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Information system acceptance and user satisfaction: The mediating role of trust

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Abstract

Satisfying users is one of the crucial objectives of information system success. In addition, trust has been found as an important factor in information system studies. Although a large amount of research have been conducted to investigate and evaluate information system satisfaction, the role of trust that mediates the relationship between satisfaction and its acceptance antecedence still requires a close attention. This paper examines the role of trust that mediates the relationship between information system acceptance and user satisfaction. Selected domains from the past models are adapted and integrated with theoretical findings from prior IS satisfaction research to theorize a model of trust and satisfaction. Six hypotheses are derived and empirically validated. Findings of the study suggest ease of learning is related to ease of use; ease of use and information quality are the determinants of trust; and trust mediates the acceptance and satisfaction relationship. This study draws substantive attention to the requirement of understanding trust as a mediating variable in an information system context.

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Keywords: information system satisfaction; user acceptance; trust

1. Introduction

One of the fundamental information system success criteria is user satisfaction. Evaluating the satisfaction and its determinant is an important exercise to gauge the value and effectiveness of the information system investment. In the past, user satisfaction has been used to surrogate information system success. It is an assessment made by a user, along a continuum from positive to negative, about certain qualities of information systems. Furthermore, various determinants of user satisfaction have been assessed and investigated on how users perceive their acceptance rate on the fit of the information system characteristics and user needs.

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For advocating user acceptance on information system use, it is thus of importance to ensure an appropriate level of fit between the user needs and expectations. Attitudinal belief constructs of Technology Acceptance Model, Information System Success Model and Theory of Planned Behavior, for instances perceive usefulness, perceive ease of use, attitude, intention, information quality and system quality have been well investigated to capture the behavioral effect of information system use on satisfaction.

In determining the acceptance also, trust has been widely studied as a key factor. Common antecedents of the behavioral beliefs are attitude, perceive behavioral control, subjective norms, perceive usefulness and perceive ease of use (Wu & Chen, 2005). There has been debate as to whether trust attributes such as benevolence, ability and integrity can be ascribed to technology. But Li et al., (2008) ascertain that the attributes are applicable to technology, especially given that the technology is designed and operated by humans. However, while trust is apparently an important antecedent of user acceptance (Wu & Chen, 2005), it is argued trust is the result of the system acceptance, which later influence the information system user satisfaction.

Therefore, the purpose of the study is to examine the influence of user acceptance on the trust of the system, and to examine the mediating role of trust on the link between information system user acceptance and satisfaction.

2. Review of Literature

Information system success has long been the concern of IS researchers. In its simplest definition, information system success is simply the dependent or output variable (Delone and Mclean, 1992). With this regard, many measures define the success. For instance, the information system success model measures the aspects of MIS success as information quality, system quality, service quality, use, satisfaction and net benefits (Delone and McLean, 2003). They further add the net benefits can be measured as work group impacts, interorganizational and industry impacts, consumer impacts and societal impacts.

On the other hand, Smith and Hirschheim (1999) describe the output variables as the consequences of the introduction of a new information system, and these consequences can affect the aspects of economics, organizations, social and management at the levels of macro, sector, firm, application and stakeholder. Although Delone and McLean (2003) suggest many dimensions of information system success, the ones that are essential are the usage and the performance impacts.

The interest and importance of the information system success has led to the antecedents investigations. Of particular interest to the researchers are the appropriation fit, individual characteristics and trusting beliefs.

While past studies have evaluated and uncovered the fit as predictor to system usage (Norzaidi et al, 2007 ; Goodhue et al, 2000 ; Staples and Seddon, 2004, Dennis et al, 2001), the fit dimensions are not standard. Yet, most follow the work of Goodhue and Thompson (1995) with quality, locatability, authorization, compatibility, systems reliability and ease of use become the common measurement.

From the individual characteristics, Strong et al (2006) have found computer self-efficacy has an effect to technology utilization, moderated by characteristics of the technology being evaluated. In another study, Goodhue et al (2000) apply user evaluation concept as a surrogate to task-technology fit, and using the individual characteristics as computer literate, the characteristics are manipulated to fit with technology. In an effort to measure user evaluations of information technology in health care industry, Pendhakar et al (2001) have adopted Goodhue's model (1995). However, instead of applying computer literacy as the individual characteristics, a very limited meaning of individual characteristic items has been used. There are only one item that measures prior information technology education and another item that measure the job orientation requirement. On the other hand, individual characteristics define as experience, prior knowledge and intellectual capabilities (Sun and Zhang, 2006) have been found to have a significant impact to usage.

Furthermore, in earlier research, the concept of trust was studied in the context of interpersonal relationship, which is the human being. However, in the IS field, the studies on trust focused on web vendor or virtual team members. Therefore, the trust was on a human, or an organization of humans. Recently, the focus has shifted to evaluating trust in technology, in which the trust is placed on a technological artefact, such as software agent or an information system (Li et al, 2008).

Trust in information system is a viable concept as highlighted by McKnight et al (2002) since it reflects the willingness of the trustor to “behaviourally depend on a piece of software to do a task.” Trust is studied in various dimensions. Yet, the most significant aspect of it is when trust is defined as a set of specific beliefs about benevolence, ability and integrity, which Gefen (2005) and Meyer et al (1995) label as trustworthiness.

While there has been debate as to whether human attributes such as benevolence can be ascribed to technology, Li et al (2008) are certain that the attributes are applicable to technology, especially given that the technology is designed and operated by humans. Previous studies have suggested trust plays a role in predicting user behaviour in adopting technology (Jarvenpaa et al, 2000 ; Gefen et al, 2003).

Thus, based on the discussion, the following hypothesis and framework will be used in the study:

- H1: Ease of learning is has a relationship with ease of use.
- H2: Ease of use has a relationship with trust.
- H3: Information quality has a relationship with trust.
- H4: System quality has a relationship with trust.
- H5: Trust has a relationship with satisfaction.
- H6: Trust mediates the relationship between user acceptance and satisfaction.

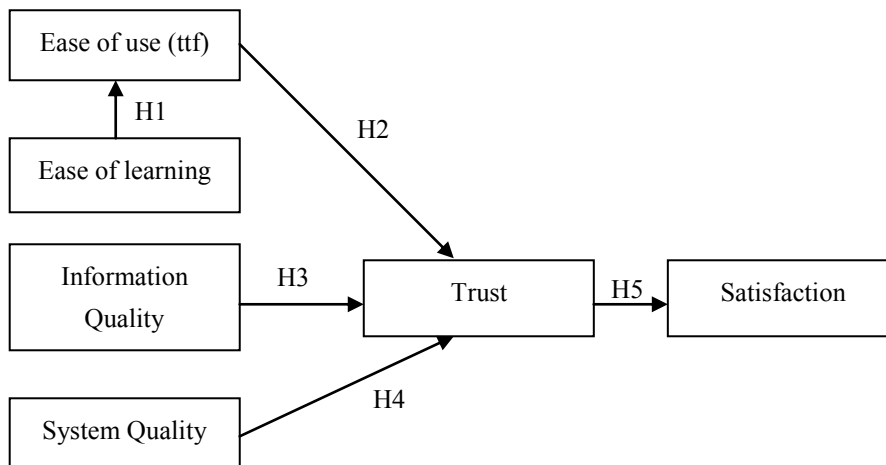


Fig. 1. The Conceptual Framework

3. Research Methodology

3.1. Instrument Construction

Six constructs were measured in this study: ease of learning, ease of use, information quality, system quality, trust and satisfaction. The constructs were measured using a seven point likert scale ranging from 1 of strongly disagree to 7 of strongly agree, drawn from measures in information system studies. Items for ease of learning, ease of use, information quality and system quality were adopted from Staples and Seddon (2004), while trust and satisfaction items that capture the post affect usage were adopted from Gefen et al., (2003) and Seddon and Yip (1992) respectively.

3.2. Data Collection

In information system studies, gauging for the uniformity of the systems and applications which are being assessed and evaluated is important for ensuring responses consistency and data . Hence, data was collected from students of higher learning institutes and they were asked to rate their level of acceptance, trust and satisfaction on the students information system. 450 questionnaires were distributed, and 331 were returned, contributing 73.5% to the response rate. The study used perceptual measures to capture data as these are acceptable measures in most survey research.

3.3. Factor Analysis

Factor analysis with varimax rotation was performed to ascertain ease of learning, ease of use, information quality, system quality, trust and satisfaction are distinct constructs. The results confirmed the existence of six constructs with eigenvalues greater than 1.0 that accounted for 74.69% of the total variance. The correlation matrix shows no value exceeds 0.85 that suggest for none existence of multicollinearity. The KMO value of 0.920 signifies that factor analysis is appropriate.

4. Results and Discussion

The results of the descriptive analysis, factor loadings, reliability and construct validity tests are shown in Table 1. The descriptive results may imply users agree the system is easy to be learnt and used, quality of the information and the system is reliable, the system can be trusted and users are satisfied. The factor loadings, convergent validity and composite reliability suggest the constructs are valid. Thus, further analyses of confirmatory factor analysis and structural equation modeling are to be proceed.

Table 1. Descriptive and reliability analyses

	Mean	Std. Deviation	Cronbach alpha	Item loadings	Convergent validity	Composite reliability
Ease of Use			.919		0.796	.921
Easy to use.	5.042	1.340		.894		
User friendly.	4.997	1.382		.934		
Easy to get the system to do what need to do.	4.870	1.367		.847		
Ease of Learning			.902		0.749	0.900
Easy to learn.	5.060	1.263		.863		
Easy to become more skilful.	5.084	1.225		.894		
New features are easy to learn.	4.879	1.271		.839		
Information quality			.824		0.634	0.837
Useful format.	4.969	1.208		.851		
Accurate.	4.897	1.229		.850		
Up-to-date information.	4.833	1.441		.675		
System reliability			.783		0.588	0.807

“Up” and available.	4.622	1.271	.586		
Minimum inconvenient down times.	4.803	1.277	.874		
Irregular problems.	4.800	1.277	.811		
Trust			.927	0.764	0.928
Competent and effective.	4.833	1.343	.854		
Performs its role very well	4.885	1.334	.941		
Truthful	5.057	1.235	.850		
Employed for best task interest.	4.948	1.379	.847		
Satisfaction			.932	0.784	0.956
Adequate	4.951	1.367	.790		
Efficient.	4.915	1.390	.951		
Effective.	4.975	1.374	.944		
Overall satisfaction.	5.069	1.470	.847		

Next, confirmatory factor analysis is performed. The analysis yields a result of chi-square/df = 2.227, CFI = 0.968 and RMSEA = 0.061. Then, running the structural equation modeling for testing the hypotheses resulted in chi-square/df = 2.350, CFI = 0.963 and RMSEA = 0.064. The model fit fulfils the minimum requirement by Segar and Grover (1993) and Browne and Cudek (1993).

The results of the hypothesis testing are shown in Table 2. Referring to the table, there are evidences that ease of learning is related to ease of use while ease of use and information quality are also related to trust. However, the results suggest system reliability has no significant relationship with trust. Yet, trust is related to user satisfaction. Comparing between ease of use and information quality, the later has a higher influence on trust as depicted by the regression weight of 0.420. In addition, ease of learning explains for about 74% variance in the ease of use. About 43% of the variance in trust is explained by ease of use and information quality while 57% of the satisfaction variance is explained by trust.

Table 2. Hypotheses Testing

Hypothesis	Relationship	R ²	β	Sig.	Result
H1	Ease of learning and ease of use	0.737	.859	.000	Supported
H2	Ease of use and trust	0.425	.213	.002	Supported
H3	Information quality and trust		.420	.000	Supported
H4	System reliability and trust		.105	.124	Supported
H5	Trust and satisfaction	0.569	.754	.000	Supported

In examining the role of trust as a mediator, the approach taken follows the recommendation of Baron and Kenny (1986). An estimation of the direct effect between ease of use, information quality and system reliability and user satisfaction is required, which produces model 1. Then, trust as the mediating variable is added up which produces model 2. Running the two models generate the results as displayed in Table 3.

Table 3. Testing for Mediating Effect

Model element	Direct effect	Indirect effect
Model fit		
chi-square/df	2.151	2.144
Degrees of freedom	94	95
Probability	0.000	0.000
CFI	0.975	0.959
RMSEA	0.059	0.059
Standardized parameter estimates		
R ²	0.391	0.571
Beta for satisfaction	0.626	0.756
Beta for trust	-	0.724

Following Baron and Kenny (1986), the results indicate that the relationship between user acceptance measured as ease of use, information quality and system quality and satisfaction is mediated by trust on the system. When trust is controlled, on average, a unit increase in user acceptance is associated with 0.756 unit increase in satisfaction, compared to 0.626 unit when trust is not controlled for. In addition, user acceptance alone explains about 39% of the variation in satisfaction, as compared to about 57% when trust is controlled. Hence, there are strong evidences that suggest trust mediates the relationship between user acceptance and satisfaction. Therefore, H6 is supported.

Therefore, the role of trust in mediating the relationship between user acceptance and satisfaction is vital in this study as drivers for user acceptance and satisfaction. As related with Maslow Hierarchy of Needs that one of an individual primary needs is safety needs which include security, protection against physical and mental dangers and future deprivation (Keeling and Kallaus, 1996, p. 167), this may be the reason of this result. Building of trust is based on an individual personal feeling of security and safety, thus, it result a positive reacting attitude towards the system.

Despite of this, using a system that is user friendly, contributed individual encouraging behavior of using the system. Furthermore, with the use of quality system that can also produce quality information may result efficiency towards system process. Nevertheless, there is scarcity of research on producing quality system by understanding individual behavior especially through cognitive behavior. Thus, understanding cognitive behavior it is expected to increase individual behavior in accepting a system.

5. Conclusion

The main objective of the study is to examine the mediating role of trust on the linkage between user acceptance of information system measured as ease of use, information quality and system quality, and user acceptance. While previous studies have found a strong effect of trust on user acceptance, the study argues trust is the result of achieving an appropriate level of user acceptance, and trust also plays a role that mediates the user acceptance and satisfaction relationship. The results of the structural equation modeling confirm the role of trust. Hence, it signals for the utter importance of ensuring the appropriate fit of the user acceptance before users will establish their behavioral beliefs and confirm on the integrity and ability of the system. In addition, as the system is more trustworthy, users will be more satisfied.

In essence, the finding of the study adds to the body of knowledge by empirically examines and evaluates the role of trust in the context of information system, and overcome the limitations of previous research. Future studies shall enhance the model by incorporating more dimensions of user acceptance and information system success criteria. Future studies shall enhance the model by incorporating more dimensions of user acceptance such as from the context of cognitive behavior and other information system success criteria.

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