Understanding Cyber Trust Using a Triadic Functioning Analysis

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Abstract
Although social informatics has been a subject of systematic analytical and critical research for more than three decades, previous research has rarely noted the importance of social informatics on cyber trust. Therefore, it is essential to establish a research framework that applies in cyber trust from a perspective of social informatics so that cyber trust may be achieved by different professionals and researchers. This study presents the factors under which cyber trust thrives from a perspective of social informatics.

1. Introduction
A universal parallel to the one of “real life” has been expanding since the 1990s, and still is in an online world. It has been an established fact of “real life” that trust should be viewed as a critical lubricant of social relations in the era of information technology [1]. Previous research has pointed out serious problems about trust developed in an online world [1], and some specific obstacles have been indicated by Nissenbaum [2]. For example, the identities of online consumers may be partially or entirely missing, which reduces the number of mutual cues upon which trust may develop [2]. This phenomenon may obscure the nature of mutual relationships among online users and imply a diminished sense of responsibility to one another [1, 2].

E-commerce has been making concerted efforts to assure their clients that their personal information and privacy are safe and confidential. However, e-commerce administration must also be concerned with something over which they have no control. That is, do people perceptually trust their e-commerce in mind? If not, the administration should have proper strategies to deal with how to strengthen individuals’ cyber trust. However, little research regarding cyber trust particularly in e-commerce has been tried previously, leaving an unexplored gap in the issue of cyber trust. In light of the aforementioned gap in the IT usage literature, the two research questions of interest to this study are:

(1) What conceptual dimensions dominate one’s cyber trust and how?

(2) What key factors drive one’s cyber trust?

Learning these research questions is important for theoretical and practical reasons. Theoretically, the recent emergence of Internet technology offers us a unique opportunity for building theories of IT-mediated cyber trust, an increasingly relevant yet under-examined area of research. Such theories may help bridge the gap between IT usage and cyber trust literature. From a practical standpoint, an improved understanding of the key determinants of cyber trust may help e-commerce administration design online product features, interfaces, and services that are better suited to the needs of the target client population. Collectively, to obtain the understandings to the above two research questions, this study starts from the theoretical underpinnings of social informatics theory in the following section and formulates a research model of cyber trust.

2. Theory background and research framework
Social informatics has been a subject of systematic analytical and critical research for more than three decades, but social informatics studies are scattered in several different fields, including computer science, information science and some social sciences [3].

A serviceable working conception of “social informatics” is that it identifies a body of research that examines the social aspects of information technology [3]. Social informatics is defined as the interdisciplinary study of the
design, users and consequences of information technologies that takes into account their interaction with institutional contexts [3]. Before understanding social informatics in cyber trust, it is important to note a social phenomenon of “productivity paradox” that has been ignored among professionals and researchers who used to link IT usage and productivity gains together [3]. The “productivity paradox” suggests that large investments in improving cyber trust do not necessarily boost its productivity. The productivity paradox implies that current strategies in cyber trust may be unable to produce expected social trust without considering social informatics. Note that the most effective IT alone is not sufficient to establish social or economic value [3] in case the attention to social practices is not paid. Thus, learning the relationships between IT applications and human life in institutions and a society is a first step before the traditional trust offline is introduced into cyber trust.

Many analysts in IT contexts frame claims about IT in deterministic approaches [4]. The analysts think that cyber trust suggests more precise and reliable information for users than ever before. This, however, won’t be the case if social informatics is not considered.

A triadic functioning analysis of cyber trust in e-commerce based on social informatics is proposed as Figure 1. In addition to tech-dynamics, the social informatics in cyber trust pays attention to socio-dynamics by considering major premise in a social system. For example, when, who and under what conditions the online information works out for users? Or are users looking for online assistance to help them make a better decision, and thus generating more cyber trust in an online world? This kind of contextual inquiry [3] illustrates the ways that social informatics help frame questions in trust and develop an analytical understanding of cyber trust to achieve high level of cyber trust among users. The socio-technical approach in social informatics views cyber trust in e-commerce as mixing both technological elements and social relationships together into an effectively inseparable ensemble [3]. According to an aspect of technological information processing, new media such as online databases, websites, bulletin boards and instant messenger are used to reduce the communication costs, expand the range of clients and facilitate communications. That is, as business clients communicate with other clients through the new media, differences in value across business organizations would rest upon the differences in technical architectures. For example, clients would be more likely to consider service from the healthcare institution A rather than the healthcare institution B if the institution A provided more informational value, such as including more extensive sets of data and graphics about healthcare, or having an elaborate set of cross links between medical symptoms. Of course, it does not mean that technological design alone is sufficient to insure a good quality of healthcare institution. However, there is a strong consensus that the content quality of specific e-commerce is essential in making the institution visible in the market.

![Figure 1. A triadic functioning analysis of cyber trust in e-commerce based on social informatics](image-url)
Social informatics has produced some useful ideas and findings that are applicable to e-commerce. The concept of “computerized information systems as social technical systems” is one such idea [3] that facilitates management to learn the character of e-commerce, as well as other e-service. Even though management in e-commerce often views IT as tools or simple appliances [3], it is more interesting to refer specific IT as “socio-technical systems” that is a complex, interdependent system comprised of the elements in Table 1. The elements in the Table 1 are not just a static list. Instead, they are highly inter-correlated with one another within a socio-technical system. An e-commerce management with a socio-technical orientation does not purely focus on these elements while working alone in a workplace far away from the clients who will encounter the e-commerce system. Establishing cyber trust in e-commerce takes a discovery process such as focus groups, user participation and field survey to help management in e-commerce understand the most critical and appealing features to the clients who frequently take the e-commerce service.

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<th>Social dynamics</th>
<th>Tech-dynamics</th>
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<td>Social image</td>
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In e-commerce access, technological access is considered the physical availability of suitable network equipment, including computers of adequate speed and equipped with proper software for a given online activity, while social access is considered the know-how, a mix of professional knowledge economic resources, and technical skills, to use IT in ways that increase commercial practices and social life [3]. Particularly, social access is not an “add on” to an IT structure [3] because a successful trustworthy e-commerce does not simply tack on an IT interface. In fact, internal structure of business institution and human interfaces are also highly coupled with e-commerce that efficiently satisfies clients’ needs.

While IT application facilitates the accessibility and volume of commercial information, the safeguards of the traditional commerce setting are not necessarily applied well to e-commerce. Particularly, successful e-commerce that provides online service requires trustworthy complementary technical-dynamics such as ease of use, usefulness and reliability, while social-dynamics such as social image, interaction and support that deal with clients’ social affection are also important. The detail theoretical rationale is discussed in the following section.

3. Socio-dynamics

There is a significant body of evidence outside the domain of e-commerce suggesting that socio-dynamics play important roles in influencing individuals’ beliefs in a wide variety of domains [3]. These socio-dynamics include social image, social interaction and social support [5], and their substantial influence on social-dynamics and cyber trust in e-commerce is examined as follows:

**Social image** is considered the extent to which online clients may derive appreciation from their peers, family members, or referent others for their usage of e-commerce systems. Given that people in general are likely to weigh the opinions of others in a society, social image becomes important in any study related to interactive IT such as Yahoo Answers frequently leads to mutual influences among users within social setting [6] and has proven to be a significant social motivation in IT contexts [7, 8, 9].

**Social interaction** is the second kind of socio-dynamics salient in e-commerce. Social interaction is a behavioral tendency displayed by a client of e-commerce to cultivate and maintain online relationships with online service providers via mutually interactive communications. It has been found that the greater the degree is of interactivity, the more likely it is for the e-commerce to be considered a popular and trustworthy one [10], suggesting that the social interaction may substantially affect online clients’ confidence toward the e-commerce. Online clients having nice experiences interacting with online commercial providers will generate strong trust toward the online service, because of the better structural bond of relational interaction, and consequently they have much higher faith on the service quality of the site.

**Social support** is referred as “the exchange of verbal and non-verbal messages conveying emotion, information, or referral, to help reduce one’s uncertainty or stress” [11]. E-commerce facilitates strengthening clients’ cohesion in its online community. Unfortunately, the role of
the e-commerce in generating an individual’s online social support is, as of yet, unclear [12]. Little is known about the factors that drive clients to trust e-commerce via their online social support. Despite the social support is transferring in a certain degree from a real world to a virtual one due to the rapid diffusion of Internet [13], scant attention has been paid to such online social support that is different from face-to-face social support, given the geographic dispersed nature of computer networks [14]. Therefore, understanding a potential paradigm shift regarding social support from a real world to e-commerce is important.

4. Tech-dynamics

There is significant evidence outside the domain of e-commerce suggesting that tech-dynamics play important roles in affecting individuals’ trust and social-dynamics in a wide variety of domains [15, 16]. These tech-dynamics include perceived ease of use, perceived usefulness and perceived reliability [17, 18, 19], and their substantial influence on socio-dynamics and cyber trust in e-commerce is examined as follows:

**Perceived ease of use** has been developed and validated to be a fundamental determinant of user acceptance towards specific information technology [20]. Perceived ease of use for e-commerce refers to the degree to which the prospective online clients expect the e-commerce usage to be free of effort [18]. The theoretical foundations for perceived ease of use as a predictor of cyber trust on specific e-commerce are derived from several diverse research streams, including self-efficacy theory [7], a cost-benefit paradigm, and adoption of innovations research [21].

**Perceived usefulness** stated as a determinant of IT preference and usage behavior is derived from a variety of research streams, such as self-efficacy theory, a cost-benefit paradigm and adoption of innovations research [22]. From a perspective of e-commerce, perceived usefulness of online clients may be defined as the prospective clients’ subjective probability that using the Internet will efficiently facilitate his or her online service or product. Although perceived usefulness sounds similar to perceived ease of use, the empirical results of factor analyses in previous research suggest that the perceived usefulness and perceived ease of use are statistically distinct dimensions [22]. It is affirmed the significance of perceived usefulness and ease of use in ultimately predicting online attitude and confidence [22].

**Perceived reliability** is a quantifiable measure useful in the management of IT [19]. Zhu et al. [23] indicated that perceived reliability has a direct positive effect on perceived service quality and customer confidence by electronic banking systems. Online consumers are disillusioned and dissatisfied with unreliable response, late deliveries, and inaccurate billing [24], suggesting that perceived reliability plays an influential role on lifting user satisfaction with the IT. Similarly, it has been reported that online service providers must offer mistake-free service and secure online transactions and functions [25] to enhance users’ confidence in online social interaction and trust on such interactive IT as e-healthcare and e-mail.

5. Conclusions

Online consumers have filed plenty of complaints with the Federal Trade Commission alleging online frauds [26]. Previous market survey has indicated that one out of ten consumers have paid online for items that never were delivered [27], suggesting the importance of cyber trust. There is no doubt that online consumers are tremendously worried bout whom to trust in online interactions [28]. This study presents the factors under which cyber trust thrives from a perspective of social informatics. Social informatics research pertains to e-commerce from a perspective of both social and technical changes that shed some light on cyber trust for business professionals and researchers. Social informatics introduces intriguing new social phenomena that emerge when clients use e-commerce and develop cyber trust on it. E-service providers should learn in depth the triadic functioning model proposed by this study so as to improve their consumers’ trust.

7. Reference


