

## EVALUATION MODEL OF YACHTERS INFORMATION SYSTEM IMPLEMENTATION SUCCESS USING DELONE AND MCLEAN TO INCREASE ORGANIZATION PERFORMANCE

WAHYU SARDJONO<sup>1</sup>, DESI MAYA KRISTIN<sup>2</sup>, GUSTIAN RAMA PUTRA<sup>3</sup>  
GUNTUR SALIM<sup>4</sup> AND SINGGIH SUBIYANTORO<sup>5</sup>

<sup>1</sup>Information Systems Management Department, BINUS Graduate Program – Master of  
Information Systems Management

<sup>2</sup>Information Systems Department, School of Information Systems  
Bina Nusantara University

Jl. K. H. Syahdan No. 9, Kemanggisian, Palmerah, Jakarta 11480, Indonesia  
{ wahyu.s; desi.kristin }@binus.ac.id

<sup>3</sup>Computer Science Study Program, Faculty of Mathematics and Natural Sciences  
Pakuan University

Jl. Pakuan, Tegallega, Bogor 16129, Indonesia  
gustian.rama@unpak.ac.id

<sup>4</sup>Post Graduate Program, Faculty of Economic Science  
University of Trisakti

Jl. Kyai Tapa No. 1 Grogol, Jakarta 11440, Indonesia  
guntursalim1979@trisakti.ac.id

<sup>5</sup>Education Technology Study Program, Faculty of Teacher Training and Education  
Universitas Veteran Bangun Nusantara

Solo, Central Java 57521, Indonesia  
singgihsbiyantoro@univetbantara.ac.id

Received March 2021; accepted June 2021

**ABSTRACT.** *Information systems use in government aims to serve public more effective and efficient. YachtERS information system is created to support government maritime programme, especially to simplified registration process for yacht visit from abroad. YachtERS information system performance measurement is needed to get information of success and weakness of YachtERS information system. The model from DeLone and McLean is used as a tool to analyze performance evaluation. The results of this research are showing positive relations between information quality and use, information quality and user satisfaction, system quality and use, system quality and user satisfaction, service quality and use, service quality and user satisfaction, use and user satisfaction, use and net benefit, and also user satisfaction and net benefit. Conclusion is the successful of information system more affected by user satisfaction based on the information quality, system quality and service quality.*

**Keywords:** Organization performance, Information system success, DeLone and McLean model, YachtERS, Evaluation model

1. **Introduction.** Currently, information systems have been used in various types of organizations with the aim of increasing organizational effectiveness and efficiency and even becoming a business strategic factor by creating new business innovations. Including in government organizations that are oriented towards public services and governance, information systems are used as a tool to provide and improve government services that are more transparent, efficient and accountable. Information systems are considered as

activators in the modernization of public services as well as a trigger for change in organizations. YachtERS application users are yacht owner tourists who will visit Indonesia to arrange entry permits in the form of a vessel declaration and port clearance. The authorized government agency will verify the data from the input provided by the user. Then the goods and people entry permit process will be carried out when the yacht arrives at the port mentioned. User data in the information system shows that the total number of registrants was 841 registrants in 2018 and 90 registrants in early 2019. Based on data on YachtERS users, YachtERS visitors and yacht tourism visit targets since the use of the YachtERS information system, statistics can be made as follows in Figure 1.

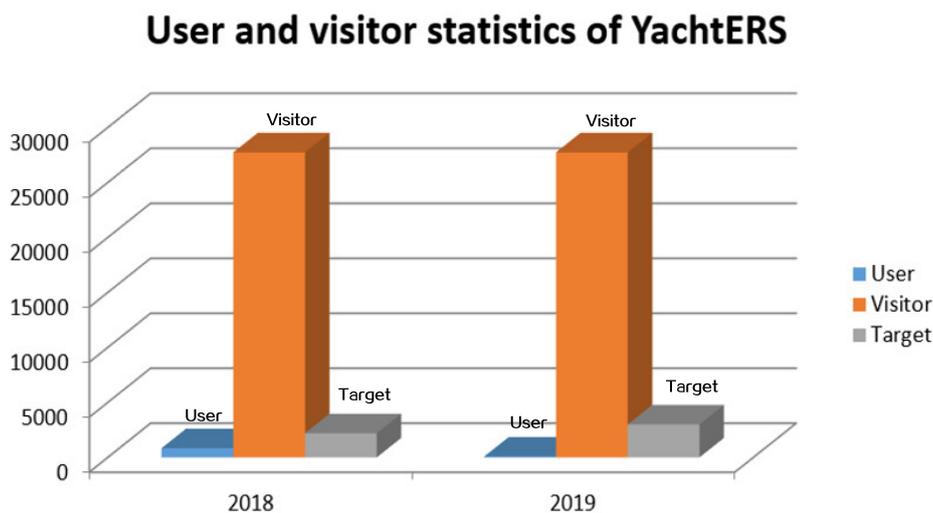


FIGURE 1. Statistics on the number of YachtERS users, visitors and the target of yacht tourism visits in 2018 and 2019

The registrant data and visitor data of the YachtERS information system compared to the yacht tourism target visits, still have a very high gap. The factor of the existence of the YachtERS information system should be able to facilitate the achievement of the target of yacht tourism visits. Therefore, the authors consider the evaluation of measuring the success of the implementation of the YachtERS information system needs to be done so that the expected results can be achieved. With this measurement, the factors that need to be improved to achieve the success of information systems.

## 2. Literature Review.

**2.1. DeLone and McLean's information systems success model.** Investments in information systems are generally carried out in large amounts so that organizations want to find out whether these investments have a good result for the organization [2]. The effectiveness of a system depends on many factors such as organization, environment and the people who use it [3]. One of the frameworks used to measure the success of information systems is the DeLone and McLean information systems success model. This model was proposed in 1992 after DeLone and McLean conducted a review of published research results on information systems, until finally they identified 6 independent variables in measuring the success of information systems, namely system quality, information quality, use, user satisfaction, individual impact, and organizational impact [4], as shown in Figure 2.

Organizational impact is influenced by individual impact and individual impact is influenced by use and user satisfaction. While use is jointly influenced by system quality and information quality, user satisfaction is also influenced by system quality and information quality. Then between use and user satisfaction they also influence each other.

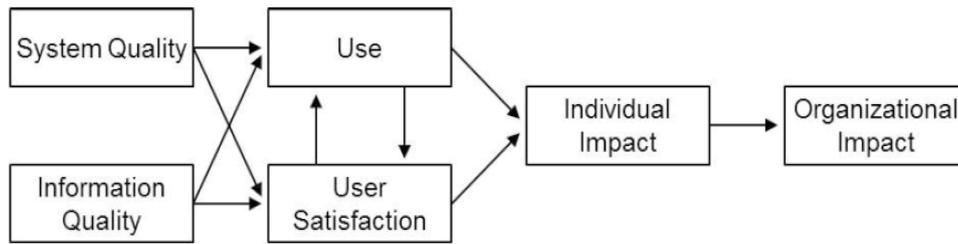


FIGURE 2. DeLone and McLean model [4]

## 2.2. Research on information systems success model of DeLone and McLean.

Research on measurement models for the success of information systems has been carried out, including research on DeLone and McLean's model in particular. In addition, the use of the DeLone and McLean models in measuring the success of information systems in an organization has been widely used. Research conducted by [4] shows that the DeLone and McLean model is more popular in the analysis in the empirical literature and in the non-empirical literature [5].

Some of the results of previous studies in evaluating information systems in the government became the reference material in this study, among others:

- 1) Research on the success of the e-Government system in Taiwan [6]. The research model uses the variables of information quality, system quality, service quality, use, user satisfaction, and perceived net benefits [11].
- 2) Research on trust in e-Government success in Singapore by Thompson S. H. Teo, Shirish C. Srivastava, and Li Jiang. The research model adds a variable of trust in the government, trust in technology and trust in e-Government websites [20]. In addition, other variables that are used in addition to information quality, system quality, service quality, and user satisfaction, are the desire to use variables [22].
- 3) Research on the success of tax information systems in Greece by Jordan Floropoulos, Charalambos Spathis, Dimitrios Halvatzis, and Maria Tsipouridou. The research model used is a combination of the DeLone and McLean models with the Seddon model [23]. The variables being measured are information quality, system quality, service quality, perceived usefulness, and user satisfaction [25].

**3. Methodology.** The population in this study were all users of the YachtERS information system registered to the system. Information system users are tour boat owners and tour boat agents who register their trips into Indonesian waters. Based on the display on the administrator account menu, the number of users is 1076 users. Thus, the population for the study was 1076. The data collection method used is using a questionnaire. Questionnaires are prepared based on indicators that have been made previously. The list of questions in the questionnaire relates to the variables used in the study. The list of questions is made in English because the prospective respondents are foreign nationals who will take care of licensing in entering Indonesian waters.

In Figure 3, net benefits is influenced by use and user satisfaction, while use is influenced by information quality, system quality, and service quality, and user satisfaction is jointly influenced by information quality, system quality, service quality and also use.

To show the relationship between factors, the resulting hypotheses to achieve the objectives in this study are as follows:

- H<sub>1</sub>: The information quality has a positive effect on use
- H<sub>2</sub>: The information quality has a positive effect on user satisfaction
- H<sub>3</sub>: System quality has a positive effect on use
- H<sub>4</sub>: System quality has a positive effect on user satisfaction
- H<sub>5</sub>: Service quality has a positive effect on use

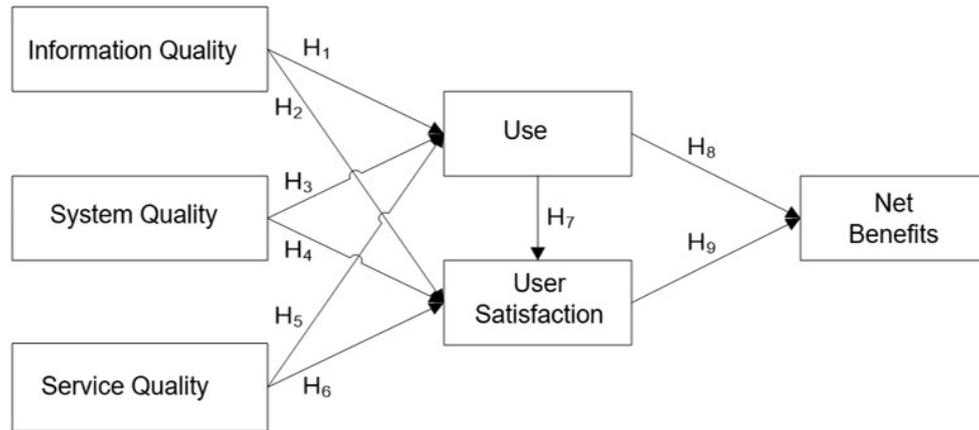


FIGURE 3. Research model

H<sub>6</sub>: Service quality has a positive effect on user satisfaction

H<sub>7</sub>: Use has a positive effect on user satisfaction

H<sub>8</sub>: Use has a positive effect on net benefits

H<sub>9</sub>: User satisfaction has a positive effect on net benefits

Data quality testing is intended to obtain question items that produce output in accordance with research needs. This test is done through validity and reliability tests.

*Validity Test:* Each measurement instrument is said to be valid if it can measure as expected [11,12]. Pearson correlation method is used to test the validity of the question items. The significance value used is 0.05.

*Reliability Test:* Reliability refers to consistency in a series of measurements, and Alpha Cronbach method is used to measure the reliability of each question item. The alpha value (reliability coefficient) of 0.6 is actually acceptable, but not as strong as the commonly used value, which is at the limit of 0.7 [13,14]. For this reason, in this study an alpha value  $\geq 0.7$  was used.

**4. Result and Discussion.** Since the implementation of the YachtERS information system in early 2018, no measurement has been taken to ensure the success of the information system. As one of the main programs for the government in the maritime sector, the measurement can be an input for developers to make improvements and increase the capacity of information systems so that they will be able to support the government's targets in increasing marine tourism. Responses from users, in this case potential marine tourists to Indonesia, will provide a clearer picture of the implementation of information systems according to user needs.

#### 4.1. Results of analysis of relationship between variables.

*H<sub>1</sub>:* The information quality has a positive effect on use

The equation for the regression model is:  $Y = 3.177 + 0.212X$ . Based on the measurement results, it was found that the information quality had an effect of 16% on use, while the other 84% were influenced by other factors. Based on [15], the relationship between information quality and use is stated to be very strong. However, in this case study, the relationship between system quality and use has a positive result with a less strong level of influence. This can be due to the fact that information system users carry out more data input activities into the system, so that the information quality of concern is the output in the form of vessel declaration forms and port declarations in accordance with the provisions of the Government of the Republic of Indonesia. However, it can be said that the better the information quality will increase the use of information systems.

*H<sub>2</sub>: The information quality has a positive effect on user satisfaction*

The equation for the regression model is  $Y = -0.10 + 0.458X$ . A negative constant value (-0.10) means that the average contribution of other variables outside the model has a negative impact on user satisfaction. Using the LIKERT scale with a range of 1-5, the X value will not equal 0, so the Y value will always be positive. Based on the measurement results, it is found that the information quality has an effect of 52% on user satisfaction, while the other 48% is influenced by other factors. The relationship between information quality and user satisfaction is stated to be very strong [16]. In this case study, the relationship between system quality and use gets positive results with a strong level of influence, so that it is consistent with the results of previous studies. This can be due to information regarding registration and output from user input activities, namely the vessel declaration form and port declaration, which are in accordance with what the user needs so that the user is satisfied.

*H<sub>3</sub>: System quality has a positive effect on use*

The equation for the regression model is  $Y = 3.776 + 0.183X$ . Based on the measurement results, it was found that the information quality had an effect of 16% on use, while the other 84% were influenced by other factors. The relationship between system quality and use is not very strong [17]. In this case study, the relationship between system quality and use gets positive results with a level of influence that is not too strong, so it is consistent with the results of previous studies. This can be because the respondent is an information system user who must register in the system, in accordance with the policy of the Republic of Indonesia government to all foreign tour boat owners who will enter Indonesian territorial waters must register first through the YachtERS information system. Thus, the perceived system quality is not too important to pay attention to.

*H<sub>4</sub>: System quality has a positive effect on user satisfaction*

The equation for the regression model is  $Y = 0.806 + 0.433X$ . Based on the measurement results, it is found that the system quality has an effect of 65% on user satisfaction, while the other 35% is influenced by other factors. Based on [18,19], the relationship between system quality and user satisfaction is stated to be very strong. In this case study, the relationship between system quality and user satisfaction gets positive results with a strong level of influence, so that it is consistent with the results of previous studies. This can be due to the perceived quality of the existing system so that users feel satisfaction. The higher the system quality level, the higher the level of user satisfaction.

*H<sub>5</sub>: Service quality has a positive effect on use*

The equation for the regression model is  $Y = 3.288 + 0.300X$ . Based on the measurement results, it is found that service quality has an effect of 20% on use, while the other 80% is influenced by other factors. Based on [20,21], the relationship between service quality and use is strong. However, in this case study, the relationship between service quality and use has a positive result and the level of influence is not very strong. This is because the service quality does not have a high impact on users, because users will still have to use the information system to carry out the tour boat permit registration process. Thus, the use of information systems will still be carried out with the value of service quality that is not too high.

*H<sub>6</sub>: Service quality has a positive influence on user satisfaction*

The equation for the regression model is  $Y = 0.341 + 0.635X$ . Based on the measurement results, it is found that service quality has an effect of 63% on user satisfaction, while the other 37% is influenced by other factors. Based on [22], the relationship between service quality and user satisfaction is not too strong. However, in this case study, the relationship between service quality and user satisfaction has a positive result with a strong level of influence. This can be because the service quality is not really felt in the interaction of using the information system that is felt enough, so that users feel

satisfaction. Communication to administrators is done via e-mail and the intensity of interaction with administrators is said to be insufficient.

*H<sub>7</sub>: Use has a positive effect on user satisfaction*

The equation for the regression model is  $Y = 2.320 + 0.624X$ . Based on the measurement results, it is found that use has an effect of 28% on user satisfaction, while the other 72% is influenced by other factors. Based on [23], the relationship between use and user satisfaction is not significant. In this case study, the relationship between use and user satisfaction gets positive results with too strong a level of influence, so it is consistent with the results of previous studies. This can be due to the fact that use does not really affect user satisfaction. Information system users need to use the information system because it follows the applicable provisions of the government of the Republic of Indonesia.

**4.2. Effect of use on net benefits.** The independent variable is use and the dependent variable is the net benefit, with the following hypothesis:

*H<sub>8</sub>: Use has a positive effect on net benefits*

The equation for the regression model is  $Y = 4.005 + 1.034X$ . Based on the measurement results, it is found that use has an effect of 29% on net benefits, while the other 71% is influenced by other factors. Based on [24], the relationship between use and net benefits is quite strong. In this case study, the relationship between use and net benefits has a positive result with a fairly strong level of influence, so that it is consistent with the results of previous studies. This can be due to the use of information systems that can help in the effectiveness and efficiency of the licensing process [25]. One-stop service through the YachtERS information system, provides convenience and savings for users in carrying out licensing procedures for foreign tourist boat visits to Indonesian territory.

*H<sub>9</sub>: User satisfaction has a positive effect on net benefits*

The equation for the regression model is  $Y = 2.546 + 1.264X$ . Based on the measurement results, it is found that use has an effect of 60% on net benefits, while the other 40% is influenced by other factors. Based on [26], the relationship between user satisfaction and net benefits is strong. In this case study, the relationship between user satisfaction and net benefits has a positive result with a strong level of influence, so that it is consistent with the results of previous studies. This can be due to user satisfaction that will provide net benefits for users in easier and faster licencing processing. Satisfaction with this foreign tourist boat visit permit service can increase the level of user desire to make a return visit to Indonesia.

The summary of the results of testing the hypothesis can be shown in Table 1.

TABLE 1. Hypothesis testing results

Relationship	Hypothesis	Influence level	Influence	Remark
Information quality on the use	H <sub>1</sub>	16%	Positive	Accepted
Information quality on the user satisfaction	H <sub>2</sub>	52%	Positive	Accepted
Syatem quality to use	H <sub>3</sub>	16%	Positive	Accepted
Syatem quality to user satisfaction	H <sub>4</sub>	65%	Positive	Accepted
Service quality for the use	H <sub>5</sub>	20%	Positive	Accepted
Service quality towards user satisfaction	H <sub>6</sub>	63%	Positive	Accepted
Use of user satisfaction	H <sub>7</sub>	28%	Positive	Accepted
Use of net benefit	H <sub>8</sub>	29%	Positive	Accepted
User satisfaction with net benefits	H <sub>9</sub>	60%	Positive	Accepted

The results of the evaluation of the success of the YachtERS information system based on measurements that have been taken from the user’s perspective, show that the YachtERS information system can be said to be quite successful. The Strategic Plan of the Ministry of Foreign Affairs for 2015-2019 states that one of the strategic target points of the Ministry of Foreign Affairs is “Strong Maritime and Border Diplomacy”. These strategic objectives are then translated back into the Information and Communication Technology Strategy Master Plan of the Ministry of Foreign Affairs of the Republic of Indonesia for 2016-2020 which contains strategies and steps for information and communication technology to support the vision, mission and strategic goals of the Ministry of Foreign Affairs. The results of the Critical Success Factor (CSF) analysis contained in the Information and Communication Technology Strategy Master Plan of the Ministry of Foreign Affairs, especially on the strategic targets of maritime diplomacy, state in the following in Table 2.

TABLE 2. Critical success factor at Ministry of Foreign Affairs

Strategic goals	Key performance indicator	Critical Success Factor (CSF)
Strong maritime and border diplomacy	Maritime and border diplomacy index	Availability of comprehensive geospatial information related to maritime and land boundaries, assignment of a solid and reliable team of negotiators, optimal collaboration in maritime and border management

The YachtERS information system is one of the information systems that supports the strategic goals of maritime diplomacy, according to the results of the CSF analysis at the Ministry of Foreign Affairs’ RISTIK. Therefore, the YachtERS information system is included in one of the critical information systems. The results of the evaluation of the success of the YachtERS information system based on measurements that have been carried out by taking from the user’s perspective, indicate that the YachtERS information system can be said to be quite successful. However, it can be said that the success rate is not too high with the acquisition of the maximum level of influence between variables in the range of 60% and the average value of all variables only in the range of 3 on a scale of 1-5. Improvement of information systems still needs to be done so that information systems can produce even better results. Looking at the existing demographic distribution, the largest users of information systems are in the age range above 60 years. Therefore, the use of information systems must be as easy and simple as possible so that users can easily follow them. From the existing demographic distribution, it can be seen that users of information systems come from four continents, namely the Americas, the Asian continent, the Australian continent and the European continent. For this reason, access to information systems must be ensured that it can be carried out properly from the four continents. The variable that has the highest level of influence on user satisfaction is the system quality variable. Factors in system quality such as fast system response time, reliable and stable system, easy-to-use system, and system availability so that it can be used anytime, are critical things to improve. Configuring good servers and applications as well as a stable Internet network is one solution to ensure good system availability. The managerial implications of the YachtERS information system, which is a critical information system based on the information system success variable, can be described as follows in Table 3.

TABLE 3. Managerial implications of YachtERS information systems

Variable	Managerial implication
Information quality	Provision of up-to-date information and in accordance with the provisions
System quality	Provision of a reliable and secure system, both in terms of servers, information systems and network connectivity
Service quality	Provision of competent and reliable IT managers
Use	Use of compliance with applicable regulations
User satisfaction	Regular evaluation of user satisfaction will improve IT services to users
Net benefits	The provision of an appropriate information system will increase the perceived benefits of users

5. **Conclusion.** Based on the results of the analysis carried out, the following conclusions were obtained.

The YachtERS information system has a positive relationship in terms of information quality, system quality, service quality to use, satisfaction and benefits. The use of the system has a level of influence that is not too big because the use of the information system is a provision set by the Government of the Republic of Indonesia for the licensing procedure for each visit of a foreign tourist vessel to Indonesian territory. User satisfaction with information systems is very good with an average level of influence above 50%, so it can be said that YachtERS information system users are satisfied with this information system. The net benefits obtained are mainly supported by user satisfaction factors, namely by providing efficiency and effectiveness in managing the permit process for foreign tourist boat visits. In general, it can be said that the information system, which is one of the important and critical information systems in supporting the vision, mission and strategic objectives of the Ministry of Foreign Affairs, is quite good/successful in implementation.

Some suggestions that can be given include:

- 1) *Theoretical suggestions:* further research can use user needs variables so that the development of information system success models will be even better. Measuring the success of information systems can be correlated with measuring the level of information security so that information systems not only provide effective and efficient results, but also ensure their security.
- 2) *Practical suggestions:* it is necessary to improve the information quality, system quality and service quality of the YachtERS information system so that it will increase user satisfaction of information systems, the development of information systems based on user needs will also determine the success of information systems.

## REFERENCES

- [1] E. Ziembra and I. Oblak, The survey of information systems in public administration in Poland, *Interdisciplinary Journal of Information, Knowledge, and Management*, vol.9, pp.31-56, 2014.
- [2] S. Y. Eroshkin, N. D. Koryagin and A. I. Sukhorukov, The paradigm of the integration of different types of management information system in investment and construction company implementing the project approach, *Procedia Computer Science*, vol.103, pp.605-608, 2017.
- [3] S. Petter, W. DeLone and E. McLean, Measuring information systems success: Models, dimensions, measures, and interrelationships, *European Journal of Information Systems*, 2008.
- [4] E. Bartis and N. Mitev, A multiple narrative approach to information systems failure: A successful system that failed, *European Journal of Information Systems*, vol.17, pp.112-124, 2008.
- [5] E. W. N. Bernroider, IT governance for enterprise resource planning supported by the DeLone-McLean model of information systems success, *Information & Management*, vol.45, pp.257-269, 2008.

- [6] G. W. Bock, A. Suh, K. S. Shin and A. Hu, The factors affecting success of knowledge-based systems at the organizational level, *Journal of Computer Information Systems*, vol.50, no.2, pp.95-105, 2009.
- [7] A. Jeyaraj, DeLone & McLean models of information system success: Critical meta-review and research directions, *International Journal of Information Management*, vol.54, DOI: 10.1016/j.ijinfo mgt.2020.102139, 2020.
- [8] S. Dörr, S. Walther and T. Eymann, Information systems success – A quantitative literature review and comparison, *Wirtschaftsinformatik*, pp.1813-1827, 2013.
- [9] A. Y. Anna, Y. Wang and Z. Yin, The effects of visual congruence on increasing consumers' brand engagement: An empirical investigation of influencer marketing on instagram using deep-learning algorithms for automatic image classification, *Computers in Human Behavior*, vol.112, DOI: 10.1016/j.chb.2020.106443, 2020.
- [10] T. Mudzana and M. Maharaj, Measuring the success of business-intelligence systems in South Africa: An empirical investigation applying the DeLone and McLean model, *South African Journal of Information Management*, vol.17, no.1, pp.1-7, 2015.
- [11] C. M. Chiu, C. S. Chiu and H. C. Chang, Examining the integrated influence of fairness and quality on learners' satisfaction and Web-based learning continuance intention, *Information Systems Journal*, vol.17, no.3, pp.271-287, 2007.
- [12] Y. S. Wang and Y. W. Liao, Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success, *Government Information Quarterly*, vol.25, no.4, pp.717-733, 2008.
- [13] T. S. H. Srivastava and L. Jiang, Trust and electronic government success: An empirical study, *Journal of Management Information Systems*, vol.25, no.3, pp.99-132, 2008.
- [14] J. Floropoulos, C. Spathis, D. Halvatzis and M. Tspiridou, Measuring the success of the Greek taxation information system, *International Journal of Information Management*, vol.30, no.1, pp.47-56, 2010.
- [15] M. Pandey and P. Mishra, *Research Methodology: Tools and Techniques*, Bridge Center, Romania, 2015.
- [16] Z. Khan and M. Ali, *Validating IS Success Model: Evaluation of Swedish e-Tax System*, Master Thesis, Department of Informatics, Lund University, 2010.
- [17] A. B. Hesham, A. B. Hoda and H. El-Islam, Assessing call centers success: A validation of the DeLone and McLean model for information system, *Egyptian Informatics Journal*, vol.14, no.2, pp.99-108, 2013.
- [18] W. Sardjono and F. Firdaus, Readiness model of knowledge management systems implementation at the higher education, *ICIC Express Letters*, vol.14, no.5, pp.477-487, 2020.
- [19] W. Sardjono, E. Selviyanti and W. G. Perdana, The application of the factor analysis method to determine the performance of IT implementation in companies based on the IT balanced scorecard measurement method, *Journal of Physics: Conference Series*, DOI: 10.1088/1742-6596/1538/1/012026, 2019.
- [20] W. Sardjono and Devyana, Performance analysis of human resource information system using a factor analysis method, *ICIC Express Letters*, vol.15, no.1, pp.87-97, 2021.
- [21] W. Sardjono, B. S. Laksmono and E. Yuniastuti, The social welfare factors of public transportation drivers with online application as a result of the 4.0 industrial revolution in transportation, *ICIC Express Letters*, vol.14, no.4, pp.361-368, 2020.
- [22] G. G. Gable, D. Sedera and T. Chan, Re-conceptualizing information systems success: The IS impact measurement model, *Journal of the Association for Information Systems*, vol.9, no.7, pp.377-408, 2008.
- [23] N. Gorla, T. M. Somers and B. Wong, Organizational impact of system quality, information quality, and service quality, *Journal of Strategic Information Systems*, vol.19, no.3, pp.207-228, 2010.
- [24] W. Sardjono, E. Selviyanti, W. G. Perdana and Maryani, Modeling of development of performance evaluation on health information systems implementation, *Journal of Physics: Conference Series*, DOI: 10.1088/1742-6596/1465/1/012025, 2020.
- [25] L. A. Halawi, R. V. McCarthy and J. E. Aronson, An empirical investigation of knowledge management systems success, *Journal of Computer Information Systems*, vol.48, no.2, pp.121-135, 2007.
- [26] A. Manchanda and S. Mukherjee, An empirical application of DeLone and McLean model in evaluating decision support system in the banking sector of Oman, *Journal of International Technology and Information Management*, vol.23, no.2, pp.47-58, 2014.