, the user tends to receive the benefits generated by the application. User satisfaction (US) has a positive and significant effect on net benefits (NB).

4. Conclusion

The variables perceived as hedonic, use, system quality, and information quality can increase user satisfaction in the application so that it can compete with other e-commerce sites. The relationship between service quality on use and user satisfaction was rejected because based on the results of the t-test in this study, the two relationships were below the t-test threshold and based on the values of f^2 and q^2 , this hypothesis also has a small effect value, so it can be said that the second hypothesis has no significant effect. This is related to complaints experienced by application users who tend to feel the quality of services provided is still not good, so in this study it does not affect their use and satisfaction as application users. The variables perceived utilitarian (PU) and perceived hedonistic (PH) are variables that represent the user experience. The relationship between perceived utilitarian (PU) and user satisfaction (US) has no significant effect because, based on the results of the path coefficient and t-test in this study, it is below the threshold, while the relationship between perceived hedonic (PH) and user satisfaction (US) has a significant influence. So, it can be interpreted that the level of application user satisfaction is influenced by a pleasant experience for users in using the application. Factors that influence application user satisfaction are information quality, system quality, perceived hedonic pleasure, and use, which significantly influence user satisfaction. Based on the results of data processing, it can be concluded that most users are satisfied with the application. The rejected variable is the relationship between the $SERVQ \rightarrow U$ and $SERVQ \rightarrow US$ variables, whose indicators include responsiveness, assurance, and empathy. Among the three indicators, the responsiveness indicator has the smallest value among the others. So that the relationship between the variables is rejected. So, the researchers suggest a review of the responsiveness indicator of the service quality variable. The relationship between $PU \rightarrow US$ variables, whose indicators included usefulness, efficiency, and productivity, was also rejected. While the indicator that has the smallest value is the productivity indicator, it can be said that this indicator causes the relationship between these variables to be rejected. So, the researchers suggest a review of the productivity indicator of the perceived utilitarian variable.

References

- [1] Atarita, I. (2016). *Improving Online Shopping Experience*. Retrieved August 14, 2019, from <https://id.wantedly.com/journals/140>
- [2] Arief, I., Fahriati, A. R., & Kartikasari, N. (2021). *Servqual scale to investigate patient satisfaction of pharmaceutical service at private dental hospital, Jakarta, Indonesia*. Proceedings of the 6th Batusangkar International Conference.
- [3] Arief, I., & Kartikasari, N. (2021). Evaluasi pengelolaan persediaan farmasi dan bahan medis habis pakai di suatu instalasi farmasi rumah sakit gigi dan mulut swasta kota Jakarta. *Phrase*, 1(1), 9-18.
- [4] Brunn, P., Jensen, M., & Skovgaard, J. (2002). e-Marketplaces: Crafting A Winning Strategy. *European Management Journal*, 286-298.
- [5] Cheong, J. H., & Park, M. C. (2005). Mobile internet acceptance in Korea. *Internet Research*, 125-140.
- [6] DeLone, W. H., & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research. The Institute of Management Sciences (Now INFORMS)*, 3(1), 60-95.
- [7] DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9-30. <https://doi.org/10.1080/07421222.2003.11045748>
- [8] Deng, L., Turner, D. E., Gehling, R., & Prince, B. (2010). User experience, satisfaction, and continual usage intention of IT. *European Journal of Information Systems*, 19(1), 60-75. <https://doi.org/10.1057/ejis.2009.50>
- [9] Andry, J. F., Tannady, H., & Gunawan, F. E. (2020). Purchase order information system using feature driven development methodology. *International Journal of Advanced Trends in Computer Science and Engineering*, 9(2), 1107-1112.
- [10] Guimaraes. (1992). The determinants of DSS success: An integrated model. *Decision Sciences*, 23, 409-430.

- [11] Gunawan, F. E., Andry, J. F., Tannady, H., & Meylovsky, R. (2019). Designing enterprise architecture using togap framework in meteorological, climatological, and geophysical agency. *Journal of Theoretical and Applied Information Technology*, 97(20), 2376-2385.
- [12] Hau, Y. S., Kim, G., & Kim, B. (2012). Antecedents of user satisfaction in the context of mobile data services: The moderating role of variety and rate of usage. *International Journal of Mobile Communications*, 10(6), 617–636. <https://doi.org/10.1504/IJMC.2012.049759>
- [13] iPrice Group. (2019). *The Map of E-commerce in Indonesia*. Retrieved April 16, 2019, from <https://iprice.co.id/insights/mapofecommerce/>
- [14] Islam, A. M., Khan, A. M., & Ramyah, T. (2011). The Adoption of Mobile Commerce Service among Employed Mobile phone Users in Bangladesh: Self-efficacy as A Moderator. *International Business Research*.
- [15] Laudon. (2012). *E-commerce 2012 (Business, Technology, Society)*. Pearson.
- [16] Negi, R. (2009). User's perceived service quality of mobile communications: experience from Ethiopia. *International Journal of Quality & Reliability Management*, 699–711.
- [17] Tannady, H., Andry, J. F., Gunawan, F. E., & Mayselste, J. (2020). Enterprise architecture artifacts enablers for it strategy and business alignment in forwarding services. *International Journal of Advanced Trends in Computer Science and Engineering*, 9(2), 1465-1472.
- [18] Tannady, H., Andry, J. F., Sudarsono, B. G., & Krishartanto, Y. (2020). Enterprise architecture using Zachman framework at paint manufacturing company. *Technol. Reports Kansai Univ*, 62(4), 1869-1883.
- [19] Nugroho, S. A. (2018). *Analysis of the Effect of Consumer Satisfaction on Consumer Loyalty in Online Shopping Through the Tokopedia Shopping Site*. Yogyakarta: Fakultas Ekonomi Universitas Islam Indonesia.
- [20] Putri, W. K., & Pujani, V. (2019). The influence of system quality, information quality, e-service quality and perceived value on Shopee consumer loyalty in Padang City. *The International Technology Management Review*, 8(1), 10. <https://doi.org/10.2991/itmr.b.190417.002>