

Using DeLone and McLean model for evaluating an e-commerce website

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Abstract. E-commerce in Indonesia has grown rapidly and provided many positive impacts especially on the field of online business. Through the developments, there are certainly many factors that must be carefully considered in all aspects to get the "goal" as desired. So, when an e-commerce website has made changes whether we can conclude that the results worked so far or not. It can start by taking the existing factors that become the determinant of one of the successes in the e-commerce website. The study aims to evaluate factors become the success of an e-commerce (jualandbeli.com). Using the McLean and Delone success model approach that has 5 factors, namely: system quality, information quality, use, user satisfaction and net benefit. The result shows system quality, user satisfaction, and net benefits influence to use factor. net benefit influence to use. Quality of information influence to user satisfaction factor. While user satisfaction influence on net benefit factor. Thus, be expected, the model can be used as reference in related evaluating an e-commerce website.

1. Introduction

The use of e-commerce has contributed significantly to the activities of online business transactions in Indonesia. The benefits of e-Commerce can be seen from customers' acceptance based on perceived benefits in using it. Perception of benefit can be defined as the degree to which customer believes that using a system can improve the perceived performance [1].

The use of e-commerce in the commercial system aims to attract more prospective buyers and maintain subscriptions in order to continue to use the services provided by the seller [2]. The e-commerce can also expand the scope or market share of the company without sacrificing much of the cost stored [3] [4]. It can be combined to reduce the cost of operational or marketing administration [5], the activity of buying, selling products, distribution, marketing, and delivery of goods electronically [6] [7] [8]. Thus, e-commerce may enhance the company in the existing competition.

However, the successful use of e-commerce needs to be evaluated to know its success. It is needed a specific model that can be a reference applied the successfully of an e-commerce [9]. There are many studies that have been done in order to identify the various factors for the success of e-commerce. For example, measuring e-commerce success using the DeLone & McLean factors, namely: system quality, information quality, use, user satisfaction and net benefit [10] [11].

The fact that e-commerce entrepreneurs in Indonesia many do not know whether their e-commerce has achieved success or not. It is due to not knowing how to assess the success of

e-commerce that has been used. Therefore, this study proposes the evaluation of an e-commerce website based on factors that refer to the DeLone and McLean model. Evaluation is done on e-commerce customers jualanbeli.com. It is an e-Commerce website who provides regular and herbal supplement products to support human health, such as supplements that are useful for eyes treatment, skin, bones/joints/nerves, internal organs (brain, heart, liver, lung) to mental illness treatment. The owner wants the researchers to test whether by step making this website online shop will provide a sense of comfort, convenience, trust and speed in making the purchase or transaction so that buyers can ongoing or large-scale purchase to transact on the jualandbeli.com. Figure 1 shows the user interface of the jualandbeli.com.

Figure 1. Jualanbeli.com

2. Research Method

In the DeLone & McLean model, there are 5 factors that influence e-commerce success: system quality, information quality, use, user satisfaction and net benefit [9] [10] [11]. Figure 2 shows the research mode, and hypotheses proposed.

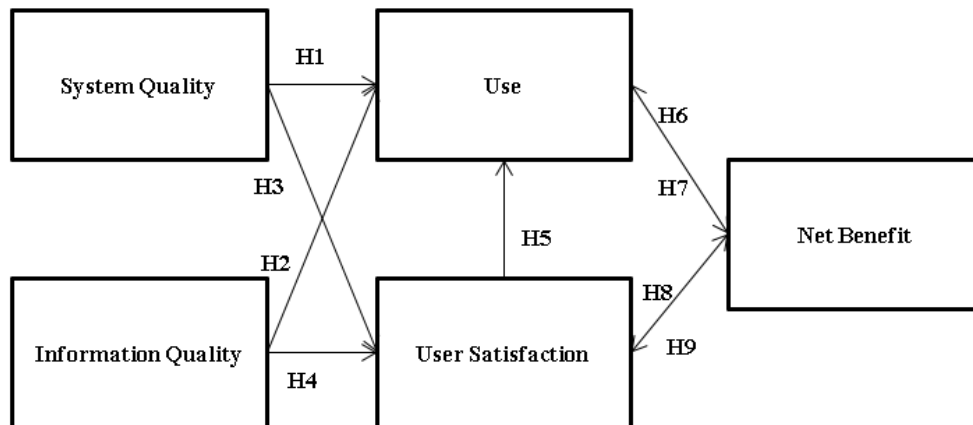


Figure 2. Research Model and Hypotheses

Based on the figure 2 there are nine hypotheses, namely: H1: concerns system quality has a positive effect on Use; H2: allows information quality to have a positive effect on use; H3: system quality is believed to affect positive to user satisfaction; H4: explains that information quality will have a positive effect on user satisfaction; H5: explains that user satisfaction can have a positive effect on use; H6: net benefit can have a positive effect on Use; H7: use will have a positive effect on net benefit; H8: user satisfaction positively affects net benefit; and H9: net benefit has a positive effect on user satisfaction.

There are 5 variables in this research, where Model DeLone and McLean already cover the needs of research variables (see Table 1).

Table 1. Variables of Research

Variables	Indicators
System Quality	Convenience (SQ1), Preferences (SQ2), Security (SQ3), and Response Time (SQ4)
User Satisfaction	Needs (US1), Efficiency (US2), Effectiveness (US3), and Enjoyment (US4)
Information Quality	Relevance (IQ1), Size of time (IQ2), Accuracy of information (IQ3), Quality of Content (IQ4), and Quality Relationships (IQ5)
Use	Frequency of Use (U1), and Duration / Usage Time (U2)
Net Benefit	Overall Efficiency (NB1), Overall Quality (NB2), Performance (NB3), and Knowledge (NB4)

The study used 210 respondents for model evaluation. All respondents were selected from active online buyers that have frequently purchased goods on jualandbeli.com for at least 1 time. Most of their ages were ranging between 22 and 30, with background education in bachelor's degree, and they were employed in the non-government company. Table 2 shows demographic data of respondents. Then, the data has been analysed with Structural Equation Modelling (SEM), by using Maximum Likelihood Estimation (MLE) method, with additional IBM SPSS Amos tool.

Table 2. Respondents based on Demographic

Variable	Data
Age	< 18 years old (Qty=30 -> 14.3%)
	18-21 years old (Qty=40 -> 19.0%)
	22-30 years old (Qty=51 -> 24.3%)
	31-35 years old (Qty=25 -> 11.9%)
	36 -44 years old (Qty=32 -> 15.2%)
Gender	> 45 (Qty= 32 -> 15.2%)
	Male (Qty=111 -> 52.9%)
	Female (Qty=99 -> 47.1%)
Education	Elementary School (Qty=13 -> 6.2%)
	Junior High School (Qty=21 -> 10.0%)
	Senior High School (Qty=35 -> 16.7%)
	Diploma (Qty=48 -> 22.9%)
	Bachelor (Qty=50 -> 23.8%)
	Postgraduate (Qty=43 -> 20.5%)
Marital Status	Not Married (Qty=111 -> 52.9%)
	Married (Qty=90 -> 42.9%)
	Widow/Widower (Qty=9 -> 4.3%)
Occupation	Student (Qty=37 -> 17.6%)
	Employees (Qty=57 -> 27.1%)
	Government employees (Qty=35 -> 16.7%)
	Private employees (Qty=40 -> 19.0%)
	Others (Qty=41 -> 19.5%)

3. Result and Analysis

Confirmatory factor analysis (CFA) is an analysis that aims to identify validation based on standardized loading factor and reliability based on cronbach's alpha. CFA processing is done with AMOS software. Table 3 shows the results of validity and reliability tests to find out valid and realizable items and invalid and non-reliable items.

Table 3. Validity and Reliability Test

Factors	Indicators	Standardized Loading Factor	Validity	Cronbach's Alpha	reliability
System Quality	SQ1	0,542	Valid	,868	Reliable
	SQ2	0,572	Valid		Reliable
	SQ3	0,576	Valid		Reliable
	SQ4	0,781	Valid		Reliable
User Satisfaction	US1	0,522	Valid	,834	Reliable
	US2	0,704	Valid		Reliable
	US3	0,527	Valid		Reliable
	US4	0,518	Valid		Reliable
Information Quality`	IQ1	0,535	Valid	,872	Reliable
	IQ2	0,647	Valid		Reliable

	IQ3	0,532	Valid		Reliable
	IQ4	0,624	Valid		Reliable
	IQ5	0,572	Valid		Reliable
Use	U1	0,566	Valid	,712	Reliable
	U2	0,541	Valid		Reliable
Net Benefit	NB1	0,671	Valid	,879	Reliable
	NB2	0,825	Valid		Reliable
	NB3	0,556	Valid		Reliable
	NB4	0,584	Valid		Reliable

Based on table 3 above shows that all standardized loading factor values $\geq 0,5$ and Cronbach's alpha $> 0,6$. Therefore it can be deduced that all indicators of each variable are valid and reliable. this result can be concluded that all indicators can be used for hypothesis analysis.

The result of SPSS Amoss showed the observed values of Chi-square (χ^2) at $298,849 < 331,786$; probability (P) at $0,000 < 0,05$; Root Mean Square Error of Approximation (RMSEA) at $0,073 \leq 0,08$; Goodness of Fit Index (GFI) at $0,874 \leq 0,90$; Parsimonious Normal Fit Index (PGFI) at $0,653 \geq 0,50$; Incremental Fit Index (IFI) at $0,938 \geq 0,90$; and Tucker Lewis Index (TLI) at $0,924 > 0,90$ [12]. The research model is good fit or accepted [12]. The result findings were summarized in Table 4.

Table 4. The Result of Finding

Size	Result	Match
X^2	298,849	Good Fit
P	0,000	Good Fit
RMSEA	0,073	Good Fit
GFI	0,874	Good Fit
PGFI	0,653	Good Fit
IFI	0,938	Good Fit
TLI	0,924	Good Fit

Table 6 showed all Critical Ratio (C.R.) values $> 1,96$ ($\alpha = 0,01$) [4] [11] except for H2, H3, H7 and H19. With probality ($P < 0,05$) and CR value $> 1,96$, the hypotheses H2, H3, H7 and H9 were rejected while others are accepted. The overall hypotheses test are summarized in Table 5

Table 5. Hypotheses Results

H	Relations	P	Standard Estimate	Standard Errors	C.R.	Conclusion
H1	Quality System \rightarrow Use	***	,444	,123	3,612	Support
H2	Quality of Information \rightarrow Use	0,054	-,374	,194	-1,930	Not Support
H3	Quality System \rightarrow User Satisfaction	0,068	,266	,146	1,825	Not Support

H4	Quality of Information → User Satisfaction	***	1,054	,210	5,009	Support
H5	User Satisfaction → Use	0,011	,552	,217	2,543	Support
H6	Net Benefits → Use	0,043	,396	,196	2,019	Support
H7	Use → Net Benefit	0,051	,391	,201	1,951	Not Support
H8	User Satisfaction → Net Benefit	0,004	,654	,224	2,915	Support
H9	Net Benefit → User Satisfaction	0,140	-,571	,232	- 2,461	Not Support

4. Conclusion

In the measurement model analysis showed that all variables have met the criteria of validity and reliability and on the analysis of structural models, H1, H4, H5, H6, and H8 support the proposed hypothesis. These hypotheses are consistent with previous studies, namely H1 [10], H4 [10] [14], H5 [10] [15], H6 [10], and H8 [10]. Thus, system quality, user satisfaction, and net benefits can become the success factors on jualandbeli.com website in terms of use. Quality of information is one of the success factors on jualandbeli.com website in terms of user satisfaction. User satisfaction is one of the success factors on jualandbeli.com website in terms of user Net Benefit. While others (H2, H3, H7 and H9) are not support.

References

- [1] Savrul, M., Incekara, A., & Sener, S. The potential of e-commerce for SMEs in a globalizing business environment. *Procedia-Social and Behavioral Sciences*, 150, 2014; pp. 35-45.
- [2] Sfenrianto, S., Saragih, M. H., & Nugraha, B. (2018). E-Commerce Recommender for Usage Bandwidth Hotel.Indonesia. *Journal of Electrical Engineering and Computer Science*, 2018; Vol. 9, No. 1, pp. 227~233.
- [3] Ahayu, R., & Day, J. Determinant factors of e-commerce adoption by SMEs in developing country: evidence from Indonesia. *Procedia-Social and Behavioral Sciences*, 195; 2015, pp. 142-150.
- [4] U, D., Ray, G., Geng, X., & Whinston, A. Implications of reduced search cost and free riding in e-commerce. *Marketing Science*, 2004; Vol.23(2), pp. 255-262.
- [5] Hao, J., Wang, S., & Huang, W. V.. A study of B2B e-market in China: E-commerce process perspective. *Information & Management*, 2008; Vol. 45(4), pp. 242-248.
- [6] Aur, P., & Joshi, M. M. E-Commerce in India: A Review. *International Journal of Computer Science and Technology*, 2012; Vol. 3(1), pp. 802-804.
- [7] Ariguna, T., & Berlilana, B. Understanding of Antecedents to Achieve Customer Trust and Customer Intention to Purchase E-Commerce in Social Media, an Empirical Assessment. *International Journal of Electrical and Computer Engineering (IJECE)*, 2017; vol. 7(3), pp. 1240-1245.
- [8] Angeshwer, D. K. E-commerce or Internet Marketing: A business Review from Indian context. *International Journal of u-and e-Service, Science and Technology*, 2013; vol. 6(6), pp. 187-194..

- [9] DeLone, W.H., & McLean.E.R The Delone and Mclean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 2003; vol.19 (4), pp. 9–30.
- [10] Wang, Y. S. Assessing e-commerce systems success: a respecification and validation of the DeLone and McLean model of IS success. *Information Systems Journal*, 2008; vol.18(5), pp. 529-557.
- [11] Chen, C. W. D., & Cheng, C. Y. J. Understanding consumer intention in online shopping: a respecification and validation of the DeLone and McLean model. *Behaviour & Information Technology*, 2009; vol. 28(4), pp.335-345.
- [12] Sfenrianto, S., Wijaya, T., & Wang, G. Assessing the buyer trust and satisfaction factors in the E-marketplace. *Journal of theoretical and applied electronic commerce research*, 2018; vol.13(2), pp. 43-57.
- [13] Eid, M. I. Determinants of e-commerce customer satisfaction, trust, and loyalty in Saudi Arabia. *Journal of electronic commerce research*, 2011; vol. 12(1), pp.78.
- [14] Al-Fadhli, S. Critical Success Factors influencing E-Commerce in Kuwait. *Journal of Internet Banking and Commerce*, 2011, vol. 16(1), pp. 1-7.
- [15] Petter, S., & McLean, E. R. A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management*, 2009; vol. 46(3), pp. 159-166