

The Review of EC-Trust system (Trust in Electronic Commerce)

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Abstract:

With the progress of the Internet and economic informatization, network and globalization, electronic commerce has developed rapidly. In this process, there are many unavoidable problems and trust has been one of the bottlenecks to restrict the further development of electronic commerce. Thus, the research on electronic commerce has become an important topic. Based on the analysis and reorganization to existing literature, the paper first summarizes the concept and characteristic of electronic commerce and trust, then reorganizes the existing research results, finally makes a detailed summary and analysis.

Keywords: *Electronic commerce, Trust, Credit evaluation, Integrity system.*

I. INTRODUCTION

With the rapid development of Internet, electronic commerce (EC) has a profound impact on whole society as one of the most applications. With more choices and quick comparisons by EC, consumers can make transactions more convenience and effective.

In the 48th survey report of China Internet Network Information Center, it has been shown that, up to July 2021, China had 1.1 billion Internet users and the Internet penetration rate reached 71.6%. The application of business trading has continued to grow rapidly [1].

However, there are many unavoidable problems in this process and trust has been one of the bottlenecks to restrict the further development of E-commerce. Take China for example, over 70% users experience network security events and the primary problem among these is online fraud as is shown in the related reference. Nearly 40% netizens have encountered online fraud, which making the research on E-commerce integrity become an important topic.

In view of the importance and the urgency, many scholars studied the EC-trust from different aspects and have obtained many results over years.

Trust is critical in EC development and online transactions. It is a good predictor for consumer's purchasing intension.

The effect of perceived value plays important role in EC trust. The study of Alsaad and Mohamad [2], Changa and Lin [3] investigates the mediating effect of perceived value of B2C E-commerce on the relationship between trust in commodity information and consumer's purchasing intention. Yulia and Dan [4] analyze the effect of perceived value to the perceptions of online trust among online purchasers and their repurchase intension from the same website.

Many models [5-8] have been developed to enhance EC trust. A path model has been tested by Oliveiraa and Alhinhoha [5] to increase trust for Internet vendors with adequate solutions. A model of GBW stickiness developed by Wang and Wang [6] indicates that trust, relationship commitment and satisfaction were key determinants of stickiness intention. A model called Trust Aware Cross-Domain Deep Neural Matrix Factorization proposed by Ahmed and Saleem [7] predicts that rating of an item for an active user and solves user cold start problem in the cross-domain scenario of 'User Overlap' in E-commerce system.

Some scholars explored other factors to effect EC trust [9-13]. Lisbet and Terje [9] proposed three methods to improve trust conditions for assessors, adopting an understanding of risk, stressing uncertainty and knowledge aspects. A comprehensive model explored by Zhang and Muhammad [10] take both short-term and long-term in consideration. The effects of SWOM quality characteristics have been analyzed in the study of Cheng and Gu [11].

On the basis of literate reading, this paper review the existing literate on E-commerce integrity and then the results of the research work are analyzed and summarized.

II. FUNDAMENTAL CONCEPTS AND THEORIES

2.1 Concepts and Models of E-Commerce

EC is a brand new business model in Europe and America in early 1990s and its emergence has undoubtedly had a huge and revolutionary impact on the world's economy. Governments, scholars and business people have given many different definitions according to their status and degree of participation in EC. So far, there is not a unified and standard definition for EC. Generally speaking, EC is a transaction process based on computer network and electronic

means with business activities as its main body. In EC transactions, people cannot see the specific commodities form of traditional business model and paper documents has not been required as a basis, instead, everything goes through the Internet, including browsing plenty information and completing the transaction through the electronic payment system.

EC can be classified from different perspectives, which can be listed in Table I.

TABLE I. Classification of E-commerce

PERSPECTIVE	CLASSIFICATION
SCOPE OF EC	Local EC, Remote Domestic EC, Global EC
TRANSACTION OBJECT	Digital Goods, Conventional Goods, Online Service
PARTICIPANTS	BtoB, BtoC, CtoC
TRANSACTION STAGE OF EC	Before a Transaction, In a Transaction, After a Transaction
PAYMENT ONLINE OR NOT	Online Payment, Underline Payment

Even though there are many different categories, they all have some common features as shown in Table II.

TABLE II. Characteristics of EC

CHARACTERISTIC	SPECIFICATION
GLOBALIZATION	with Internet as its carrier, and no time and region boundary
VIRTUALIZATION	All aspects of transaction can be completed through computer work, without face-to-face, and the whole transaction is completely virtualized.
TECHNICAL DEPENDENCE	Information communication and transmission is dependent on Internet technology.
LOW COST	cost of storefront rent, personnel employment, excess inventory and others have been saved
ELECTRONIZATION	electronic transmission and documents
INTEGRATION	a lot of intermediate segment have been reduced and the firms are direct-to-consumers
COORDINATION	the communication between firms and consumers has been accelerated
SECURITY	security is the core of EC. It required the network to provide a secure solution such as encryption, access control and firewalls.

Due to the characteristics above, traditional commerce has been strongly impacted by EC

and the economic efficiency of whole society has been improved unprecedentedly. Meanwhile, some problems are inevitably highlighted. And EC integrity is one of the important problems.

2.2 Trust Theory

Trust is a common problem in society and market. Deutsch [14] seminal study analyzed trust from both the behavioral and the cognitive aspects. He defined trust as a set of expectations to lead to behavioral intentions of potential loss. Giffin [15] explained trust from three dimensions, i.e. intelligence (corresponding to ability), good character (honesty and integrity), and good will (benevolence). He defined trust as “reliance upon the characteristics of an object, or the occurrence of an event, or the behavior of a person in order to achieve a desired but uncertain objective in a risky situation”. Sociology, psychology, management and other disciplines have conducted extensive and profound researches on trust from their own perspectives.

The main research focus on three aspects: the concept of trust, factors that affect trust and the trust-building mechanism as shown in Table III.

TABLE III. Definition of trust

AUTHOR	DISCIPLINE	DEFINITION
HOSMER (1995)	Sociology	Trust is the expectation by one person, group, or firm of ethically justifiable behavior-that is, morally correct decisions and actions based upon ethical principles of analysis-on the part of the other person, group, or firm in a joint endeavor or economic exchange. Trust includes connotation of four levels: personal expectations, interpersonal relationships, economic transactions and social structure trust
COOK AND WALL (YEARS)	Social psychology	the extent to which one is willing to ascribe good intentions to and have confidence in the words and deeds of others
MAYER, DAVIS, AND SCHOORMAN (1995)	Management	The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.
MORGAN AND HUNT	Marketing	one party have confidence in or rely on another party to fulfill his obligations

(1994)		
PEARCE (1974)	Communication science	Trust exists when one individual believes that another individual will behave in ways that are beneficial to the relationship, without controlling or directing either the relationship or the individual

One important concept related with trust is integrity. Integrity is a universal moral rule, it means to be honest. The basic requirement is to keep promises. As a social person, everyone has relationship with other social people all the time. Only by following certain rules can we deal with all kinds of relationships. Otherwise, individuals will lose their foundation, while the society will lose its operational rules.

Another important concept related with integrity is credit. "Credit" comes from the Latin credere, meaning "to believe" or "to trust" [16]. Different understandings can be obtained from different perspectives. From the ethical and moral level, credit refers to the conduct rules in which people should be honest and keep their promises in daily communication. From the economic aspect, it depends on the basis of person who give credit to another person and makes the latter one have the ability of getting goods, services, money and do not need to pay cash. From the legal level, it refers to interest expectation that can be realized according to the law. The party who violates the obligation of good faith must shoulder corresponding liability. Thus, the scale of credit is often used to measure and evaluate integrity. For individuals, a lot of possible interrelated behaviors of other individuals and organizations should be considered in the interactions [17]. The social complexity can be solved by the presumption that others behavior is in a socially acceptable ways. Trust acts as the substitute guarantor to materialize the effect of relevant rules and customs [18-19]. Herbig et al. [20] discussed the construction of credit models. Tadelis [21] proposed that credit is a tradable asset, and it is also an incentive or dynamic mechanism. Fukuyama [22] believed that credit is the virtue of society and can create prosperity, he studied the role of social trust in countries from the comparative perspective and then pointed out that trust as a kind of social capital has a very important influence on the economic development.

2.3 EC Trust Theory

In EC field, each participant, including firms, consumers and banks, must be honest and trustworthy, then EC activities can run smoothly and efficiently. If the enterprises are in good faith, consumers will believe them and further to buy their products, and the enterprises can make profits. The enterprises should take integrity as the culture core in the whole process of operation and management. EC intermediaries, such as banks and certification center, must be

honest to keep a fair environment for EC activities. Also, the government and legal institute must be honest to ensure the further development of EC.

According to the 40th survey report of China Internet Network Information Center, the most important problems of online transaction selected by customers are privacy issues, unguaranteed product quality and after-sale services, which have shown huge impacts on the stable and healthy development of China's E-commerce. So, researches on effects of lack of EC integrity.

III. THEORETICAL RESEARCHES ON E-COMMERCE TRUST

At present, EC research is still at the beginning stage. For China, researches are mostly focus on reasons lead to the lack of EC integrity and establishment of EC credit management system, which are mainly based on case studies and qualitative analysis.

3.1 Reasons for the Lack of E-Commerce Trust

Thierer et al. [23] proposed that the sharing economy provided a solution to the lemons problem. Li [24] studied the lemon problem of online trading from the perspective of information asymmetry between two parties, in which some possible solutions are also proposed. He suggested that the scope and service of transaction should be further expanded under network environment and impacts will be further aggravated for digital products and service as comparing with the existing lemon problems in the trading process of physical products and services. This maybe the first research on problem of EC integrity in China, but still investigate from one dimension angle. Wang et al. [25] proposed reasons for credit lack of EC came from three aspects: (1) Computer network, (2) Online transaction, which is mainly caused by information asymmetric and uncertain economic behavior between parties, (3) Management, which indicated that a strict and effective management mechanism can be one of the important solutions to prevent credit risk of EC. Wei and Xiao [26] suggested the super cycle mechanism formed by EC credit risk from view of super circulation system. Yang et al. [27] empirically analyzed the main factors affecting integrity of E-commerce from four aspects, including consumers, business and products, website platform and trading environment. Based on platform shopping website, Wu [28] discussed factors that influence E-commerce integrity and its action mechanism by focusing on interaction between websites. Ou [29] established a static game model between businesses and consumers and intended to solve the credit problems existing in the online shopping process. Also, based on analysis of equilibrium solution of the mixed strategy, suggestions for the online credit mechanism have been provided.

Many scholars also discussed this problem from different angles. MacInnes [30] summarized the factors that led to online fraud, including product, traders and transaction process. Resnick and Zeckhauser [31] discussed the credit relationship between strangers in EC by taking the credit system of eBay, and concluded that it was hard to establish the trust relationship in virtual market. Yoon and Occena [32] developed a C2C E-commerce trust model with four perspectives into consideration, personality perspective (natural propensity to trust), website feature perspective (perception of website quality), interpersonal transaction perspective (other's trust of buyers/sellers) and institutional feature perspective (third party recognition).

In conclusion, main reasons for the lack of EC integrity can be summarized as following: (1) information asymmetry of transactors is one key factor. (2) the relevant legal system is not perfect and EC development needs more and more perfect legal norms. The lack problem of EC integrity cannot be solved properly under current laws and regulations in most countries around the world. (3) credit systems still have lot of flaws and EC credit system has not been established. There will be more and more false websites, false information and false intermediaries without a good credit mechanism to restrict EC participants. Fourth, the current technology cannot meet the requirement of E-commerce development and also cannot completely cope with the complex EC market because of the lack of related technologies with independent property rights. Fifth, the integrity consciousness of EC is weak. Deception and counterfeiting may take short-term benefits, but in the long run, it is inevitable to lose faith in the people and the society. The market economy cannot operate in a healthy way.

3.2 Research on EC Trust Theory

In recent years, the research in China still focus on theoretical qualitative aspects while the research outside China is more in-depth and standardized, with experimental economics as its main method. The common research thoughts and method are as followed:

3.2.1 Influence of integrity on economy and establishment of integrity system

Scholars outside China discussed the integrity from multi-angle investigation with comprehensive application of behavior theory, economic experiment and empirical analysis, combined integrity with economic theory. Williamson [33] thought that integrity is the choice of interest maximization after calculation of cost and benefit by rational actors. Dore [34] believed that integrity can reduce transaction cost of enterprises under uncertain environment. Mayer et al. [35-36] defined trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other party will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party". In the

trust model proposed by Mayer, trust object have three important attributes: ability, integrity and benevolence. These attributes constitute trustworthiness factor of the object and can be perceived by the subject.

The domestic scholars also analyzed the influence of integrity on economy from different perspectives and put forward the importance of building the credit system. Zhang [37] analyzed integrity from the perspective from property right, system and law then proposed that it is imminent to rebuilt creditability system. On the basis of Taobao, Li et al. [38] analyzed importance of reputation mechanism under the absence of law or the imperfection of the law.

Research on credit evaluation and establishment of credit mechanism and trust model (shown in Table IV).

TABLE IV. The credit evaluation index system of traders

PRODUCT CHARACTERISTIC	Product quality
	Product price
	Validity period of product
SERVICE QUALITY	Product advertise
	Product consultation
	Delivery of product
TRANSACTION SECURITY	Transaction mode
	Transaction process
	Transaction result

3.2.2 Integrity research based on different EC model

Most of the literature research is focus on C2C, B2B and B2C model. Jones and Leonerd [8] developed and tested a C2C E-commerce model and found that perception of website quality and third party recognition are instrumental to influence EC trust. Alsaad and Mohamad [2] revisited the function of B2C EC from an alternative view and suggested that trust has the indirect impact rather than direct impact. A path model proposed by Oliveiraa and Alhinhoa [5] provided solutions to increase trust from three dimensions, i.e. competence, integrity, and benevolence. The study of \ GBW stickiness model [6] indicated that stickiness intention were mainly determined by relationship commitment, trust, and satisfaction.

3.2.3 Research on third party certification bodies

The research on this aspect is based on credit seals. The study of Hu and Lin [39] empirically examined the influence of trust-promoting seal on consumer's online purchasing decisions, the result shows that trust-promoting seals are generally effective in promoting web sales and some seals enhance promotion better than others. Head and Hassanein [40] empirically demonstrated the effect of the third party credit seal on the establishment of consumer credit from evaluation perspective. Wei and Xiao [26] put forward some hypotheses, which are based on the economic function of promoting scales, and considering the Chinese experimental subjects, then tested these hypotheses with relevant data collected in the simulation transaction. A similar conclusion has been obtained.

3.2.4 Research on the participant of E-commerce activity

Consumers and businesses are main participants in E-commerce activities. Research content and method of E-commerce integrity are different due to both consumers and businesses have their own characteristic. Customers are mainly divided into new customers (first-time shopping) and old customers (frequent shopping), while business can be divided into two categories of high reputation and low reputation. Generally speaking, small and medium-sized enterprises, especially newly established, are low reputation enterprises. Trust crisis faced by enterprises of low reputation is inevitable higher than that of high reputation. For the enterprises, how to make potential consumers become their new customer, and then the new customer become their old customer is one of the important problems. In this process, trust is a key factor. Relative to old customer, the trust of potential consumers is one of the determinants of whether they are new customers or not. Therefore, in the research of existing scholars, trust study is based on small and medium-sized enterprises visited by first-time client which haven't established the reputation.

The research of Kai and Sia [41] investigated two trust-building strategies: portal association and satisfied customer endorsement to influence the effectiveness of actual buying behavior. The study of integrated model of initial trust and TAM [42] indicated that perceived ease of use should be required as a basic function for system design. The research model is shown as in Fig 1:

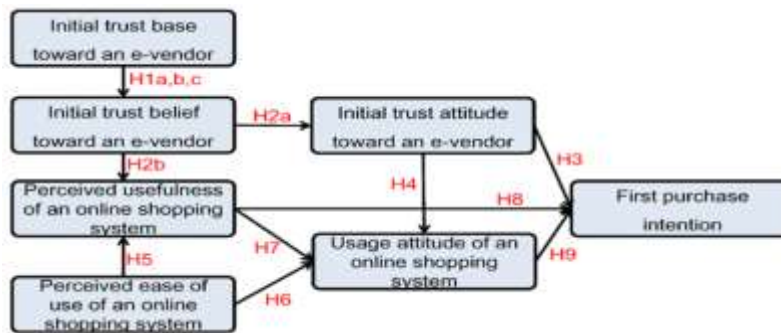


Fig.1: the integrated model of initial trust [42]

3.2.5 Meta-analysis on E-commerce trust

Kim and Peterson [43] have made a meta-analysis to examine the role of on-line trust in B2C e-commerce. The resulted showed that online trust has a significant relationship with selected antecedents and consequences. Furthermore, methodological characteristics such as study design and website type plays moderating role in this relationship.

IV. CONCLUSIONS

At present, research on EC credit is mainly focused on the risk of EC, some other important factors are rarely considered, such as social and cultural traditions, and constructions of economy and law. Therefore, describing and metrics multi-aspect factors of EC integrity need to investigate the formation of the propagation mechanism of EC, and explore more advanced assessment models and management methods by means of computer and decision-making techniques, which will be an important research direction in the field of EC credit analysis. In addition, under the influence of covid-19, the global economy has been seriously impacted, EC ushered in unprecedented challenges and opportunities, and EC credit analysis based on crisis, has become an important research topic.

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