

Exploring the Influential Antecedents of Actual Use of Internet Banking Services in Indonesia

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Abstract—With the emergence of electronic banking use, satisfaction and trust become crucial and prominent factors in determining online banking success, whereas consumers' reluctance in directing their decisions to adopt and use e-commerce has remarked the significant aspect of trust, security, and privacy in either traditional and online commerce systems. This study proposes an extended framework based on the DeLone and McLean's IS Success Model incorporated into the development of consumer's usage and behaviors towards Internet-based banking services in Indonesia. The results of this study show that security was the most important concern for user satisfaction, which in turn strongly affected Internet banking usage in Indonesia. Satisfaction influenced both consumer's trust and usage significantly. Interestingly, trust was found insignificant on Internet banking usage. The study will derive conclusions including subsequent discussions and implications.

Keywords- *e-commerce; internet banking; IS success model, trust; satisfaction; security; privacy; technology use; Indonesia*

I. INTRODUCTION

The emerging use of electronic commerce or e-commerce brings out the importance to properly understand the contextual study of Internet banking (IB) which may not be excluded from the consideration that IB is a part of e-commerce within various IT-based applications [6]. However, there are still few empirical studies that have deeply investigated the relational factors within actual IB use success, including the measurement of trust, security and privacy separately in the online banking area [5].

Several prior researches have investigated and found the significant findings conveying the irrefutable factors associated with e-commerce success such as perceived site quality–system quality and information quality, service quality, user satisfaction, usage, and perceived benefits [13]-[15], [32]. Moreover, such success is also heavily related to trust [11], [8], [26], security and privacy concerns [20], [7], uncertainty and information infringement [31], which has therefore driven their importance on the successful penetration of Internet-based commerce [31] and electronic banking in particular [37], [18].

Since most previous studies in either e-commerce or e-banking relatively have less attention on the occurrences outside Northern American and European countries [34], [7], it is necessary to comprehensively investigate what crucial building factors affecting consumers' behaviors on adopting and using technology such as IB system which is distinctively applied among such countries [40].

Accordingly, this study aims to elicit several aspects of the influential antecedents and determinants which associate with the technology usage from users' perspectives within IB area in Indonesia.

Therefore, to achieve the objectives of present study, a research model and hypotheses based on the DeLone and McLean's IS Success model will be proposed to clarify the relationships among the investigated matters with IB users in Indonesia who are currently using IB services. The study will exemplify interpretative conclusions and implications with a discussion of findings.

II. LITERATURE REVIEW

A. The Emergence of Internet Banking Success in Indonesia

Following the growing emergence of financial industries, e-banking gradually displaces traditional-based financial services into an electronic-based and online system services such as Automatic Teller Machines (ATMs), credit cards usage, e-payment, online shopping and e-banking to cope with consumers' financial demands [19].

In spite of the increasing growth of such e-banking services, there are still as yet, many people who actively access the Internet and have already become bank customers still evade using IB services and assertively keep their decisions to use non-IB services such as ATMs [36], due to trust shortage [34], uncertainty, security, and privacy [36], [5].

Furthermore, there are not many empirical investigations which have evaluated IB success, especially one which accentuates across relational variables such as trust, security, privacy, and satisfaction in general, particularly in Indonesia

with its inconclusive condition and very few previous IB studies.

Since the first utilization of ATM and Internet banking services started in 1991 by Bank Niaga [2], Indonesia is currently the fastest and highest growth rate in South East Asia with 749,000 [12] and at least twenty banks [38] have been utilizing e-banking services in these days (Table I). Bank Central Asia (BCA) has become the largest and widest enabled network of automated teller machines (ATMs) across the country with more than 7,200 units as of 2011 [3].

The implementation of e-banking in Indonesia is still in its immature phase though Indonesia has a big population with a huge number of active Internet users. The penetration of the Internet in Indonesia and people using the Internet services within five years are predicted to significantly increase [23].

TABLE I. BANKS WITH INTERNET BANKING SERVICES IN INDONESIA

Bank Names			
BCA ^a	BRI ^f	PaninBank	Bank Bukopin
BNi ^b	OCBC NISP ^g	Bank Mega	Bank Sinar Mas
HSBC ^c	CIMB Niaga ^h	Bank Mandiri	Bank Danamon
BII ^d	ANZ Panin ⁱ	Bank Ekonomi	Bank Muamalat
BSM ^e	Citibank	Bank Permata	Commonwealth

a. Bank Central Asia; b. Bank Negara Indonesia; c. The Hong Kong and Shanghai Banking Corporation Limited; d. Bank International Indonesia; e. Bank Syariah Mandiri; f. Bank Rakyat Indonesia; g. Nilai Inti Sari Penyimpan/NV Nederlandsch-Indische Spaar en Deposito Bank; h. Commerce Investment Merchant Bank; i. Australia and New Zealand Banking Group Limited.

B. Internet Banking Success Framework

Trust, security and privacy, and consumer satisfaction play critical role on incorporating a successful e-commerce implementation as well as IB in particular. Such factors have also been empirically investigated by many previous studies and strongly considered in the e-commerce discipline.

As postulated by DeLone & McLean [13], there are six interdependent variables [13], [33] which will direct significant influences on IS success, i.e., system quality, information quality, satisfaction, use, individual and organizational impacts. While such variables were later customized with the inclusion of net benefits and directive descriptions on use [14], satisfaction and intention to reuse were regarded as the composed dimensions of net benefits measures [41].

Furthermore, website quality is considered as a unified variable of website quality–system quality and information quality [1], [30]-[31], [11], have also been regarded as critical factors in influencing consumers’ perceptions in previous e-commerce studies [11], [31], [25].

Grounded on three distinct classifications, IS success model was developed through technical, semantic, and effectiveness levels [13]-[15]. The technical level attributes to system quality dimensions: e.g., ease of use, functionality, reliability, and data quality of a system; whereas the semantic level refers to information quality considerations–on the system such as system accuracy, timeliness, relevance,

consistency, and completeness. Then, the effectiveness level designates service quality: e.g., tangibility, responsiveness, assurance, and empathy [14]-[15], [33].

Nevertheless, it seems that some salient criticisms on the modified structure of the DeLone and McLean’s success models as a good standard of an IS/e-commerce success measure with the ‘usage’ dimension [35]. The criticized subjects particularly pertinent to its multi-dimensions [14], and its contradictory in IS adoption [41] as well. Thus, applying usage and perceived usefulness dimensions within the current studies as the right measures on IS/e-commerce success have frequently become arguable [35], [14].

However, the modified structure may also become an appropriate model for assessing and measuring IS/e-commerce implementation [13]-[14] and organizational performance overall [32], though the apparently various outlook on the most suitable dimensions of structure of IS success models still prevail up to now.

Wang [41] argued the DeLone & McLean IS success model integrated the elements of identified requirements to evaluate a technology system success implementation which are still strongly correlated with prior postulation, i.e., Theory of Reasoned Action (TRA) and Technology Acceptance Model (TAM) through dimensions on beliefs, attitudes and behaviors. Furthermore, TAM regards more on directive dimensions of net benefits from future IS use, whereas the DeLone and McLean IS/e-commerce success model designates net actualized benefits of IS use. Accordingly, “intention to reuse” reflected an adjacent coverage of the contextual e-commerce systems success rather than the other use of success dimensions measure [41].

III. RESEARCH MODEL AND HYPOTHESES

A. Proposed Framework

This study is proposing an extension based on the DeLone and McLean IS success model where the consumers determine to actively use IB services are mainly driven by two dimensions:–user satisfaction and trust, which in turn direct such perceptions to form their actual use. Accordingly, we will investigate the current use condition of IB from consumers’ perspectives regarding satisfaction and trust as mediating aspects in addressing actual use.

Due to the fact that the relationship between trust and risk still remain debatable in e-commerce area [8], inconclusive in some cases [4], and the influence of perceived risk in IB adoption is still being arguably regarded in some cases [4], this study will develop hypothesized assumptions with exclusion of perceived risk, though risk is frequently considered as a significant factor for trust to emerge and to reasonably drive trust [29].

We proposed our model based on some perceived interdependent dimensions, i.e., site quality as a combination of system quality and information quality [28], [41], service quality, perceived security, perceived privacy; whereas user satisfaction and trust as mediating variables and actual usage as an independent variable to describe relational impacts on

the measured constructs in engaging with IB services as shown in Figure 1.

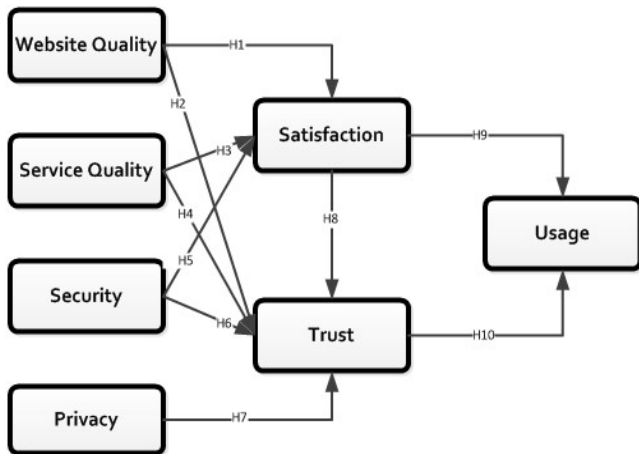


Fig. 1. Proposed framework

B. Study Hypotheses

IS Success model accentuated the importance of system quality and information quality on IS success framework which were discerned as the composite dimensions influencing customers' overall satisfaction. On the other hand, such qualities delivered more impact on trust than did effects on user satisfaction [27]. Website quality and service quality are important variables in building trust and trusting belief, particularly underlying on process-based buyer-seller-relationship [25], [11], [31], in delivering website success [28] and may lead customers satisfied after experiencing in utilizing a system [14], [41]. Therefore, we hypothesize that:

H1: The higher the level of website quality of IB services perceived, the greater the positive influence on his/her satisfaction.

H2: The higher the level of website quality of IB services perceived, the greater the positive influence on his/her trust.

H3: The higher the level of service quality of IB services perceived, the greater the positive influence on his/her satisfaction.

H4: The higher the level of service quality of IB services perceived, the greater the positive influence on his/her trust.

As the important factors in building trust [5], [24], [26] and determining e-commerce and IB success [20], [7], security and privacy continuously remain irrefutable to consider in e-commerce. Thus, they should be considered critically as a distinctive factor and need to be separated, though they are still related each other [5]. Such factors have been also heavily favored within many previous investigations, in regard to their prominences and substances in mediating consumers and organizations. After all, security may drive impact as influential factor on the formation of overall satisfaction as well [39]. Thus, we presume:

H5: The higher the level of security perceived by customer when utilizing IB services, the greater the impact on his/her satisfaction.

H6: The higher the level of security perceived by customer when utilizing IB services, the greater the impact on his/her trust.

H7: The higher the level of privacy perceived by customer when utilizing IB services, the greater the impact on his/her trust.

Consumer satisfaction has always been mainly presumed for driving trust, particularly in e-commerce area [5], [17], and is still perceived as the most joint success measure in organizational activities [14]. Additionally, satisfaction and trust substantially leverage outcomes regarding consumer responses [16] and significantly drive an impact on consumers' trust and its formation based on their experiences while using services [25]. Moreover, trust directly compromises with e-commerce activities to successfully conduct such transactions, particularly in IB. Trust also remains crucial in the e-commerce area where trust delivers a critical impact on either consumer activities or overall e-commerce success [11] and IB sustainability [37]. Accordingly, we hypothesize:

H8: The higher the level of satisfaction appraised by customer after using IB services, the greater the influence on his/her trust.

On the other hand, satisfaction and system use were previously noted as important dimensions in driving e-commerce success [13], [33]. Likewise, because we apprehend usage as an outcome and an independent variable, the following considerations can be assumed here:

H9: The higher the level of satisfaction appraised by customer after using IB services, the greater the impact on his/her actual use.

H10: The higher the level of trust perceived by customer when using IB services, the greater the influence on his/her actual use.

IV. DATA ANALYSIS AND RESULTS

Online and offline questionnaires were distributed using a Likert's seven-point scale (strongly disagree to strongly agree) to bank customers in Indonesia who have already used IB services with proper Internet.

Total complete and usable sample data were 155 out of 162 respondents with 74.19% male and 25.81% female having an average of more than 10-year experience of Internet usage (Table II).

The proposed framework was measured by using components-based structural equation modeling-partial least squares (PLS) analysis with SPSS 17.0 and PLS Graph 3.0. All the investigated factors in our proposed model were above the recommended level (Cronbach's alpha and CR > 0.70, AVE > 0.50), whereas all factor loadings were significant with greater than 0.70 in almost all cases except two items. Therefore, our results revealed that all the measured factors in our model had sufficient reliability and convergent validity on estimated factors [22], and each construct satisfied the criteria for discriminant validity [9].

TABLE II. DEMOGRAPHIC DESCRIPTIONS OF RESPONDENTS

Distribution of Respondents		Frequency	%
Gender	Male	115	74.19
	Female	40	25.81
Age	<20	2	1.29
	20-29	76	49.03
	30-39	55	35.48
	40-49	21	13.55
	>49	1	0.65

Education	High School	2	1.29
	Diploma	8	5.16
	Bachelor	59	38.06
	Master	71	45.81
	Doctorate	15	9.68
Profession	Employee	73	47.10
	Public Servant	57	36.77
	Entrepreneur	8	5.16
	Student	15	9.68
	Other	2	1.29
Length of Internet Use	<1 year	7	4.52
	1-2 years	6	3.87
	2-5 years	27	17.42
	5-10 years	56	36.13
	>10 years	59	38.06

Table III and Figure 2 presented that website quality and service quality positively drove impact on the formation of customers' satisfaction in using Internet banking services, whereas perceived security, perceived privacy, and satisfaction positively affected trust respectively. Perceived security strongly influenced satisfaction whereas satisfaction positively drove a strong impact on trust, which in turn directs impact on the IB usage.

TABLE III. PATH COEFFICIENT AND VARIABLES

Distribution of Respondents		Path	t-value	Result
H1	Website Quality → Satisfaction	0.196 ^a	1.988	Accepted
H2	Website Quality → Trust	-0.046 ^d	0.668	Not Accepted
H3	Service Quality → Satisfaction	0.257 ^b	2.490	Accepted
H4	Service Quality → Trust	0.013 ^d	0.204	Not Accepted
H5	Security → Satisfaction	0.461 ^c	5.470	Accepted
H6	Security → Trust	0.204 ^b	2.874	Accepted
H7	Privacy → Trust	0.315 ^c	4.963	Accepted
H8	Satisfaction → Trust	0.490 ^c	6.349	Accepted
H9	Satisfaction → Usage	0.374 ^b	2.736	Accepted
H10	Trust → Usage	-0.044 ^d	0.315	Not Accepted

Significance level: a. p value<0.05; b. p value<0.01; c. p value<0.001; d. p value=not significant.

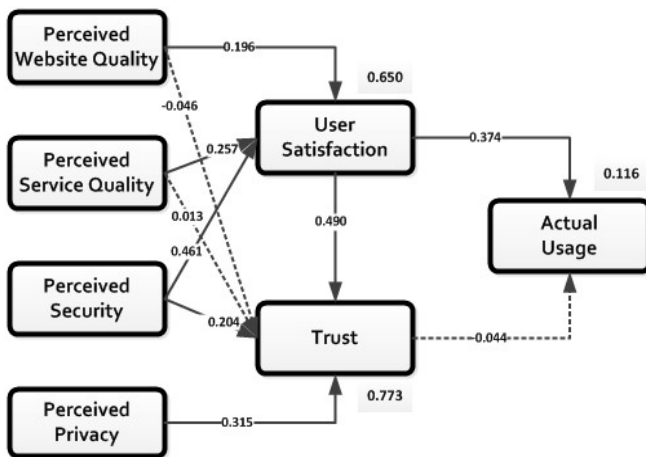


Fig.2. Framework with results

Conversely, though most of our proposed hypotheses were well-supported at a two-tailed test at 95 percent significance level in the overall findings, three of them were not accepted, i.e., H2, H4, and H10. Therefore, both website quality and service quality did not statistically influence trust, followed by

trust which also did not significantly influence the actual IB use.

All mediating variables are sufficient and significantly affect actual use by describing the model with 65.0 percent of the variance in satisfaction, 77.3 percent in trust, and 11.6 percent of the variance in usage.

V. DISCUSSION AND IMPLICATIONS

The overall findings, perceived security strongly drove impact on the formation of customers' satisfaction in using Internet banking services, which furthermore strongly influenced consumer trust building. In other words, customer satisfaction was a critical consideration in adopting and using a technology system and proven to either affect consumers' trust perceptions or actual use of a technology-based service [17], whereas security and privacy concerns were consistently regarded as substantial elements on trust building and determinant factor on e-commerce success [20], [24] as well as IB context [7], [5].

Though both website quality and service quality did not statistically affect consumer trust in using IB services, these results affirmatively supported previous studies regarding the insignificant relationship between perceived qualities of vendor's electronic-based channel and consumer trust [25], [10]. It was noted that system quality did not significantly influence trust either for potential or repeat customers [25] and neither on the considerable relationship between service quality and trust [10].

Most bank customers regarded security as the most crucial factor on driving them satisfied or unsatisfied in using IB. Though all banks' websites have already implemented strong security system through installing secure pages for financial transactions (SSL-support sites) and security token-based authentications, bank customers still perceive unsecure in doing online transactions. Thus, they still recommended more well-secured transaction systems and require the banks being able to deliver better services and as the most required prerequisites to be considered by banks in order to successfully fulfill customers' financial needs. From 2001 up to now, there have been several occasions of phishing activities falsifying legitimate IB websites in Indonesia.

Hence, many respondents argued that banks still do not provide adequate and satisfying services to the customers. They perceived that banks' customer services in particular, frequently accommodated unsatisfactory solutions to the obstacles they experienced while conducting IB services, particularly in the case of payment using credit card. However, many customers favored private-owned banks services but not for government-owned ones.

The most interesting factor in this study was the weakness of trust impact on actual use. In other words, actual use as one of e-commerce success factor was found not to be a determinant dimension on one's consideration to use IB. Since usage was hypothesized and proven significant to influence a system success in previous studies [13], [12], it is interesting to find out the reasonable factors behind this finding. However this result affirmed prior research that trust will not always

address a positive impact on services use [21]. Moreover, the impact of trust in IB use might be already mediated by satisfaction.

Due to the fact that the appearance of security and privacy in building trust while satisfaction plays important roles in IB services usage in IB success, the results showed that it is worth noting conveying the importance of conducting preconditions which must necessarily be considered by Indonesian banking institutions, including the bank regulators.

The banks should encouragingly possess capability and competency in administering and maintaining website and service qualities continuously. The qualities include interface and display simplicity, functions easiness, user-friendliness, accessibility, reliability, accuracy, relevancy, timeliness, and responsiveness [11], [5].

Accordingly, banking firms should supportively manage critical website functionalities to remain secure, reliable, controllable, and capable to accommodate their consumers' needs in conducting transactions electronically. Furthermore, banks should also evolve the supporting efforts such as enabling salespeople to increase customer trust in services usage [40], more frequent communication [16], and conducting regular promotion to continuously inform customers about what services banks can provide [7].

Lastly, the banks can enable supporting promotions to sustainably develop and increase corporate image by widely deploying vending-based video screen and internet-based information on their branches in order to avail customers more familiar with the banks services and increasingly develop their self-capability in using IB products/services [7], [18].

VI. CONCLUDING REMARKS

This study positively supports the previous related studies by presenting the significance of perceived qualities on consumer satisfaction formation and the salience of perceived security and perceived privacy on trust building through the mechanisms incorporated with Internet banking success. Moreover, the results also indicate the strong salience of satisfaction on trust formation and actual use of IB services.

Though the DeLone and McLean success model have been frequently used to designate e-commerce system evaluation, it still reveals a complex and an arguable matter on its measurement validity in explaining the extent to which implementation of a system is successful, due to the constructs dimensionality in gauging the acceptance of technological system [35], [41].

On the other hand, the result of this study also shows that the mechanisms incorporated in the trust formation still derive debatable arguments on the construct of trust, the antecedents, and outcomes due to trust dimensionality in intermediating technological system use [29].

Even though this study merely investigated customers' perceptions in Internet banking use within a country, it presented considerable findings which needs a comparative and empirical investigations against other related studies so

that it can reveal more representative results for Internet banking sector in particular.

Additionally, adopting a technology may beget various considerations on its implementation because it cannot ascertain accurately that it will be widely accepted and practically used. Therefore, to successfully implement IB system, it will relatively rely on how a technology is comprehensively adopted, including the impacts of environmental and socio-economic conditions across different cultures, supporting communications infrastructure and the Internet penetration within a country [4].

VII. LIMITATIONS AND FUTURE STUDIES

Some limitations prevail in this study. First, though this study used an appropriate sample size, it still requires a larger sample for further investigation in order to prove the present research hypotheses.

Second, this research was designed with a limited investigation view-point on Internet banking customers, though they might have used other e-banking services such as ATM banking, phone banking, and mobile banking to accommodate their financial transaction requirements. Therefore, this study could not conclusively explain such conditions.

Third, this study was confined in investigating the usage of IB services with which factors described the mediation of satisfaction and trust in Indonesia only that is not precise enough to determine every single aspect of the success dimensions measure in the context of electronic banking, particularly in developing countries.

Consequently, this study requires necessary considerations in order to cope with such limitations for extending the existing model, which in turn generating a better validity and reliability in the future studies.

Since the significant role of satisfaction in driving e-commerce success emerges, it is necessary to provide a more surrogate proxy for handling the overall measure on organizational performance through customer satisfaction, given that it is a complex attitude [32].

Finally, the findings are expected to generate a better comprehension and wider considerations of IB adoption and use in developing countries. Therefore, it is necessarily required to strengthen the extant model with further investigations and related theories to provide a better understanding on IB studies.

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