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Consumer's Initial Acceptance of E-Commerce Website: A Contingency Approach

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Abstract

As the consumer e-commerce market grows intensively competitive, the strategy in retaining new customers at their first visits to a website has been recognized as a critical research issue. Not only does the customer's initial acceptance of a website capture business opportunities, it also casts great impact on customers' return purchases in the future and their loyalty buildup. From a contingency approach, this paper attempts to explore the theoretical explanations for consumer's initial acceptance of e-commerce website. By synthesizing previous research into a coherent body of knowledge and by recognizing the roles of contingency factors, we develop a new e-commerce website acceptance model that examines user's initial acceptance of a website. We expect the research to shed light on e-commerce business model and website design practice as to successfully retain new customers.

Keywords

Business model, e-commerce, web engineering, consumer, technology adoption, contingency theor*y*

Introduction

Business models is "a conceptual tool that contains a big set of elements and their relationships and allows expressing the business logic of a specific firm" (Osterwalder et al. 2005). It refers to the firm value for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams. In the digital economy, the development of business supported by information and communication technologies casts huge impact on economic systems and introduces new business models (Zimmermann 2000). Consumer e-commerce (B2C), which leverages the Internet for new customer-oriented business ventures, represents a challenging business model that bears significance in the new economy (Zimmermann 2000). A typical business model of consumer e-commerce includes flexible market structures, customer-driven value creation processes, digitalized products, and matured infrastructure for distributed market place (MacInnes et al. 2005; Zimmermann 2000).

New electronic medium has created opportunities for virtually all companies ranging from small start-ups to Fortune 100 companies (Garrity et al. 2005). Such web-based information system represent a new frontier for business to establish on-line presence which exists in the cyberspace and offers merchandise and services (Hoffman et al. 1996). Due to the low setup cost, transaction cost, maintenance cost, and increasing business opportunities (24*7), the prevalence of the e-commerce

websites on retailing and services has been stimulated. This prosperity in consumer e-commerce websites, however, introduces enormous competition into the online market. Meanwhile, the higher availabilities of broadband Internet access and personal computers have granted online users with capabilities and convenient access to online shopping. Customers have grown to be powerful, demanding, and utilitarian in their online shopping (Koufaris et al. 2004) which shifts the locus of power from vendors to customers (Raman 1997). As the realization of consumer e-commerce profits depends on consumer willingness to employ the web for transactions, it has been regarded as important for websites to retain new customers at their first visits (McKnight et al. 2002). Not only does the customer's initial acceptance of a website capture immediate business opportunities (Longwell 1999), it also casts great impact on customers' return purchases in the future and the buildup of their loyalty, which is poor in consumer e-commerce nowadays (Morrisette et al. 1999).

A number of factors may prevent the customers from accepting a website during their first visits. Among other, information asymmetry may cast huge impact on customer's perception toward the new website. Without prior interactions, customers possess little knowledge of the website and they perceive the website as a unfamiliar actor who does not have credible and meaningful information (Bigley et al. 1998). McKnight et al. suggest that such information may not be gained until the customers engage in purchasing behaviors which allow more opportunities in assessing the company quality (McKnigh et al. 2002). At the first visit to a website, consumers therefore have to rely on cues, signals, and symbols (such as site appearance or vendor reputation) to make inferences about the vendor (McKnight et al. 1998). The research on customer's initial acceptance of website, however, has been understudied and research findings are scanty (Koufaris et al. 2004; McKnight et al. 2002). Prior research of consumer website success typically assumes an existing contact between the consumer and the website. This assumption has been found questionable due to the reasons suggested above. New e-commerce acceptance models, therefore, are important and necessary to explore the website success within the context of users' initial visit.

In this paper, we explore how website can attain new customer by improving the website system design and the data management practices. The contribution is two folded: (1) we distinguish the roles of website system quality and data quality and we explore their special design concerns and (2) we examine the contingency factors (such as individual traits and purchasing task characteristics) and discuss their impacts on the individual online customers with attitude and behaviors. The paper helps the system design and management so that the website can efficiently capture new online users and business opportunities.

The rest of the paper is organized as follows. In the next section we present the literature review and the theoretical foundations. Next, we discuss the research model development. Finally, we conclude the paper by discussing the implications for business modeling and consumer e-commerce website design theorizing.

Literature Review

The existing consumer e-commerce website success models have evolved from the prior studies of IS success models such as Technology Acceptance Model, Task-Technology Fit, and DeLone and McLean Model. We provide a detailed discussion of the prevailing IS success models and their influences to consumer e-commerce studies.

Technology Acceptance Model (TAM) and Extensions to Consumer E-Commerce

A web site is, in essence, an information technology. And thus, online purchase intentions may be explained in part by the Technology Acceptance Model (TAM). TAM is a preeminent theory of technology success and adoption in IS research. Numerous empirical studies have proved that TAM is a parsimonious and robust model of technology acceptance (Adams et al. 1992; Chin et al. 1995; Gefen et al. 1997). TAM is developed to explain and to predict computer-usage behavior. Davis et al. suggested that "The goal of TAM is to provide an explanation of the determinants of computer acceptance that in general is capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Davis et al. 1989). The major determinants are the perceived usefulness and perceived ease of use, contributing to user behavior intention which later leads to actual system use.

TAM has been widely adopted into consumer e-commerce and proved to be successful (Benslimane et al. 2003; Dishaw et al. 1999; Klopping et al. 2004). However, TAM does not clearly state the external variables which may impact the perceived usefulness and perceived ease of use in a given context. When extended into consumer e-commerce studies, it is important to carefully examine the set of influential factors. Prior literature has suggested that the systems quality (Negash et

al. 2003; Palmer 2002) and data management (Huizingh 2000; Ivory et al. 2001), among others, are of particular relevance to the website design. Without a justified theoretical model of system design involving pivotal factors as such, consumer e-commerce systems are at risk of losses of business opportunities.

Task-Technology Fit (TTF) and Extensions to Consumer E-Commerce

Task-Technology Fit (TTF) model was introduced by Goodhue and Thompson (Goodhue et al. 1995). TTF posits that information technology will be fully utilized if, and only if, the functions fit the activities of the user. Besides, TTF model asserts that, for an information technology to have a positive impact on individual performance, the technology must be utilized. TTF has been validated within organization context (Zigurs et al. 1999) and been extended into e-commerce (Klopping et al. 2004).

It is arguable that some constructs in TTF may require further refinement. Goodhue and Thompson suggested that technology refers to computer hardware, software, and data. This suggestion, however, contradicts with the other IS literatures which regard data as different from information technologies (hardware and software). Shannon and Weaver urged that technical level of system support and semantic level to be separated as to avoid obscured understanding about the contributions from both levels (Shannon et al. 1949). Similar position is held by numerous studies in IS (DeLone et al. 1992; Karimi et al. 2004; Zhang et al. 2000). In addition, the core construct of "Utilization" in TTF may not fit the context of users' first visits.

DeLone and McLean Model and Extensions to E-Commerce

The DeLone and McLean (D&M) Model is mainly based on the communication research of Shannon and Weaver (Shannon et al. 1949) and the Information Influence theory of Mason (Mason 1978). In the D&M Model, construct "system quality" measures technical success and "information quality" measures semantic success. In addition, "user satisfaction", "individual impacts", and "organizational impacts" measure system success when the system "use" is executed. The D&M model has been validated by the researchers (Seddon et al. 1994) and further been adopted in the analysis of consumer e-commerce (Molla et al. 2001).

However, researchers have commended on the difficulty of applying the model to specific research contexts (DeLone et al. 2003). Secondly, the D&M model does not recognize the impact of contingency factors. Suggested by contingency literatures (Myers et al. 1998; Van den Hooff et al. 2005), a universal solution is unrealistic for any given information system design in that the application of information systems will be impacted by the environment. The implication of contingency theory is valid in the context of consumer e-commerce as individual traits, purchasing task characteristics, and cognitive believes may influence the online customers with their decision making or purchasing behaviors. Therefore, researchers are strongly suggested to study and integrate related contingency factors for website success model development. When the context of first visit is concerned, the relevant contingency factors remain largely unknown.

Theoretical Development

To measure user's initial acceptance of e-commerce website for system design practices, we present the following research model as in Figure 1. The model extends the D&M model and incorporates contingency factors at varying levels.
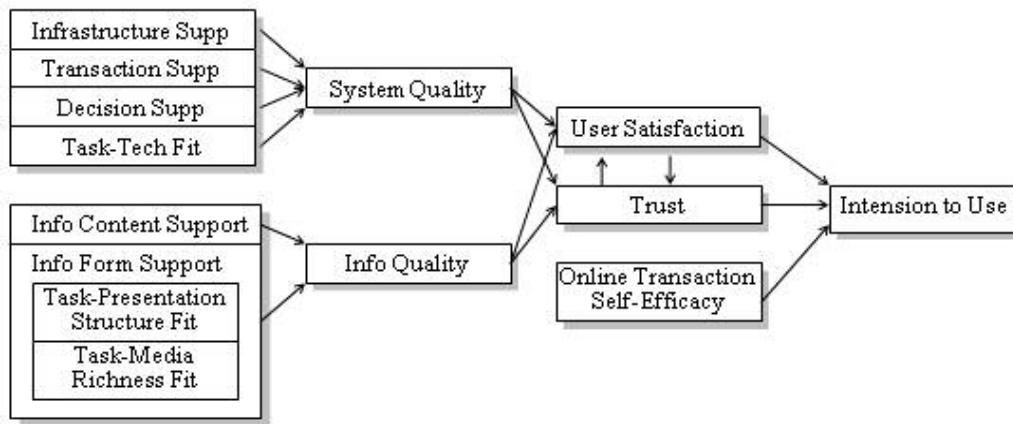
Figure 1. Consumer's Initial Acceptance of E-Commerce Model

System Quality

To evaluate the contribution of information systems, the processing system has been identified as a critical object in the research. The existing IS literature has contributed an abundant volume of findings on system quality factors. We summarize the major factors in Table 1.

Table 1. Major Factors of Web System Quality

Factor	Literature	Factor	Literature
System Accessibility	Liu and Arnett (2000) Negash et al. (2003) Nelson et al. (2005)	System Reliability	Tiwana (1998) Liu and Arnett (2000) Aladwani and Palvia (2002) Nelson et al. (2005)
System Responsiveness	Tiwana (1998) Liu and Arnett (2000) Molla and Licker (2001) Chen et al.(2004) Nelson et al. (2005)	Decision Support	Haubl and Trifts (2000) Vahidov and Fazlollahi (2003) Kohli et al. (2004) Garrity et al. (2005)
Transaction/ Task Capability	Huizingh (2000), Parsons et al. (2002), Garrity et al. (2005)		

Infrastructure Support

The set of system quality factors in Table 1 may be further categorized. Constructs such as "System Reliability," "System Accessibility," and "System Responsiveness" measure the qualities of website infrastructures. The infrastructures are mainly concerned about the software system and hardware system which support the online website business processes (Nelson et al. 2005). Software systems may include operating systems, web server systems, and database management systems. Hardware systems may include network facilities, mainframes, and data storage. The quality of these infrastructures determines whether the website could achieve a satisfactory performance in download speed, connection reliability, uninterrupted business transactions, and stability of software and hardware etc (Han et al. 1999). Hence, we propose the following proposition.

P1: Infrastructure support has a positive impact on system quality

Transaction Support

Constructs such as "Transaction Capacity" and "Task Capacity" assess the website's capacity to facilitate user's purchase transactions (Huizingh 2000). Tang et al. defined e-commerce transaction as "a means to conduct particular commercial activities using the global digital E-commerce infrastructure" (Tang et al. 2004). Transaction involves a flow of activities towards online purchasing. Example activities are such as "Searching for Product", "Managing Shopping Cart", "Filling the Payment", "Submitting the Order", and "Tracking Order Status". To support transactions like these, the website information

system is expected to provide a complete set of transaction procedures, tools, and security. An incomplete, flaw, or unreliable transaction support system may lead to low customer satisfaction and low online purchasing rate as a result. Therefore, we propose the following proposition.

P2: Transaction support has a positive impact on system quality

Decision Support

A consumer e-commerce website can be decomposed into numerous tasks, subtasks, and decisions (Garrity et al. 1998). Many of the purchasing tasks and subtasks can be categorized as intellectual or decision support based. The construct of "Decision Support" measures the support provided by the web site in facilitating user decision making process. Decision support adds value to the web information system as it helps users make purchasing decisions at efficiency and quality (Garrity et al. 2005; Haubl et al. 2000). Hence, we propose the following proposition.

P3: Decision support has a positive impact on system quality

Task-Technology Fit

Original TTF model suggests that the application of information technology may not lead to high level of system quality given a poor fit in between. By eliminating "data" from original term of "technology", we study how the technology alone may impact the system quality. This separation has practical implication in that software design and raw data management are usually managed by separate divisions in organizations. Hence, the construct of "Task-Technology Fit" discussed hereafter is different from the one originally proposed by Goodhue and Thompson.

The level of task-technology fit is dependent on task characteristics and the functionalities of the technology. As suggested, online purchasing tasks may involve "Identifying Potential Product Category" and "Selecting Product". Such modeling requires that we distinguish re-buys from new-buys (Novack et al. 1991). In the context of consumer's initial visit to a website, re-buys refers to the scenario where user purchases products or services that he or she is familiar with; new-buys, however, refers to the purchases of unfamiliar products or services. Re-buy represents a task characteristic of "routines" which requires little or no additional information and decision making (Benslimane et al. 2003). On the contrary, new-buys represents non-routine purchases and involve much complexity. Consumers are required to search for information about the product specification, price, and vender. As the size of purchasing problem increases, consumer may find the purchasing processes to be time consuming and complicated. With the varying tasks and related characteristics, therefore, users rely on matching technologies to facilitate their purchasing tasks. With regards to non-routine purchase, advanced technology supports are advised such as higher level of user machine interaction and enhanced algorithms for search and multi-criteria comparison. In the case of routine purchase, however, simple technology may be perceived as enough. However, it is also observed that sophisticated and advanced technology may degrades routine purchasing task performance since much more time, complexity, and learning effort are involved (Karimi et al., 2004). Hence, it is important to achieve the fit between consumer tasks and the technology employed. We propose the following proposition about task-technology fit.

P4: Task-technology fit has a positive impact on the system quality

Information Quality

Information quality has been identified as another essential quality of information systems in that it measures the quality of the data delivered to the customers (DeLone et al. 1992). Quality information helps customers capture product and service information and enhances the efficiency of decision making and purchasing tasks. Meanwhile, quality information affects customers' perceptions of the quality of products and services (Wang et al. 1996). Hence, information quality is a pervasive concept and a key antecedent of information systems success and user acceptance. Some of the most important factors of information quality are listed as in Table 2.

Table 2. Factors of Information Quality

Factor	Literature	Factor	Literature

Accuracy	DeLone and McLean (2003) Wang and Strong (1996) Redman (1996) Fisher et al. (2003) Cappiello et al. (2003)	Relevance	DeLone and McLean (2003) Chengalur-Smith et al. (1997) Chengalur-Smith and Pazer (1998) Fisher et al. (2003)
Completeness	DeLone and McLean (2003) Cappiello et al. (2003) Garrity et al. (2005)	Format/ Representation	Katerattanakul and Siau (1999) Zhang et al. (2000) Garrity et al. (2005)
Interpretability/ Understandability	Xu and Koronios (2004) Nelson et al. (1999) Garrity et al. (2005)	Accessibility	Huang et al. (1999) Katerattanakul and Siau (1999) Garrity et al. (2005)
Currency/ Timeliness	Cappiello et al. (2003), Xu and Koronios (2004), Garrity et al. (2005)		

In consumer e-commerce context, these information quality constructs may be grouped into the content dimension and form dimension as suggested by Kim et al. (Kim et al. 2003). It has been recognized that the information in consumer e-commerce is different from that in the traditional information systems, as cyber businesses do not have the luxury of face to face interaction between customers and sellers. Consumer e-commerce websites are highly dynamic and interactive in nature. They utilize rich hypermedia mechanisms in user interfaces for information presentation and provide a tremendous amount of control over temporal aspects of information delivery to end users (Kim et al. 2003). Unlike the data quality studies of traditional information systems, website data management concerns about the interface-related information presentation, the information delivery performance, and the structuring of hypermedia data objects and hyperlinks. The two dimensions address the main problems that online consumers may encounter during purchasing on websites: irrelevant information, cognitive overhead, and disorientation (Kim et al. 2003).

The Content Dimension

The content dimension of information quality includes factors such as "Accuracy," "Relevance," "Completeness," "Interpretability/Understandability," and "Currency/Timeliness." It is geared towards providing users with accurate, relevant, complete, and current information, thereby addressing primarily the problem of irrelevant information in web systems. Information accuracy is referred as "the extent to which data are correct, reliable, and certified" (Wang et al. 1996). Information relevance assesses whether the information content is pertinent to users' interest. Information completeness is associated with data values and it measures the extent to which information is not missing and is of sufficient breadth and depth for the task at hand (Xu et al. 2004). Information currency refers to the temporal accuracy of information content and links on web pages and assesses the extent to which data is sufficiently up-to-date (Xu et al. 2004). Since the content dimension is inherent in information quality, we propose the following proposition.

P5: Information content has a positive impact on information quality

The Form Dimension

Covering factors of "Format/Representation" and "Accessibility," the form dimension assesses the information presentation in terms of interface structure, information packaging, and information accessibility that are geared towards enhancing users' cognition, thereby addressing the hypermedia problem of cognitive overhead (Kim et al. 2003). Interface structural quality is determined by interface consistency and structural awareness. Information packaging quality refers to the efficiency that information is packed within hypermedia interfaces for presentation. Information accessibility measures the ease and efficiency of navigation within the website. However, the quality of information form dimension may be influenced by contingency factors such as purchasing task characteristics. Both the task-presentation structure fit and the task-media richness fit cast great impact on users' perception of information form.

Among the online shopping tasks, two major categories are identified with consensus: searching tasks and browsing tasks. In searching tasks, consumers have particular, known, and specific objective; whereas in browsing tasks, consumers only have general objectives. Hong et al. studied the fit between these two tasks and two most popular presentation structures of "matrix" and "list" (Hong et al. 2004). Supported by Cognitive Fit Theory (Vessey 1991), the Competition-for-Attention Theory (Janiszewski 1998), and the Scanpath Theory (Noton et al. 1971a; Noton et al. 1971b)), Hong et al. found that the list

format supports browsing tasks and the matrix format facilitates searching tasks. This result suggests that the task-information presentation structure fit is an important concern in selecting the information forms.

Meanwhile, information quality should always be considered in terms of "use-based data quality" (Orr 1998). This highlights the fit between the task characteristics and the information media. Rice et al. found that the degree to which a person perceives an information medium to be appropriate to his or her task influences the adoption and use (Rice et al. 1990). According to the Media Richness Theory (Daft et al. 1986), richer information, such as multimedia, has a higher capacity "to change understanding within a time interval" (p.560). In the context of consumer e-commerce, rich media are those information formats which are high in (a) the possibility of instant feedback, (b) the ability to convey multiple cues (c) the use of natural language to convey subtleties and nuances, and (d) the personal focus of the medium. An example of rich media is 3D technologies and construction of *Virtual Reality* as explored by Suh and Lee (Suh et al. 2006). Since information requirement of uncertainty and equivocality are inherent in non-routine online purchasing tasks, a high level of support in the information quantity and media richness are desirable; This is, however, not the truth for routine purchases where low volume of information and lean median are recommend (Van den Hooff et al. 2005).

Since the form dimension is inherent in information quality, we propose the following proposition.

P6.1: Task – Presentation Structure fit has a positive impact on information quality

P6.2: Task – Media Richness fit has a positive impact on information quality

User Satisfaction

Satisfaction is widely accepted as a major indicator of the system success and adoption (Gatian 1994). Doll and Torkzadeh defined end-user computing satisfaction as "the affective attitude towards a specific computer application directly" (Doll et al. 1988). Prior research suggested that low level of user satisfaction with an information system may cause users to abandon the technology (Bailey et al. 1983). In addition, Paul et al. (Paul et al. 2004) indicated that user satisfaction is directly related to system use. Arguably, the role of satisfaction may remain valid in the context of user's initial visit to a website. A low level of user satisfaction may lead the users to leave an unfamiliar website and try the other websites. We propose the following proposition.

P7: User satisfaction has a positive impact on intention to use

DeLone and McLean, in their IS Success Model, suggested that system quality and information quality positively influence the user satisfaction in general information systems. Other researchers (Seddon 1997) further examined the D&M model and found the similar relationship between system quality/information quality and satisfaction. We argue that the similar relationship exists within the context of user' fist visit to a new e-commerce website.

P8: System quality has a positive impact on user satisfaction

P9: Information quality has a positive impact on user satisfaction

Trust

The consumer e-commerce poses new challenges to the online purchasing as risk becomes a concern (Gefen et al. 2003a; Gefen et al. 2003b; Gefen et al. 2004). Unlike the conventional buying-selling process, consumers have limited information concerning about the website and the vendor; this, in turn, introduces the uncertainty and risk of online purchasing such as Internet fraud, credit card theft, and privacy leakage (McKnigh et al. 2002). The level of risk inherent in consume e-commerce, however, is offset by the degree to which trust is maintained by online customers. Trust reduces the uncertainty and risk perceived by users and, consequently, enhances the perception about the website quality and leads to higher satisfaction, especially at a user's first visit to a new website with which he or she has no prior experience (Koufaris et al. 2004). Higher user satisfaction with the information and system qualities of a new website, in turn, may enhance the trustworthiness perceived about the website (Koufaris et al. 2004; McKnight et al. 2002). We propose the following propositions.

P10: Trust towards the website has a positive impact on user satisfaction

P11: User satisfaction has a positive impact on trust towards the website

Gefen et al. proposed that trust should be understood as a multi-dimensional construct in ecommerce (Gefen et al. 2003b). They conceptualized that, in addition to a general trust of the environment, trust is "a set of specific beliefs" about the specific party in terms of its integrity, benevolence, and ability. Hence, the quality of the website system and information may have a large impact on the trust that an individual perceives about a website. Thus, we propose that:

P12: System quality has a positive impact on trust

P13: Information quality has a positive impact on trust

Trust also plays a key role in purchasing processes where consumers look for credential qualities of goods or services (Kim et al. 2005). It is considered as a potential antecedent of user intention to use (Chircu et al. 2000). Within the context of initial visits to new websites, trust issue appears to be more salient that in other scenarios in that prior experience is absent and there is a lack of information about website credibility. High trust towards a new website therefore may lead the visitors to use it while a low level of trust may deter the online users. We therefore propose as follows.

P14: Trust has a positive impact on user intention to use

Online Transaction Self-Efficacy

In the domain of consumer e-commerce where transaction activities are the core of business interest, Kim and Kim developed online transaction self-efficacy as a specific self-efficacy that is influenced by the degree to which one believes in one's overall competence to effect performances in online activities (Kim et al. 2005) . Kim and Kim suggested that consumers are more likely to purchase on a website over which they have confidence about purchasing exactly the item they want. The more self-efficacious consumers are with online purchasing activities, the more favorable expectation they are likely to have, and the more they are likely to use the website. The transaction self-efficacy is of high importance in the context of consumer's first visit to a website. Due to the fact that cyberspace introduces a great volume of uncertainty and risks, transaction self-efficacy may act as a pre-requisite to enable the online users to participate in the consumer e-commerce and to transact with websites that they are new to.

P15: Online transaction self-efficacy has a positive impact on user intention to use website

Conclusion and Future Research

This paper presents a conceptual framework to assess consumers' initial acceptance of a new e-commerce website. It recognizes the unique context of user initial visits by taking into consideration the specific user purchasing behaviors and technology adoption patterns in this setting. Contingency factors are integrated into the proposed model with the task-technology fit, task-info presentation structure fit, and task-media richness fit explored in detail. The research model distinguishes the different roles of system quality and data quality and suggests for related design concerns. The research model sheds light on the web system design practices and helps commercial websites successfully capture new customers and business opportunities consequently.

Website is an integrated component critical to the digital business model of consumer e-commerce. It not only provides the source of revenues to the Net-based economy but also functions as a communication channel between firms and customers. As Zimmermann suggests that the value creation processes become initiated and driven by customers, the process development of the e-commerce business model therefore has to highlight the customer-orientation (Zimmermann 2000). In addition to the website design and management strategies discussed in this paper, further study may consider the use of advanced techniques such as personalization features and online community (Negash et al. 2003; Zimmermann 2000).

The future work also includes the validation of research model and examination of propositions. Empirical data may be obtained through a quasi experiment design where websites are implemented with different levels of information quality, system quality, and other related qualities. Statistical analysis is to be conducted through structural equation modeling as to test the propositions.

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