Study on Information Security Issues of E-Commerce

Qiaofen Ji
Fuzhou University of International Studies and Trade, Fuzhou City, Fujian Province, China, 350202

Abstract. The rise of e-commerce has injected a new force for China's industrial upgrading and economic and social development. Although e-commerce has flourished greatly, a great many of security risks have been caused due to information security issues of cyber transaction which have not be powerfully guaranteed in the respect of legislation nor technology, thus weaken consumers’ confidence to cyber products directly, and then restrict further development of China’s e-commerce. Information security systems of e-commerce will be analyzed and studied from three perspectives that are technology, management and legislation in this paper, with the purpose of constructing a multi-layer and multi-platform modern e-commerce security guaranteeing system.

1. Overview of information security status of China’s e-commerce

Although China’s e-commerce stared late, by 1996, few relatively professional e-commerce websites appeared successively, since then, market size of e-commerce turned unstoppable. Although the growth rate declines in recent years, the development scale appears to be a rising trend totally. As shown in chart below, overall size for market transactions of China’s e-commerce in 2014 exceeded 12 trillion Yuan, with a 21.3% year-on-year increase. Among which, online shopping accounted for 23% of the total, and the transaction volume was close to 3 trillion, with a 48.7% year-on-year increase. China has become the largest online retail market in the world with the transaction volume exceed the United Nations, online shopping also turns to a significant power that pushing development of China’s e-commerce forward. However, China’s e-commerce is far from reaching a scaled mature stage in general, if compared with developed countries in Europe and America and other regions, there are still big gaps. The most noteworthy one lies in gaps of information security.

For a long time, information security issue has always being a key factor and significant problem that restricting healthy development of China’s e-commerce. While security incidents of the country at present emerge in endlessly, cybercrime is also more than forbidden and information leakage cases come one after another. Common security issues of e-commerce such as dirty tricks in prices of attraction tickets, air tickets and hotel reservations, etc. also including fraud trap of illegal phishing websites, tourists won’t receive the products after payment, refunds and returns can’t be made when services are found problematic, online payment of products are not so convenient. This series of information security issues have caused enormous obstacles to development of China’s e-commerce.

As most e-commerce platforms lack unified and high-efficiency internal websites management systems, and there are no governmental legal and statutory supervision and sanctions for e-commerce in effectively, when many of Chinese consumers encounter website information security issues, they could do nothing. Such problem influences sustainable development of China’s e-commerce to some
extent. So, we shall pay more attention to information security issues; strive for figuring out suitable solutions as quickly as possible.

![Market size of e-commerce (trillion Yuan)](image1)

**Figure 1.** Market size of e-commerce (trillion Yuan).

![The growth rate of e-commerce in recent years](image2)

**Figure 2.** The growth rate of e-commerce in recent years.

2. **Analysis to information security issues lie in China’s e-commerce**
 Advanced information technology is the basis for realizing e-commerce, the premise for implementation of e-commerce is security guarantee of product information. As a network platform based transaction, information security is needed to both parties, which is the basis and guarantee for the development of e-commerce. According to investigations by social institutions that 40% of the users regard their transaction security can’t be guaranteed, 45% of the users regards the management is not so normative; while investigations by professionals also indicate legal issues account for 38%, technical issues account for 18% and managerial issues account for 44%. It could be seen that information security issues of China’s e-commerce mainly lie in three aspect, that is technical, managerial and legal issues. Summary of issues is shown in the chart table.
Table 1. The types of the current issues of China’s e-commerce.

| Number | Issues 1 | Issues 2 | Issues 3 |
|--------|----------|----------|----------|
| issues of China’s e-commerce | Technical | Manageria | Legal |

2.1. Lacking of support of advanced security technology
As e-commerce is implemented by companies and users by means of a virtual network platform, while both parties of the transaction need not to meet in real world, thus result in a dual uncertainty issue of identifies of the both parties of the transaction. So, criminals could make use of all illegal means to intercept other persons’ session data to acquire effective information of legal users in websites, such as users’ personal identity information, bank accounts, payment passwords and other privacy information, and make use of other persons’ legal identify to make product and service transaction with the website or the third companies, to cheat and obtain illegal rewards. So, administrative staffs of websites shall do strengthen investigation and confirmation to real identify of each user in daily maintenance to guarantee transaction security of both parties.

2.2. Lacking of strict management awareness
Most Chinese e-commerce platform nowadays only focus on sales performance of its website, while it neglects management to systematic optimizing of information security of websites. Due to missing of management awareness, that result in a great many of information security issues to China’s e-commerce platform websites. It is on the one hand users’ transaction security: if users’ identify information is leaked, bank accounts and payment passwords are cracked, or they are cheated by the third partnership companies, many unnecessary troubles will be caused to customers, which severely affect users’ mood and loyalty to the website; It is on the other hand security issues of companies’ websites. If internal data and large customers’ information of a company is stolen by its competitors, not only immeasurable losses will be causes, but also future development prospect of the company and the website will be deeply affected. To this end, companies do need to strengthen internal management to its websites, establishing and perfecting operation system of Chinese e-commerce platform websites, do guarantee information security of the websites and its customers.

2.3. Lacking of supervision of systematic legal system
China’s e-commerce security faces various kinds of risks, which may come from all kinds of potential aspects, some are deliberate, and some are unintentional. As China’s legal system in the aspect of e-commerce at present is not so perfect, no law and regulation exclusively servicing for the whole process of e-commerce exists. Apart from April 1st, 2015 issued Law of Electronic Signature that is specially for legislation of e-commerce, most laws and regulations are just partly related to e-commerce, without any detailed and specific stipulations, operability is thus missed. Therefore, many criminals make use of law and policy loopholes one after another, as well as any means to obtain illegal rewards and extravagant profits. Such improper behaviors not only violate principle of justice and equity, but also affect other consumers’ legal interests and security.

3. Solutions to solve information security issues of China’s e-commerce

3.1. Utilizing advanced data encryption technology
Order data generated at the same time when website transactions is being made is often prone to be intercepted or tampered when they are being transmitted, thus make customers could not take the scheduled flights, stay in the booked hotel, or even receive the tickets information although they had paid. To solve these security issues, these important order data could be firstly encrypted by the website and then send it, after reaching the intended destinations, they will be then restored and website customers’ data confidentiality will be guaranteed. Such method is called information encryption technology. Encryption technology improves security of online payment transaction of
Chinese websites, making it possible for China’s e-commerce is universally accepted and extensively utilized.

Encryption technology is one of the often utilized safety guarantees in China’s e-commerce transaction, and companies could use it in transaction processes according to its demands. Common encryption techniques have two basic elements that are algorithm and secret key. Process of which could be simply summarized as this: in line with a certain algorithm, to combine original text of orders and a string of secret key, thus to generate the cipher text. Main encryption technologies are general key encryption, symmetric key encryption and asymmetric key encryption. Compared with symmetric key encryption, asymmetric key encryption is more convenient to use, with stronger confidential, but its speed is slower.

3.2. Strengthening the construction of website management

Furthermore, internal staffs of Chinese websites shall also strengthen protection management of websites. They shall also pay close attention to the latest development trends of their own websites from time to time, clean up spam advertisements and harmful information in time, to conduct all-around and overall process supervision and detection to websites transaction, thus reduce probability of appearance of illegal merchants and reduce offending transactions issues of companies in the websites; sellers who don’t provide excellent products or good services after transactions will be regulated and punished, thus to establish and perfect websites management systems, promoting sustaining development of China’s e-commerce.

3.3. Establishing and perfecting legal system of e-commerce

As achievements of e-commerce in China’s utilization and development at present are just starting, which have not yet reached the hierarchical and classified mature stage, a lot of security loopholes exist. A complete set of legal system is then urgently needed. However, there is no specialized law of regulation in the aspect of e-commerce so far in China, and we can only rely on law of e-commerce. While law of e-commerce of China is one-sided and not systematic enough, so, in order to guarantee information security of e-commerce of China, we must establish a set of systematic, comprehensive and specialized law of e-commerce.

As missing and deficiency of laws and regulations will leave many customers negative impression towards China’s e-commerce due to information security issues, long-term development of China’s e-commerce could never be separated from support of relevant laws and regulations. Each level of government and legal department shall strength organizing, by combining objective needs of development of China’s e-commerce at present, to correspondingly amend and perfect existing laws and regulations which are correlative to e-commerce, such as Criminal Law, Contract Law, Commercial Law, etc. For these existing laws and regulations, provisions for punishments of e-commerce crime might be added suitably, and increase punishments to website crimes; for a series of issues which are urgently to be solved in the development of China’s e-commerce, including electronic payment, security authentication, website and information security, protection of consumer rights, etc., that related competent departments could firstly develop department rules and regulations, and then issued by the State Council in terms of administrative laws and regulations, or turn into laws by following certain procedures.

4. Conclusion

With the China’s promotion to industrial upgrading and updating, role of e-commerce in national transformation is increasingly significant. But development of China’s e-commerce is now at the starting stage, in the aspect of processing method and mean, there is no support of the most advanced information security technology in the world; in the aspect of websites management, there is no systematic optimized management mode; in the aspect of restrain and punishment, there is no guarantee of comprehensive and specific punishment in terms of laws and regulations, and policies, so, big security gaps existed when compared with other developed countries and regions. However, as
long as we effectively solve these information security issues, we could lead and promote sustaining, fast and health development of China’s e-commerce to the maximum, and make e-commerce a real leap in China. Thereby, to promote further enhancement of China’s economic status and social status in the world.

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