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Antecedents of Chinese consumers' adoption of online auctions: An extended TAM study

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Antecedents of Chinese consumers’ adoption of online auctions: An extended TAM study

by

Rui Li

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

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Major: Apparel, Merchandising, and Design

Program of Study Committee:
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Ames, Iowa
2013

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ABSTRACT

Catalyzed by eBay’s success, e-auctions quickly became one of the major C2C transaction forms globally (Huang & Dai, 2006). eBay China began as an arm of eBay U.S. in 2003. Simultaneously, a local C2C online shopping platform, Taobao.com (Qu & Davison, 2009), was initiated. However, by 2007 Taobao had occupied over eighty percent of the market and its rival eBay was left with 8% of the market (iResearch, 2008). eBay, which has a long history, mature online auction transaction processes, and success in over 30 countries around the world, lost to its local rival, Taobao. It is important to determine the factors potentially continuing the success of Taobao, which did RMB 1 trillion in sales in 2012 (Jude, 2012). Thus, the present study examined the factors that influenced Chinese consumers’ adoption of e-auctions.

The present study identified antecedent factors affecting Chinese consumers’ adoption of e-auctions. The antecedent factors explored were security, connection speed, time consumption, economic gain, playfulness, and social motives. The effects of these factors on variables of the extended Technology Acceptance Model (TAM) (trust, enjoyment, perceived ease of use, perceived usefulness, and attitude) (Childers, Carr, Peck, & Carson, 2001; Davis, 1989; Pavlou, 2003) were examined to help explain consumers’ adoption of e-auctions.

An online survey regarding e-auction adoption was developed by the author and administered through a market research agency in China to Chinese college students who had
experience with e-auctions. A total of 210 useable responses were collected. Confirmative Factor Analysis (CFA) was conducted to assess the measurement model, and Structural Equation Modeling (SEM) was used to test the hypotheses.

The results showed that the security features of e-auction websites not only enhanced consumers’ trust toward the websites, but also reduced their effort in the operations of payment, which increased their perceived ease of use of e-auctions. Connection speed had a positive effect on consumers’ overall experience on e-auction websites, enhancing their perceived ease of use, enjoyment, and trust of e-auctions. Economic gain had a significant impact on consumers’ perceived usefulness of e-auctions. Playfulness played a significant role in consumers’ perceived usefulness and enjoyment of e-auctions. Social motives positively affected perceived usefulness, enjoyment and trust of e-auctions. Contrary to expectation, the time consuming trait of e-auctions did not have a significant effect.

These results provide insight into best practices for designing e-auction websites in China. First, a well-established infrastructure with a secure environment and fluent connections is a must for e-auction players. In addition to the economic benefits brought about by the online auctions, playfulness and social interactions from an e-auction experience had a significant impact on perceived hedonic value, and affected consumers’ perceptions and attitudes toward e-auction websites. E-auction websites can consider incorporating more forms of social interaction such as an online forum or micro-blogs for consumers to share their experience. These experiences help create a consumer community which includes
like-minded potential sellers and buyers. Variables of the extended TAM were proven robust in explaining acceptance of e-auctions. SEM results indicated enjoyment, associated with hedonic value, is more important than usefulness, associated with utilitarian value, in affecting consumers’ attitude.

This present study contributes to the growing body of research on Chinese consumers’ adoption of e-auctions. This study uncovered additional influential antecedents (i.e., connection speed, playfulness, and social motives) to the adoption of e-auctions, enhancing the understanding of Chinese online shoppers. The present study also validated the extended TAM in an Asian country.
CHAPTER 1. INTRODUCTION

E-auction Commerce in China

With the broad adoption and diffusion of the Internet for commercial purposes and the dramatic growth of the online population, shopping online became extremely popular. According to Nielson (2008), more than 85% of global Internet users, greater than 875 million, were online shoppers. China has the largest online population and the greatest potential purchasing power in the world, as its online market continues to grow at a rapid rate. According to the China Internet Network Information Center ([CNNIC], 2009), China achieved the largest online population of all nations in June 2008. A recently released report shows Chinese Internet users increased to 591 million and 271 million had online shopping experiences as of 2013 (CNNIC, 2013a,b). Total online shopping transactions in China reached 1.26 trillion Chinese Yuan (USD 210 billion) in 2012 (CNNIC, 2013).

The consumer-to-consumer (C2C) market represents a large portion of all online transactions in China. According to an e-commerce report by Sohu.com (2009), in developed countries like the United States, the ratio between the business-to-consumer (B2C) sector and the C2C sector in the online market is about 6:4. However, the C2C sector of the Chinese online market was more than 93% of the total, leaving only 6.8% of the market for the B2C sector in 2008 (iResearch, 2009a). In the C2C market, there are two kinds of transactions: fixed price sales and e-auctions. Compared to fixed price sales, which allows an individual to purchase merchandise from another individual at a set price, e-auctions
provides an alternative way of shopping: by bidding. E-auctions have attracted a lot of
attention globally. The most famous and largest e-auction website, eBay, was once five
times the size of the largest online retailer, Amazon.com (Chong, 2004).

Catalyzed by eBay’s success, e-auctions quickly became one of the major C2C
transaction forms globally (Huang & Dai, 2006). Unlike traditional auctions, which are
limited in scope, time, and space, the online auction has furnished a new online shopping
means to provide participants with an all-encompassing selection of goods they can buy or
sell (Huang & Dai, 2006). China witnessed the start of online auctions in 1999, when
Eachnet was founded. eBay acquired Eachnet in 2003 and started operating eBay China as
an arm of eBay’s U.S. headquarters (Qu & Davison, 2009). eBay China had about 4 million
users and claimed a predominant 85% market share in 2003, when a local online shopping
platform, Taobao, was founded (Huang & Dai, 2006). Taobao, a wholly-owned subsidiary
of the Alibaba group, the leading e-commerce company in China, was a C2C online shopping
platform with both fixed price sales and e-auctions. Taobao grew quickly from 9% of the
market share in the first quarter of 2004 to 41% in the fourth quarter of the same year. The
total number of registered users of Taobao reached 13.9 million at the end of 2004, while its
main rival, eBay China, had 17.9 million registered users (Lin & Li, 2005). According to
CNNIC (2006b), in 2005 Taobao surpassed eBay with 67.3% of the Chinese online C2C
market share in comparison to eBay’s 29.1%. In 2007, Taobao had over 80 million users,
83.6% of the market, with less than 8% of the market share left to its rival eBay (iResearch,
2008). According to Alexa (2012), Taobao ranks third in traffic in China, whereas eBay China ranks 851st.

Although eBay has a long history, mature online auction transaction processes/programming, (i.e., online tools for accepting bids with the highest bidder winning the item), and success in over 30 countries around the world, it lost to its local rival, Taobao, in China. eBay’s loss in China showed the adoption of its e-auction did not perform well in China. Chinese online consumers prefer fixed price sales rather than e-auctions in the C2C market. According to CNNIC (2006b), only 3.6% of Taobao’s sellers sold items by auction, whereas 29.5% of eBay’s sellers were auction sellers. The popular auction mode of online transactions did not attract Chinese online consumers as it did in other countries. The reason for Chinese online consumers’ lack of adoption of e-auctions is an interesting question and one that has not appeared to be fully addressed by empirical research to date. Although there are few empirical studies by researchers who tried to explore factors that influence Chinese consumers’ assessment, adoption, and selection of e-auction websites (Lu, Wang, Yu, & Wu, 2009; Huang & Dai, 2006; Quaddus, Xu, & Hoque, 2005), there still are factors that could further explain Chinese consumers’ adoption of e-auctions. The present study aimed to discover additional factors that affect Chinese consumer’s adoption of e-auctions. This information can be useful for online retailers from the aspect of attracting Chinese online shoppers to e-auctions and increasing their intention of participating in e-auctions.
One of the predominant online shopper groups in China is college-aged students. Online shopping is attractive to college students because of the various choices in merchandise and the relatively low prices. According to iResearch (2011), more than 30% of online shoppers in China were between 18 and 24 years of age. Student consumers made up one third of the online shoppers and one fourth of all online purchases (CNNIC, 2008). Hence, college students account for a large proportion of Chinese Internet users and online shoppers. In addition, college students represent future buying power in Chinese society because they will enter the job market after graduation as young professionals.

Understanding college students’ perceptions of e-auctions will help e-auction service providers determine what is important for Chinese customers to adopt e-auctions as well as help the service providers predict future trends of this market.

**Adoption of E-auctions**

Several studies explored website features that affect Chinese consumers’ adoption of e-auctions. For example, researchers determined that web trustworthiness, user friendliness, functionality, and interactivity affect consumers’ assessment of an e-auction website and influence consumers’ satisfaction and retention of that website (Lu et al., 2009). Huang and Dai (2006) found web design, trust, and country of origin are three key factors affecting consumers’ choice of e-auction websites in China. In addition, Quaddus et al. (2005) found social norms, trust, and consumers’ innovativeness significantly influence consumers’ adoption of e-auctions. Although several researchers attempted to answer the question of
what factors affect Chinese consumers’ adoption of e-auctions, it has not been fully addressed.

The extended technology acceptance model (extended TAM) can be used to determine factors affecting consumer adoption of e-auctions. The technology acceptance model (TAM) was originally proposed by Davis (1989) and indicates that two beliefs about a new technology—its perceived usefulness and perceived ease of use—would influence an individual’s attitude toward using that technology and then further affect the individual’s intention of using the technology. The TAM originally assessed the acceptance of technology used in a working environment (Davis, 1989). Over time, TAM was extended to better explain technology adoption by consumers in consumption environments (e.g., Childers, Carr, Peck, & Carson, 2001; Dahlberg, Mallat, & Oorni, 2003; Pavlou, 2003). By integrating different variables, such as trust and enjoyment (e.g., Childers et al., 2001; Pavlou, 2003), the extended TAM was widely used to explain the adoption of new information technologies and was proven to be robust in various contexts. The extended TAM explained adoption of e-commerce, e-services, e-shopping, e-banking, and e-learning (Ha & Stoel, 2009; Peng, 2007; Shih, 2004; Tong, 2010; Lee, Cheung, & Chen, 2005). Therefore, the extended TAM makes a suitable framework for studying adoption of e-auctions. However, no studies were found that used extended TAM to explore factors affecting Chinese consumers’ adoption of e-auctions.
Apart from those previously identified factors mentioned above, there should be other factors that significantly affect Chinese consumers’ adoption of e-auctions. Given the specific Internet infrastructure, the e-commerce market, and culture in China, a number of new factors could be integrated into the extended TAM model to better understand what factors, other than those previously identified, influence Chinese consumers’ adoption of e-auctions.

First, features of e-auction websites may affect consumers’ adoption of e-auctions. For example, website security will greatly affect consumers’ trust of a website. As suggested in previous research, consumers’ trust of an e-auction website may directly affect their adoption of that website (Huang & Dai, 2006). Security features of e-auction websites may provide consumers with the protection of their finances and privacy as well as play a significant role toward enhancing their trust of the websites. Connection speed of the e-auction websites may be another key factor that affects consumers’ adoption of e-auctions, because slow connections may cause a lag in bidding and reduce the chance for successful bidding. These two factors, security and connection speed, were categorized as website variables in the present study.

Second, factors stemming from the nature of e-auctions should be taken into account. For example, e-auctions are time consuming. Because of the nature of e-auctions, specifically the bidding process to purchase, one online auction may last for days. So, its time-consuming nature could be a factor that affects consumers’ participation in an e-auction.
However, although e-auctions may be time-consuming, consumers participating in e-auctions may be able to obtain products at reasonable prices. The chance to acquire collectable items also brings economic gains to consumers in e-auctions. Therefore, economic gain could be an important factor that affects consumers’ adoption of e-auctions.

In addition, there is an inherent playfulness associated with an e-auction. The gamesmanship involved in bidding against others may also attract consumers to adopt e-auctions. Hence, the playfulness of e-auction could be another factor that influences consumers’ adoption of e-auctions. Other factors associated with the e-auction process, such as social motives, may significantly affect consumers’ adoption of e-auctions, too. In an e-auction bidding process, interactions with the seller and/or the other bidders could provide consumers with engaging social experiences through communications as well as sharing of interests and knowledge. This social aspect may attract consumers to e-auctions.

Therefore, the present study empirically explored additional factors, such as website variables of e-auction websites (security and connection speed), and other antecedents that are associated with consumers’ experiences in e-auction websites (time consumption, economic gain, playfulness, and social motives) that affect Chinese consumers’ adoption of e-auctions. The findings enhance understanding of Chinese consumers’ perceptions toward e-auctions further.
Purpose and Objectives

The purpose of the present study was to explore antecedent factors that may affect Chinese consumers’ adoption of e-auctions. The effects of these factors on variables of the extended TAM (Childers et al., 2001; Davis, 1989; Pavlou, 2003) were explored to help explain consumers’ adoption of e-auctions. Specifically, the objectives of this study were to:

1. Explore Chinese consumers’ perceptions of e-auctions website experiences (i.e., security, connection speed, time consumption, economic gain, playfulness, and social motives);
2. Determine the impact of these antecedent factors on the extended TAM elements (i.e., perceived usefulness, perceived ease of use, enjoyment, and trust); and
3. Examine the impact of these extended TAM elements on attitude and behavioral intentions toward e-auctions.

Definitions of Terms

*Attitude:* “Refers to the degree to which a person has a favorable or unfavorable evaluation of a behavior in question” (Ajzen & Madden, 1986, p. 454). In this study, attitude refers consumers’ general evaluation of e-auctions.

*Behavioral intention:* The “indications of how hard a person will try and how much effort one will exert to perform a behavior” (Ajzen, 1991, p. 181). In this study,
behavioral intention refers to the likelihood that consumers will join in an e-auction in the future.

*Connection speed:* Indicates the amount of capacity (or speed of data transfer) provided on a telecommunications network (Umino, 2002). In this study, connection speed indicates how quickly data are transmitted when browsing, searching, and bidding on e-auction websites.

*E-auction:* An auction held via the Internet. Specifically in this study, e-auctions refer to auctions in which consumers offer various amount of money for a typical product provided by the seller online in a given period of time; at the end of the period of time, the highest offer wins the product.

*Economic gain:* In this study, economic gain refers to the financial benefits consumers gain from e-auctions.

*Enjoyment:* A pleasant experiential state (Vorderer, Klimmt, & Ritterfeld, 2004). In this study, enjoyment refers to consumers’ belief that experiences on e-auction websites will provide pleasure for its own sake.

*Perceived ease of use:* The perceived extent to which using a new technology will be free of effort (Davis, 1989). In this study, perceived ease of use refers to a consumer’s expectation that e-auctions are easy to participating.
Perceived usefulness: The perceived degree to which using a new technology will enhance performance (Davis, 1989). In this study, perceived usefulness refers to a consumer’s expectation that participating in e-auctions will bring positive outcomes.

Playfulness: A situational characteristic of the interaction between an individual and the environment (Moon & Kim, 2001). In this study, playfulness refers to a consumer’s belief that the strategically operation of bidding in e-auctions will bring excitement and fun.

Security: The state of being free from danger or threat. In this study, security refers to e-auction websites’ features to protect consumers’ financial property and privacy.

Social motives: Consumers’ desire to communicate and interact online with sellers and/or other buyers during e-auctions.

Time consumption: In this study, time consumption refers to the time spent on an e-auction website for browsing, searching, and bidding.

Trust: Firm belief in the reliability of someone. In this study, trust refers to consumers’ beliefs about the reliability of e-auctions and e-auction websites.
CHAPTER 2. LITERATURE REVIEW

This section includes (a) the background information of online shopping and e-auction in China, (b) college students as online shoppers, (c) the extended TAM as the conceptual framework for this study, and (d) literature that supports the hypotheses.

Online Shopping and E-auction in China

Since June 2008, China has had the world’s largest online population (CNNIC, 2009). According to CNNIC (2013b), the population of Internet users reached 591 million in June 2013. The increase in size of the online population in China is shown in Figure 2.1, and the Internet penetration rates in China from 2002 to 2013 are shown in Figure 2.2.

![Online population (million)](chart.png)

*Figure 2.1. Online populations in China (Source: CNNIC, 2003–2013b).*
From Figure 2.1 and Figure 2.2 one can see that the number of Internet users in China increased quickly, especially from 2006 to 2009. The Internet was expected to become more popular in China with the recent development of high-speed Internet connections. With the continuous improvement in infrastructure, economic growth, and increase in income, the Internet would penetrate more deeply into existing user groups in all aspects of life and become more widely accessible across China.

The number of people who shopped online in China had reached 271 million by June 2013, increasing from 194 million in 2012 (CNNIC, 2012b, 2013b). In addition, the online market size reached 1259.4 billion Chinese Yuan (USD 210 billion) in 2012 with a growth rate of 66.5% compared to 2011 (CNNIC, 2013). The total sales revenue of the Chinese
online market from 2002 to 2012 is shown in Figure 2.3, and the growth rate of the Chinese online market is shown in Figure 2.4. One can see that there was rapid growth in the sales revenue in Chinese online market from 2002 to 2010, frequently more than doubling the sales year by year. This fast growth paralleled the increase of Internet users. Comparing Figure 2.3 and Figure 2.4, one can see that the drastic growth rate from 2003 to 2005 was due to the limited market size. After 2006, the growth rate of the Chinese online market tended to be steady and stable. Although the Chinese online market developed very fast, Chinese online consumers possess different characteristics compared to those from other countries (i.e. Kim, Forsythe, Gu, & Moon, 2002; Brashear, Kashyap, Musante, & Donthu, 2009).

According to Kim et al. (2002), because of Chinese culture, Chinese consumers weigh the value of social needs of products more than other attributes such as quality or service. When Chinese consumers shop online, they tend to be more brand and price conscious because of China’s relatively low gross domestic product per capita (Brashear et al., 2009).
Figure 2.3. Sales revenue from the Chinese online market (Source: CNNIC, 2003–2013b).

Figure 2.4. Growth rate of the Chinese online market (Source: CNNIC, 2003–2013b).
In the huge Chinese online market, the C2C sector dominated 93.2% of the total sales in 2008, leaving only 6.8% for the B2C sector (iResearch, 2009a). Recently, the B2C sector caught up a lot with 36.6% of the market (iResearch, 2013). In the C2C market, e-auction was important and played a significant role. According to Li and Kuo (2011), an auction is a competitive bidding process in which a product of uncertain value is sold to the individual who offers the highest price. E-auctions are auctions held via the Internet. In e-auctions, consumers offer various amounts of money over a given period of time for a product provided by the seller online. At the end of the period of time, the bidder with the highest offer wins the product. Unlike traditional auctions, e-auctions can be held without geography or time restrictions. In e-auctions, sellers and buyers need not be present at the same place or the same time (Abdul-Ghani, Hyde, & Marshall, 2011). However, because of the lack of face-to-face contact between sellers and buyers, the e-auction is perceived as riskier than is a traditional auction (Massad & Tucker, 2000). The online auction-style bidding to gain goods helped eBay, one of the first e-auction platform providers, to succeed in more than 30 countries around the world (eBay, 2009). However, evidenced by an examination of the history of eBay China, it was never popularly accepted by Chinese consumers. The market share of eBay China and its main rival, Taobao.com, from 2003 to 2010 is shown in Figure 2.5. As the data show, within 2 years after the launch of Taobao, Taobao gained about 60% of the market share and left its main rival, eBay China, far behind. The major difference between eBay and Taobao is that Taobao focused on fixed price C2C
sales by which products could be purchased immediately, similar to the C2C section of Amazon.com. However, an e-auction, where bidding promotes various prices over time, often lasts several days.

![Market share of eBay China and Taobao.com](image)

*Figure 2.5 Market share of eBay China and Taobao.com (Sources: Alibaba, 2006; CNNIC, 2006b; Donews, 2005; Huang & Dai, 2006; iResearch, 2008–2010).*

**College Students as Online Shoppers**

In China’s online market, young people occupy a major portion of the online shopper population, more than any other age groups. According to the latest report by CNNIC (2010), online users under 30 years of age made up more than 70% of all online users. Moreover, college students accounted for one third of the online shoppers and contributed to
one quarter of the online market sales (CNNIC, 2009). Chinese Internet users’ age groups and occupations are shown in Figures 2.6 and 2.7, respectively.

*Figure 2.6. Age groups (in number of years) of Chinese Internet users (Source: CNNIC, 2010a,b).*
A study by Shiu and Dawson (2004) showed that college students are one of the most active groups to adopt new technologies, and the tendency is that acceptance of new technology declines with age. College students will become the main shopping power in the future, and their online shopping habits will continue to contribute to the entire online market. As iResearch (2010) indicated, college students and young professionals combined equals more than half of all online shoppers in China.
Conceptual Framework

Davis (1989) and Davis, Bagozzi, and Warshaw (1989) developed the technology acceptance model (TAM). TAM has been used widely to understand and predict users’ adoption of new information technologies (Ha & Stoel, 2009). In connection with behavior theories developed earlier, such as the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 1985), TAM is based on the causal relationship of belief–attitude–behavioral intention. TAM suggests individual’s attitude towards a new technology affects the intention to adopt that technology that leads to the actual usage (Davis, 1989). Davis (1989) postulated that two constructs, perceived usefulness and perceived ease of use, contribute to one’s attitude and behavior intention toward using a new technology. In a context of adopting new technology, perceived usefulness is defined as the perceived degree to which using a new technology will enhance performance (Davis, 1989). Perceived usefulness represents the expectation that using a new technology will bring positive outcomes. Perceived ease of use is defined as the perceived extent to which using a new technology will require little effort (Davis, 1989). In other words, perceived ease of use represents the expectation that the new technology will be easy to learn and use. The combination of perceived usefulness and perceived ease of use affects a user’s attitude toward new technology usage (Liaw & Huang, 2003). Also, perceived ease of use has a positive influence on perceived usefulness (Davis, 1989).
Some researchers claimed that TAM is one of the most successful theories to understand and explain technology adoption (Sun & Zhang, 2006). TAM was proven to be very promising and robust in studies of users’ acceptance of new information technologies (Gefen & Strub, 1997; Moon & Kim, 2001; Szajna, 1996; Taylor & Todd, 1995; Venkatesh, 1999; Venkatesh & Davis, 1996). These studies were conducted in various areas such as e-shopping, e-banking, e-learning, and m-commerce (Bruner & Kumar, 2005; Ha & Stoel, 2009; Peng, 2007; Shih, 2004; Tong, 2010; Lee et al., 2005). Although a number of studies validated TAM’s robustness, researchers argued that the constructs in the original TAM are better suited to situations with few technology usage choices involved (Vijayasarathy, 2004). In situations with multiple choices of new technologies, the original TAM might not be able to fully explain the adopting process. Yen, Wu, Cheng, and Huang (2010) indicated that an important assumption of TAM is users’ voluntariness of using a new technology. The original TAM was developed to examine technology acceptance in a working environment, where introducing computer software seems obviously beneficial. However, in other situations, such as online shopping, there are many forms of online purchase transactions (e.g., e-tailing, e-auctions, Groupon) employing different technologies. When there are multiple choices, a consumer’s voluntary decision to use a certain technology may not be fully explained by usefulness and/or ease of use. Hence, the original TAM may not be adequate to capture the key factors that influence a consumer’s acceptance of e-auctions, a specific method of online shopping using specialized technology.
Studies extended the original TAM by adding new variables in an attempt to better understand and explain consumer adoption behavior in various online situations (Childers et al., 2001; Dahlberg et al., 2003). Two of the most important variables are trust and enjoyment.

**Trust-enhanced TAM**

Trust, a basic principle of any kind of business relationship (Hart & Saunders, 1997), is required between the seller and shopper online. Hosmer (1995) defined trust as the expectation that both parties of business will agree to commitments, will negotiate honestly, and will not take advantage, whether or not there is an opportunity. Because of the lack of face-to-face contact between sellers and consumers, trust in the online market is even more important. Trust is also more important in the online shopping context than in the physical stores due to the inherent uncertainty of online shopping websites and strangers as sellers. A number of studies suggested that many people do not shop online because of the lack of trust in online businesses (Clark, 1990; Hoffman, Novak, & Chatterjee, 1996). Gefen, Karahanna, and Straub (2003) suggested that online shopping intentions are the outcome of both consumers’ assessment of the information technology and their trust of the shopping websites. In the context of e-auctions, both the e-auction platform and the sellers must gain trust from potential buyers prior to the bidding process.

Incorporating trust into TAM leads to a better understanding and prediction of consumer behavior intentions toward the adoption of new technology (Chen & Tan, 2004;
Dahlberg et al, 2003; Gefen & Straub, 2003; Pavlou, 2003; Suh & Han, 2002). Trust was considered as an antecedent of perceived usefulness (Dahlberg et al, 2003; Pavlou, 2003), attitude (Chen & Tan, 2004; Suh & Han, 2002), and behavior intention (Gefen & Straub, 2003; Pavlou, 2003; Suh & Han, 2002). Dahlberg et al. (2003) developed the trust-enhanced TAM and claimed this new model is better for understanding consumers’ adoption of new technology than is the original TAM. In the present study, trust was treated as an antecedent of perceived usefulness, attitude, and behavior intention.

**Enjoyment-enhanced TAM**

Enjoyment is another construct found to enhance the original TAM. Shopping enjoyment is the extent to which one believes shopping will provide pleasure for its own sake, going beyond performance consequences (Childers et al., 2001), and such enjoyment can also be found in online shopping context (Bauer, Falk, & Hammerschmidt, 2006). Davis, Bagozzi, and Warshaw (1992) adapted this motivational perspective and added perceived enjoyment as an intrinsic motivation factor to the original TAM. Intrinsic motivation emphasizes the pleasure and satisfaction inherent in specific activities (Vallerand, 1997). Davis et al. (1992) defined perceived enjoyment as the extent to which the activity of using a technology is perceived as enjoyable in its own right, apart from any utilitarian outcomes. Previous studies indicated that perceived enjoyment positively affects perceived usefulness (Venkatesh, 1999), attitude, and behavior intention toward adopting a new online technology (Childers et al., 2001; Van der Heijden, 2003). E-auctions have the ability to generate fun
and entertainment in the process of competing with others for a desired item. Thus, one’s tendency to seek enjoyable experiences through fun activities such as e-auctions may affect one’s intention to adopt it as a way of shopping. This study proposed that perceived enjoyment has a positive influence on perceived usefulness, attitude, and behavior intention.

**Hypotheses**

In the present study, several factors, website variables and variables specifically associated with e-auctions, were proposed to be antecedents of the extended TAM explaining Chinese consumers’ adoption of e-auctions. First, website variables refer to the features that e-auction websites possess. These variables increase or reduce consumers’ intention to use the website. In the present study, general website variables include security and connection speed. Second, antecedent variables associated with the purpose and process of e-auctions, and associated with consumers’ experience on e-auction websites were taken into account. These variables include time consumption, economic gain, playfulness, and social motives, which are discussed below.

**Security**

One key reason why many consumers use the Internet, but do not purchase online, is their concern about online security, especially when bidding and purchasing from a stranger online. While online shipping usually requires consumers to provide their personal and financial information such as name, address, phone number and credit card via the Internet, consumers would want to make sure that the information is transmitted securely and will be
used appropriately. O’Cass and Fenech (2003) argued that an Internet user who views the website as having a low level of security is unlikely to become an online shopper. In an online context, environment uncertainty exists mainly because the online shopper does not have full control of the exchange process after entering the payment information (Pavlou, 2003). Hence, employing security features in a study in the uncertain context of e-auctions is reasonable. Relatedly, previous studies focused on how consumers’ perceived risk affects their intention to shop online. According to Pavlou (2003), the uncertain online environment creates two main risks for online shoppers: economic and privacy. A website’s security features play an important role in reducing consumer’s perceived risks and enhancing trust of the website. Hence, a consumer’s belief about online security is considered salient and important (Vijayasarathy, 2004). According to previous research, a consumer’s trust can be inspired only when the website is secure enough for one to complete transactions without worries (Chen & Tan, 2004). Therefore, the present study proposed that the perceived security of an e-auction website would have a positive influence on consumers’ trust of an e-auction. The following hypothesis was proposed for this study:

**H1:** Perceived security associated with e-auction websites positively affects consumers’ trust of e-auctions.

**Connection Speed**

In this study, connection speed is defined as how fast the data are transmitted when consumers browse, search, and bid on e-auction websites. Connection speed is affected by
two factors: (a) the general data transmission speed of the Chinese Internet and (b) the capability of the e-auction websites’ servers. According to CNNIC (2010), broadband Internet usage in China reached more than 360 million—about 98.1% of the total Internet users. Compared to when eBay entered the Chinese online market, the connection speed improved substantially. However, the connection speed for Chinese Internet users is still slower than most advanced countries, such as South Korea, Japan, and United States (Sina, 2011). Actually, China’s average Internet connection speed ranks only 90th in the world (Sina, 2011). Former e-auction studies focused on western countries, so the connection speed was not treated as an important factor affecting consumers’ acceptance of e-auctions. However, considering the nature of e-auctions, connection speed may play a very important role in a consumer’s experience. In a typical e-auction bidding process, though potential buyers are allowed to repeatedly bid over a period of time, a buyer needs to maintain the highest bid until the last moment in order to successfully purchase the item. Hence, the last minute outbid becomes many consumers’ strategy for bidding online. However, a slow connection speed may cause a lag in bidding and reduce the chances for successful bidding. In addition, the e-auction website’s connection speed and the server’s ability to maintain a number of auctions operating smoothly at one time can have a great influence on consumers’ experiences with e-auction websites as well. In other words, a slow connection may reduce perceived usefulness of the website and reduce enjoyment on the website, too. The following hypotheses were proposed for this study:
**H2a:** The connection speed associated with e-auction websites positively affects consumers’ perceived usefulness of e-auctions.

**H2b:** The connection speed associated with e-auction websites positively affects consumers’ enjoyment of using e-auctions.

**Time Consumption**

Time consumption is defined as the time cost in the process of bidding in an e-auction and is a factor naturally associated with e-auctions. Unlike a tradition auction, which generates a winner in a very short time period, the e-auction has a relatively long time period during which potential bidders have access to the bidding. A typical online auction lasts for several days, which may be a long period of time for some consumers. During this period of time, consumers need to check continuously as to whether they have been outbid. Although some websites send e-mails to consumers when they have been outbid, it still costs time and effort to check e-mail and submit a new bid. For consumers seeking the gratification of obtaining what they want immediately, the time-consuming nature of e-auctions may not be gratifying. Trivial actions that require time during the bidding process may reduce consumers’ perceived usefulness, perceived ease of use, and enjoyment of the website. The following hypotheses were proposed for this study:

**H3a:** Time consumption associated with e-auction websites negatively affects perceived usefulness of e-auctions.
H3b: Time consumption associated with e-auction websites negatively affects perceived ease of use of e-auctions.

H3c: Time consumption associated with e-auction websites negatively affects enjoyment of using e-auctions.

**Economic Gain**

The main advantages of online shopping are convenience, competitive prices, and access to an expanded variety of products (Ha & Stoel, 2009). Consumer may find online shopping convenient because they have access to the online stores without time and geographic constrains, and they can receive door-to-door delivery. Consumers can find products online nationally or even internationally because there is no customs barrier on the Internet. In addition, online stores can usually offer more competitive prices because of lower operating costs and taxes. For an e-auction, some of these advantages become even more attractive. First, traditional auctions are for consumers interested in products not easily found in brick and mortar stores, such as vintage accessories, celebrity-signed items, and other rare articles. E-auctions provide both sellers and buyers the opportunity to trade goods without traveling. Second, auctions frequently result in savings for the buyer, because any item’s price is determined by the demand or competition for the item (Abdul-Ghani et al., 2011). Large numbers of items in the e-auction marketplace may result in less competition for a specific item, and consequently, a lower final price. In addition, the starting price is usually very low to attract more bidders. Bidders have control over
what they consider to be a reasonable price range. Therefore, by participating in an
e-auction, consumers may get a product at a lower price than by purchasing it from a retailer.

From the perspective of obtaining meaningful items or rare products and paying an
acceptable price, an e-auction provides consumers with the potential for economic gain,
which may increase consumers’ perceived usefulness of e-auctions. The following hypothesis was proposed for this study:

**H4**: Economic gain associated with e-auctions positively affects perceived
usefulness of e-auctions.

**Playfulness**

The action of bidding in an auction may offer consumers great fun and excitement,
because they compete with others for a product they desire. Whereas the final result could
be exciting or disappointing, the process of bidding and competing may be associated with
fun and pleasure. According to Heyman, Orhun, and Ariely (2004), the thrill of competing
with other bidders brings an excited and competitive state-of-mind, which is called the
“opponent effect” (p. 11). The opponent effect increases a bidder’s willingness to pay more
for a product in an auction because the competition raises his or her private value of that item
(Heyman et al., 2004). The difference between a traditional bidding process and an online
bidding process is that e-auction buyers have more flexibility for different strategies because
e-auction bidding process takes longer. Before an auction ends, there is plenty of time for a
consumer to bid. During the bidding period, one bidder could choose different strategies to
compete with other bidders. For example, last minute sniping is one of the exciting bidding strategies that require accurate bidding at the last moment before the auction is closed (Kamins, Noy, Steinhart, & Mazursky, 2011). Adopting different strategies to compete with other bidders makes e-auctions very playful. Playfulness is defined as a situational characteristic of the interaction between an individual and the environment (Moon & Kim, 2001). In this study, playfulness specifically indicates the interaction between the buyer and the e-auction—the strategic bidding process brings fun because of the underlying competitiveness and excitement. The following hypothesis was proposed for this study:

**H5:** The playfulness associated with e-auctions positively affects enjoyment of using e-auctions.

**Social Motives**

Social motivations may be directly related to e-auctions because interactions between people are part of the purchasing process (Joines, Scherer, & Scheufele, 2003). According to Parsons (2002), four out of five social motives identified by Tauber (1972) also relate to motives of online shoppers. Among those four social motives, social experience, communication, and peer group attraction (Parsons, 2002) may be salient in e-auctions. In e-auctions, consumers have the opportunity to communicate with both sellers and other competitors. These competitors usually have common interests. Through the interactions and communications during the bidding process, consumers may not only acquire goods they desire, but also share interests, knowledge, and/or information with each other. During an
e-auction, consumers may receive useful product information and interesting background information from others, which may enhance his or her general knowledge and aid in choosing items and adjusting bids. Furthermore, the feeling of belonging, recognition and acknowledgement from peers, and friendship and respect gained from the social experiences during e-auctions may bring buyers great enjoyment. The following hypotheses were proposed for this study:

**H6a:** Social motives associated with e-auctions positively affect perceived usefulness of e-auctions.

**H6b:** Social motives associated with e-auctions positively affect enjoyment of using e-auctions.

**Trust**

The more consumers trust a certain technology, the more they will consider it to be useful, because this technology alleviates their worries about risks. In addition, trust leads to positive attitudes regarding the use of that technology because the trustworthiness of the technology enhances consumers’ confidence in using it. As long as consumers have the faith that e-auctions are trustworthy, they may be more likely to treat e-auctions as a useful tool to shop online. According to previous studies, trust was supported as an antecedent of perceived usefulness (Dahlberg et al., 2003; Pavlou, 2003) and attitude (Chen & Tan, 2004; Suh & Han, 2002). Thus, the following hypotheses were proposed for this study:
H7a: Trust associated with e-auctions positively affects perceived usefulness of
e-auctions.

H7b: Trust associated with e-auctions positively affects consumers’ attitude toward
e-auctions.

Enjoyment

For those consumers who are seeking hedonic shopping experiences, enjoyment may
be associated with an e-auction’s playful gamesmanship, exposure to unique or limited
products, and social experiences during bidding process. There could be consumers who
participating in e-auctions just for the enjoyment, trying to gain a pleasurable feeling from
the experience in an e-auction. For those consumers, e-auctions could be a useful tool to
kill time and seek fun. From this point of view, enjoyment associated with an e-auction
may positively affect consumer’s perceived usefulness of e-auctions. Moreover, consumers
may have positive attitudes toward e-auctions because of the enjoyment they bring.

Previous studies indicated that perceived enjoyment positively affects perceived usefulness
(Venkatesh, 1999) and attitude (Childers et al., 2001; Van der Heijden, 2003) in adopting a
new online technology. Hence, the following hypotheses were proposed for this study:

H8a: Enjoyment associated with e-auctions positively affects perceived usefulness of
e-auctions.

H8b: Enjoyment associated with e-auctions positively affects consumers’ attitude
toward e-auctions.
The combination of perceived usefulness and perceived ease of use affects users’ attitudes toward new technology usage (Liaw & Huang, 2003). Perceived ease of use has a positive effect on perceived usefulness because achieving the same outcome requires less effort when the technology is easy to use. As the main factor of TAM, perceived usefulness affects behavioral intentions, and this influence may be mediated by attitude (Ha & Stoel, 2009). These relationships were also supported in different settings such as e-shopping, e-learning, and t-commerce (Lee et al., 2005; Shih, 2004; Tong, 2010; Yu, Ha, Choi, & Rho, 2005). Therefore, the following hypotheses were proposed for this study:

**H9a:** Perceived ease of use of e-auctions positively affects perceived usefulness of e-auctions.

**H9b:** Perceived ease of use of e-auctions positively affects consumers’ attitude toward e-auctions.

**H10a:** Perceived usefulness of e-auctions positively affects consumers’ attitude toward e-auctions.

**H10b:** Perceived usefulness of e-auctions positively affects behavioral intentions toward using e-auctions.

**H11:** Consumers’ attitude toward e-auctions positively affects behavioral intentions toward using e-auctions.

The factors discussed above, integrated into an extended TAM and thus providing the proposed conceptual framework for the present study, are illustrated in Figure 2.8.
Figure 2.8. Conceptual framework for the present study.
CHAPTER 3. METHOD

A quantitative research approach was used to fulfill the research objectives. An online questionnaire that included consumers’ perceptions about e-auctions and demographic information was distributed to college students in China. This chapter presents the study’s sample and sampling procedures, how the research variables were measured, how the questionnaire was administered, and how the data was analyzed.

Sample and Sampling

The research population for this study was Chinese college students; this group of consumers was selected as a convenience sample because they commonly are Internet users and online shoppers in China (CNNIC, 2008). The sample for this study was recruited from universities across China with the help of a marketing research agency- sojump.com. Sojump is one of the most popular marketing research companies in China, which provides full-scale services for academic research and marketing research. Sojump provides a free online survey tool, as well as a fee-based sampling service (Sojump, 2012). Sojump has a regularly updated sample pool of more than 3 million people across China, within which 28.2% are college students (Sojump, 2012). The online questionnaire was coded by a technician from Sojump.com and distributed randomly to college students who are members of Sojump.com across China. All participation was voluntary; a consent form informed the respondents of risks and benefits of participating before they accessed the survey. Moreover, only those who had had experience with online auctions, according to the
screening question, were able to participate the survey. As an incentive, respondents earned points in Sojump.com that they could use to redeem for cash or coupons. Overall, the sample was expected to be representative of young, educated Chinese online shoppers who had online auction experience.

**Instrument**

The first part consists of items tapping consumers’ perceptions of e-auctions. The items in the extended TAM, taken from previous studies, were adapted to fit the context of e-auctions (i.e., Suh & Han, 2002; Lee et al., 2005; Kulviwat, Brunner, Kumar, Nasco, & Clark, 2007; Yen et al., 2010; Yu et al., 2005; Vijayasarathy, 2004). The present researcher developed new items for two of the proposed antecedent variables in this study, time consumption and economic gain. Items for connection speed, playfulness, and social motives were adapted from previous research combined with several items constructed in this current study (Loiacono, Watson, & Goodhue, 2007; Ahn, Ryu, & Han, 2007; Gefen & Straub, 2003). The second part of the survey includes demographic and general questions about the respondents, such as gender, age, and Internet usage. Appendix A shows the English version of the survey; Appendix B shows the Chinese version of the survey.

Seven-point Likert-type scales, ranging from 1 (strongly disagree) to 7 (strongly agree) were used for all variables presented in the conceptual framework. Items from previous studies using extended TAM to assess new technology acceptance were adapted to measure perceived usefulness, ease of use, attitude, and behavioral intention (Yen et al., 2010;
Yu et al., 2005). For example, statements such as “Using an e-auction helps me be more effective in shopping,” “It is easy to learn how to bid in an e-auction,” “Overall, I am positive about participating in e-auctions,” and “I intend to use e-auctions frequently to do my shopping in the future” were used to measure perceived usefulness, ease of use, attitude, and behavioral intention, respectively. Trust and enjoyment items were drawn from research using the trust- and enjoyment-enhanced TAM to investigate new technology acceptance (Suh & Han, 2002; Lee et al., 2005). For example, statements such as “E-auction websites keep their promises and commitments,” and “The actual process of participating in e-auctions is pleasant” were used to measure trust and enjoyment, respectively. Items from the study of O’Cass and Fenech (2003) were adapted to measure users’ perceptions of security with regards to both financial and personal information. For example, statement such as “I feel secure sending personal information such as my address on e-auction websites” was used to measure security.

The present researcher developed items needed to measure some of the antecedent variables including time consumption and economic gain, because no previous developed measurement items were suitable for the context of this current study. Other antecedents like connection speed, playfulness, and social motives were measured by both items adapted from previous research and items constructed in this current study (O’cass & Fenech, 2003; Loiacono et al., 2007; Ahn et al., 2007; Gefen & Straub, 2003). For example, statements such as “When I place a bid on e-auction websites, there is very little waiting time between
my click and the web site’s response,” “The web pages on an e-auction website usually loads quickly,” and “When clicking on pages of an e-auction websites, the transition is usually fast” were used to measure the connection speed of e-auction websites. Statements such as “I need to spend a lot of time to monitor how the e-auction is going after bidding,” “An e-auction usually takes a lot of time before the winning bid is determined,” and “It is time consuming to make a bid on an e-auction website” were used to measure the time consumption variable. Statements such as, “The winning bidder usually saves much money on a product,” “Competitive bidding usually generates reasonable price,” and “The final price of a product in an e-auction is usually lower than retail prices” were used to measure the economic gain. Statements such as “When bidding on an e-auction website, I do not realize the time elapsed,” “When bidding on an e-auction website, I am not aware of any noise,” and “When bidding on an e-auction website, I often forget the work I must do” were used to measure the playfulness. Other statements such as “Participating in an e-auction gives me an opportunity to get to know new people,” ”Participating in an e-auction allows me to communicate with others who have similar interests to me,” and “There is a sense of human contact in e-auction sites” were used to measure the social motives.

**Procedure**

The survey was developed and refined in English. It then was translated by the researcher into Chinese and back translated into English by two graduate students in the U.S. who have proficiency in both Chinese and English. Then the present researcher met with
these two scholars to verify that the translation was accurate, clear, and without bias. Any discrepancies were worked out to reach agreement among three scholars. The Chinese version of the questionnaire was examined and approved by a bilingual committee member.

A web-based pretest survey was created with the free online survey tool provided by Sojump.com and distributed to the researchers’ co-workers, colleagues, classmates and friends in China who then verified that there were no wording errors, misconceptions, or unclear statements.

After collecting the feedback from the pretest, a final revised version of the questionnaire was sent to Sojump.com. The Sojump technician constructed the survey on their server and distributed it to the target population. A sample size of 210 usable responses was collected.

**Data Analysis**

The data collected from the survey was analyzed using the Statistic Package for Social Science (SPSS 19) and M-plus 6.0. The data analysis procedures include descriptive analysis, exploratory and confirmatory factor analysis, structural equation modeling (SEM) analysis, and chi-square and goodness of fit measures.

Descriptive analysis was conducted to profile the respondents. Exploratory and confirmatory factor analysis was used to test the reliability of the constructs. SEM analysis was conducted to test the hypotheses. The chi-square and goodness of fit measures were assessed to test the fit of the proposed SEM analysis model.
CHAPTER 4. RESULTS

This chapter reports the results of this study including sample demographic characteristics, descriptive statistics of the research variables, and hypothesis testing.

Sample Demographic Characteristics

Respondents’ Profile

A total of 1,145 questionnaires were distributed to Sojump members who were college students; 394 completed questionnaires were returned for a response rate of 34.4%. A total of 210 useable responses were selected from the returned questionnaires based on the screener questions and the completion of the questionnaire. The demographic characteristics of the sample, including gender, age, student level, and major, are illustrated in Table 4.1.

The results showed that 67.14% of the respondents were female and 32.86% were male. However, no significant differences were found in independent sample t tests among all measurement items, indicating no gender difference among respondents. More than 99% of the participants ranged from 18 and 30 years of age. As college students, participants spanned the college years from freshman to graduate student with juniors showing the highest percentage at 39.52% of all participants. Participants’ majors ranged from engineering and the arts to business and management with 44.29% of the participants coming from business schools.
Table 4.1.

*Demographic Characteristics of the Sample (N = 210)*

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>141</td>
<td>67.14</td>
</tr>
<tr>
<td>Male</td>
<td>69</td>
<td>32.86</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-22</td>
<td>135</td>
<td>64.29</td>
</tr>
<tr>
<td>23-30</td>
<td>74</td>
<td>35.24</td>
</tr>
<tr>
<td>Older than 30</td>
<td>1</td>
<td>0.48</td>
</tr>
<tr>
<td>Student level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>6</td>
<td>2.86</td>
</tr>
<tr>
<td>Sophomore</td>
<td>44</td>
<td>20.95</td>
</tr>
<tr>
<td>Junior</td>
<td>83</td>
<td>39.52</td>
</tr>
<tr>
<td>Senior</td>
<td>56</td>
<td>26.67</td>
</tr>
<tr>
<td>Graduate</td>
<td>21</td>
<td>10.00</td>
</tr>
<tr>
<td>Major</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>44</td>
<td>20.95</td>
</tr>
<tr>
<td>Art and Design</td>
<td>24</td>
<td>11.43</td>
</tr>
<tr>
<td>Social sciences</td>
<td>28</td>
<td>13.33</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>14</td>
<td>6.67</td>
</tr>
<tr>
<td>Business and management</td>
<td>93</td>
<td>44.29</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>3.33</td>
</tr>
</tbody>
</table>

**Respondents’ Online Shopping Behavior**

The respondents’ online shopping experiences, including monthly expenditure, shopping frequency, and product categories of online shopping regarding fixed price sale (i.e., directly purchasing from online retailers without bidding) and e-auction, are illustrated in Figures 4.1, 4.2, and 4.3. As illustrated in Figure 4.1, more than 97% of the respondents made at least one direct online purchase per month, and the majority of them (84.76%) purchased one to six products online every month via fixed price sale. In contrast, only 78.10% of the respondents purchased products through online auction every month, and the
majority of them (65.24%) successfully purchased only one to three products per month through online auctioning.

**Figure 4.1.** Respondents’ online purchase frequency.

These findings indicate that, even among consumers who had adopted online auction, fixed price sale still accounted for the majority of their online shopping. These findings also showed that, as an alternative way of shopping online, e-auctions accounted for only a small portion of consumers’ online shopping activities.

The average monthly expenditure of the respondents’ online shopping is shown in Figure 4.2. Comparing Figure 4.2 with Figure 4.1, one can see that monthly expenditure has an obvious correlation with purchase frequency. The majority of the respondents who participated in online auctions (61.43%) spent 100 to 250 yuan (18 to 40 USD) monthly on
e-auctions, and 48.10% of them spent another 251 to 500 yuan (40 to 80 USD) monthly online on fixed price sales. This result is accordant with previous findings of respondents’ online shopping frequency.

The product categories from which the respondents regularly shopped are shown in Figure 4.3. From Figure 4.3 one can see that the most shopped product category was apparel and accessories in both fixed price sale (61.90%) and e-auction (38.10%). However, the popular product categories for e-auction were more evenly distributed compared to the popular product categories for fixed price sale. This result aligns with an industry research report that indicated apparel and accessories as the most shopped product category, occupying 70.10% of all products shopped online (CNNIC, 2010a,b).

![Monthly expenditure chart](chart.png)

*Figure 4.2. Respondents’ monthly online expenditures.*
Figure 4.3. Product categories of respondents’ online shopping.
Taobao was the website used most frequently by respondents shopping by both fixed price sale and e-auction. Almost 98% of respondents had shopped by fixed price sale on Taobao, and 88.57% of all respondents had participated in e-auctions on Taobao. The second most popular website was Paipai; about half of the respondents had shopped on Paipai.

**Analysis of the Structural Equation Model**

**Factor Analysis of Model Constructs**

An exploratory factor analysis (EFA) was conducted for construct item reduction. A principal component method with Varimax rotation was employed to ensure construct validity (Thomas & Nelson, 1996). Items exhibiting adequate factor loading (> .55; Nunnally, 1978) and low cross-loading (< .30; Kline, 1998) on other factors were retained. In this item reduction process, items for attitude and behavior intention were found to highly cross-load on each other. Table 4.2 shows the correlations between items of attitude and behavior intention. As one can see, every item is highly correlated with another, indicating high co-linearity between attitude and behavior intention. For maintaining the validity of the measurement scale, the author decided to eliminate one of the two variables.
Table 4.2.

*Correlation between Items of Attitude and Behavior Intention*

<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attitude 1 “Participating in e-auctions is good”</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attitude 2 “Participating in e-auctions is beneficial”</td>
<td>.65</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Attitude 3 “Participating in e-auctions brings benefits for me”</td>
<td>.60</td>
<td>.71</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Attitude 4 “Overall, I am positive about participating in e-auctions”</td>
<td>.57</td>
<td>.59</td>
<td>.61</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Behavior intention 1 “I intend to use e-auctions frequently to do my shopping in the future”</td>
<td>.59</td>
<td>.67</td>
<td>.61</td>
<td>.54</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Behavior intention 2 “I intend to use e-auctions whenever appropriate to do my shopping”</td>
<td>.54</td>
<td>.49</td>
<td>.52</td>
<td>.42</td>
<td>.52</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Behavior intention 3 “I intend to use e-auctions to do my shopping on a regular basis”</td>
<td>.63</td>
<td>.59</td>
<td>.61</td>
<td>.53</td>
<td>.63</td>
<td>.61</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8. Behavior intention 4 “I intend to keep using e-auctions to do my shopping in the future”</td>
<td>.68</td>
<td>.69</td>
<td>.68</td>
<td>.56</td>
<td>.71</td>
<td>.59</td>
<td>.71</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note.* All correlations are significant at p<0.01 level.

The present author presumed that, because the respondents were e-auction users already, survey items such as “I intend to use e-auctions frequently to do my shopping in the future,” indicating future usage, might have confused them. To some extent, this item might have the same meaning, whether or not to continue using e-auctions, as that of respondents’ perceived attitude toward e-auctions. In addition, a model examining factors that influence attitude, instead of behavior intentions, of current users may suggest features to attract future users of e-auctions, which would be advantageous for e-auction firms. Because the respondents were not consumers who were new to e-auctions, the author decided to eliminate
the behavioral intention construct and keep the construct attitude. Hence, another round of EFA was conducted without behavior intention. Eleven constructs were successfully extracted, including security, connection speed, time consumption, economic gain, playfulness, social motives, trust, enjoyment, usefulness, ease of use, and attitude. An accumulated total of 78.10% of the variance was explained by these constructs.

A confirmatory factor analysis (CFA) was then conducted and resulted in unidimensional factors. Standardized factor loadings above .50 on one factor but below .30 on other factors were used to guide the development of the constructs (Kline, 1994). The standardized factor loadings of each item and the reliability of each construct after purification process are reported in Table 4.3. With the standardized factor loadings ranging from .58 to .87 and the Cronbach’s alpha values ranging from .74 to .92, convergent validity and internal consistency were satisfied (Hair et al., 2010). For constructs with only two items, the correlation between items is also reported in Table 4.3.

The correlations between each pair of constructs, the average variance extracted (AVE) for each construct, and the square root of AVEs are reported in Table 4.4. As illustrated in Table 4.4, all constructs except time consumption were significantly correlated with others. Time consumption was significantly correlated with security, connection speed, economic gain, playfulness, and trust but not significantly correlated with social motives, enjoyment, usefulness, ease of use, or attitude. According to Fornell and Larcker (1981), if the square root of AVE for each construct is larger than any of the correlations between one construct
and another, then the discriminate validity of the construct is satisfied. As illustrated in Table 4.4, all AVEs except the AVE of trust met Fornell and Larcker’s criteria. The square root of AVE of trust (.78) was actually slightly smaller than the correlation between trust and attitude (.79). However, because the standardized path coefficient between trust and attitude (.39) was not close to 1, the author decided to keep these two constructs. As a result, the discriminate validity of constructs was acceptable using in Structural Equation Modeling (SEM).

Table 4.3.

*Factor Loading and Reliability of Measurement Items*

<table>
<thead>
<tr>
<th>Constructs and measurement items⁹</th>
<th>Standardized factor loading</th>
<th>Cronbach’s α</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td></td>
<td>.92</td>
<td></td>
</tr>
<tr>
<td>I feel secure sending personal information such as my address on e-auction websites</td>
<td>.78</td>
<td>.86</td>
<td>.83</td>
</tr>
<tr>
<td>I feel secure sending financial information such as my credit card number on e-auction websites</td>
<td>.86</td>
<td>.83</td>
<td>.86</td>
</tr>
<tr>
<td>I feel safe providing personal information such as my address on to e-auction websites</td>
<td>.83</td>
<td>.86</td>
<td>.86</td>
</tr>
<tr>
<td>I feel safe providing financial information such as my credit card number to e-auction websites</td>
<td>.86</td>
<td>.86</td>
<td>.86</td>
</tr>
<tr>
<td>Connection speed</td>
<td></td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>The web pages on an e-auction website usually loads quickly</td>
<td>.77</td>
<td>.80</td>
<td>.82</td>
</tr>
<tr>
<td>When clicking on pages of an e-auction websites, the transition is usually fast</td>
<td>.80</td>
<td>.80</td>
<td>.82</td>
</tr>
<tr>
<td>Moving between pages when searching products information is usually fast on e-auction websites</td>
<td>.82</td>
<td>.80</td>
<td>.82</td>
</tr>
<tr>
<td>When bidding on e-auction websites, there is usually no lag time</td>
<td>.81</td>
<td>.80</td>
<td>.82</td>
</tr>
<tr>
<td>Time consumption</td>
<td></td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>An e-auction usually takes a lot of time before the winning bid is determined</td>
<td>.80</td>
<td>.80</td>
<td>.82</td>
</tr>
<tr>
<td>It is time consuming to make a bid on an e-auction website</td>
<td>.85</td>
<td>.80</td>
<td>.82</td>
</tr>
<tr>
<td>I need to bid several times before the winning bid is determined</td>
<td>.58</td>
<td>.80</td>
<td>.82</td>
</tr>
</tbody>
</table>
Table 4.3. (continued)

<table>
<thead>
<tr>
<th>Constructs and measurement items&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Standardized factor loading</th>
<th>Cronbach’s α</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic gain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The winning bidder usually saves much money on a product</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-auctions provide opportunities to win desirable products at low prices</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive bidding usually generates reasonable prices</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The final price of a product in an e-auction is usually lower than retail prices</td>
<td>.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playfulness</td>
<td></td>
<td></td>
<td>.81</td>
</tr>
<tr>
<td>When bidding on an e-auction website, I do not realize the time elapsed</td>
<td>.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When bidding on an e-auction website, I am not aware of any noise</td>
<td>.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When bidding on an e-auction website, I often forget the work I must do</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social motives</td>
<td></td>
<td></td>
<td>.91</td>
</tr>
<tr>
<td>There is a sense of human contact in e-auction sites</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is a sense of sociability in e-auction sites</td>
<td>.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating in an e-auction gives me an opportunity to get to know new people</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating in an e-auction allows me to communicate with others who have similar interests to me</td>
<td>.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating in an e-auction gives me an opportunity to learn from others who have similar interests to me</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td></td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td>E-auction websites keep their promises and commitments</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-auction websites keep customers’ best interests in mind</td>
<td>.76</td>
<td></td>
<td>.60**</td>
</tr>
<tr>
<td>Enjoyment</td>
<td></td>
<td></td>
<td>.80</td>
</tr>
<tr>
<td>The actual process of participating in e-auctions is pleasant</td>
<td>.80</td>
<td></td>
<td>.67**</td>
</tr>
<tr>
<td>Overall, I have pleasure participating in e-auctions</td>
<td>.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usefulness</td>
<td></td>
<td></td>
<td>.81</td>
</tr>
<tr>
<td>Using e-auction helps me be more effective in shopping</td>
<td>.83</td>
<td></td>
<td>.69**</td>
</tr>
<tr>
<td>Using e-auction helps me be more productive in shopping</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of use</td>
<td></td>
<td></td>
<td>.81</td>
</tr>
<tr>
<td>It is easy to bid in an e-auction</td>
<td>.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall, it is easy to use an e-auction website</td>
<td>.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It didn’t take long to learn how to use an e-auction website</td>
<td>.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td>.83</td>
</tr>
<tr>
<td>Participating in e-auctions is beneficial</td>
<td>.88</td>
<td></td>
<td>.71**</td>
</tr>
<tr>
<td>Participating in e-auctions brings benefits for me</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Items remaining after purification process.

<sup>**</sup> p < .01.
Table 4.4.

*Correlation Coefficients between Constructs and Construct Average Variances Extracted (AVE)*

<table>
<thead>
<tr>
<th>Constructs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Connection speed</td>
<td>.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Time consumption</td>
<td>.16</td>
<td>.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Economic gain</td>
<td>.38</td>
<td>.48</td>
<td>.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Playfulness</td>
<td>.54</td>
<td>.47</td>
<td>.17</td>
<td>.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Social motives</td>
<td>.70</td>
<td>.63</td>
<td>ns</td>
<td>.49</td>
<td>.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Trust</td>
<td>.74</td>
<td>.69</td>
<td>.20</td>
<td>.47</td>
<td>.56</td>
<td>.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Enjoyment</td>
<td>.53</td>
<td>.57</td>
<td>ns</td>
<td>.41</td>
<td>.69</td>
<td>.69</td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Usefulness</td>
<td>.56</td>
<td>.43</td>
<td>ns</td>
<td>.49</td>
<td>.68</td>
<td>.75</td>
<td>.68</td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Ease of use</td>
<td>.60</td>
<td>.60</td>
<td>ns</td>
<td>.37</td>
<td>.44</td>
<td>.54</td>
<td>.60</td>
<td>.72</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Attitude</td>
<td>.72</td>
<td>.64</td>
<td>ns</td>
<td>.46</td>
<td>.66</td>
<td>.78</td>
<td>.79</td>
<td>.79</td>
<td>.77</td>
<td>.73</td>
<td></td>
</tr>
<tr>
<td>AVE</td>
<td>.70</td>
<td>.64</td>
<td>.56</td>
<td>.54</td>
<td>.61</td>
<td>.62</td>
<td>.61</td>
<td>.67</td>
<td>.69</td>
<td>.60</td>
<td>.71</td>
</tr>
<tr>
<td>Square root of AVE</td>
<td>.84</td>
<td>.80</td>
<td>.75</td>
<td>.73</td>
<td>.78</td>
<td>.79</td>
<td>.78</td>
<td>.82</td>
<td>.83</td>
<td>.77</td>
<td>.84</td>
</tr>
</tbody>
</table>

*Note.* ns = nonsignificant.

All correlation coefficients are significant with p-values < .05, except for those noted with nonsignificant.

The measurement model for constructs revealed an acceptable model fit, $\chi^2 = 868.57$, $df = 486$, $p < .001$, CFI (comparative fit index) = .92, RMSEA (root mean square area of approximation) = .06 (Acceptable cut off value: CFI $> .92$ and RMSEA $< .08$ with sample size smaller than 250 and number of items larger than 30) (Hair et al., 2010).
Figure 4.4. SEM path coefficients and model fits for the proposed model (standardized path coefficients with $t$ values in parentheses; * $p < .05$; ** $p < .01$; NT = not tested; dashed lines = non-significant paths

- $\chi^2 = 868.57$, $df = 486$
- CFI = .92, RMSEA = .06
Hypothesis Testing

A SEM structural model with a maximum-likelihood estimation procedure was used to test hypotheses. The standardized path coefficients (\(\beta\)), \(t\) values, and significance of all proposed paths as well as the amount of variance explained by predictor variables for each endogenous variable (\(R^2\)) are illustrated in Figure 4.4. The chi square value of this structural model was 868.57 (\(df = 486\)). The chi square to degrees of freedom ratio was 1.79, which falls within the acceptable range of 1 to 3 suggested by Carmines and McIver (1981). The CFI was .92 and the RMSEA was .06, which indicated an acceptable model fit (Hair et al., 2010).

Hypothesis 1 proposed that there was a positive impact of consumer’s perceived security on their trust of e-auctions. The results supported this hypothesis, \(\beta = .82, t = 18.14, p < .01\).

Hypothesis 2 proposed that the connection speed of e-auction websites had a positive influence on consumers’ (a) perceived usefulness and (b) perceived enjoyment of e-auctions. The results showed that there was significant influence of connection speed on perceived usefulness (\(\beta = –.38, t = –3.53, p < .01\)). However, the impact was negative, contradicting the direction of influence stated in the hypothesis. Thus, hypothesis 2a was not supported. As for hypothesis 2b, the path coefficient was .20 with a \(t\) value of 2.29 (\(p < .05\)). Thus, hypothesis 2b was significantly supported.

Hypothesis 3 predicted that the time consumption associated with e-auctions would have a negative impact on consumers’ (a) perceived usefulness, (b) perceived ease of use, and (c) perceived enjoyment of e-auctions. No part of hypothesis 3 was supported by the results.
Time consumption had a negative influence on perceived usefulness ($\beta = -0.06$) and perceived enjoyment ($\beta = -0.05$); however, the results were both nonsignificant. The results also showed a nonsignificant positive effect of time consumption on perceived ease of use ($\beta = 0.09, t = 1.02, p = 0.311$) indicating the lack of support for hypothesis 3c.

Hypothesis 4 was significantly supported ($\beta = 0.21, t = 2.3, p < 0.05$). The findings indicated that economic gain had a positive impact on consumers’ perceived usefulness of e-auctions.

The path coefficient of consumers’ perceived playfulness on their perceived enjoyment on e-auction websites was $0.44, t = 5.17, p < 0.01$, indicating a significant positive influence. Thus, hypothesis 5 was supported.

Hypothesis 6 proposed that the social motives of joining in e-auctions had a positive influence on consumers’ (a) perceived usefulness and (b) perceived enjoyment of e-auctions. Both hypotheses 6a and 6b were supported. Social motives had a significant positive impact on both perceived usefulness ($\beta = 0.55, t = 4.21, p < 0.01$) and perceived enjoyment ($\beta = 0.31, t = 2.99, p < 0.01$) of e-auctions.

Hypothesis 7a predicted consumers’ trust of e-auctions had a positive impact on their perceived usefulness of e-auctions. This hypothesis was not supported by the results ($\beta = 0.21, t = 1.78, p = 0.08$). Hypothesis 7b proposed that consumers’ trust of e-auctions had a positive influence on their attitude toward e-auctions. This hypothesis was significantly supported ($\beta = 0.39, t = 4.56, p < 0.01$).
The results showed that consumers’ perceived enjoyment of e-auctions had a positive impact on their perceived usefulness of e-auctions ($\beta = .24, t = 1.98, p < .05$). Thus, hypothesis 8a was supported. Hypothesis 8b predicted a positive effect of perceived enjoyment on consumers’ attitudes toward e-auctions. The results also significantly supported this hypothesis ($\beta = .38, t = 3.88, p < .01$).

Hypothesis 9a posited that perceived ease of use positively affected perceived usefulness of e-auctions. The effect of perceived ease of use on perceived usefulness was significant at the .01 level, $\beta = .27$, with a $t$ value of 3.16. Thus, hypothesis 9a was supported. Hypothesis 9b, predicting a positive impact of perceived ease of use on attitude toward e-auctions, was proven to be significant ($\beta = .22, t = 2.8, p < .01$). Thus, hypothesis 9b was supported, too.

Hypothesis 10a proposed that consumers’ perceived usefulness of e-auctions would positively affect their attitude toward e-auctions. This hypothesis was supported with significance at the .05 level ($\beta = .24, t = 2.52, p < .05$). Hypotheses 10b and $\beta$11 were not tested because of the elimination of the outcome variable behavior intention of using e-auctions.

As illustrated in Figure 4.4, a large amount of the variance of the outcome variables was explained by the predictive variables. The only exception was perceived ease of use, which had only 1% of the variance explained by the predictive variable.

**Fully Recursive Model**

A fully recursive model was created to enhance the understanding of the relationship between the predictive variables and the outcome variables. The model fit index indicated a
better fit for the fully recursive model than for the originally proposed model ($\chi^2 = 723.81$, $df = 467$, $p < .001$, CFI = .95, RMSEA = .05) as illustrated in Figure 4.5 (Hair et al., 2010).
Figure 4.5. Fully recursive model with significant paths and model fits (standardized path coefficients with $t$ values in parentheses; $^* p < .05$; $^{**} p < .01$.)
In the fully recursive model, the results showed five more significant paths between variables. The nonproposed but significant paths are shown in Table 4.5. As illustrated, connection speed and social motives had significant impacts on consumers’ trust of e-auctions. Playfulness was a significant predictor of consumers’ perceived usefulness of e-auctions. At the same time that playfulness showed a direct influence on perceived usefulness, the mediation effect of enjoyment between playfulness and perceived usefulness lost its significance. This result contradicts hypothesis 8a, which was supported in the proposed model. Security and connection speed showed a significant positive influence on consumers’ perceived ease of use of e-auctions. Thus, the fully recursive model provided additional information about perceptions of e-auctions held by Chinese users. An F test was conducted to compare the Chi-square value of both proposed model and the fully recursive value, the result showed that the two models were not significantly different at .05 level, but significantly different at .1 level \((F = 1.15, p = .064)\). Given that the proposed model had missed some significant paths, this result was not surprising. More discussion of these findings is presented in Chapter 5.
Table 4.5.  

*Significant Additional Paths from the Fully Recursive Model*

<table>
<thead>
<tr>
<th>Predictive variable</th>
<th>Outcome variable</th>
<th>Standardized path coefficient</th>
<th>t value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection speed</td>
<td>Trust</td>
<td>.24</td>
<td>2.44</td>
<td>.015</td>
</tr>
<tr>
<td>Social motives</td>
<td>Trust</td>
<td>.31</td>
<td>2.60</td>
<td>.009</td>
</tr>
<tr>
<td>Playfulness</td>
<td>Usefulness</td>
<td>.31</td>
<td>3.24</td>
<td>.001</td>
</tr>
<tr>
<td>Security</td>
<td>Ease of use</td>
<td>.25</td>
<td>2.15</td>
<td>.032</td>
</tr>
<tr>
<td>Connection speed</td>
<td>Ease of use</td>
<td>.32</td>
<td>3.10</td>
<td>.002</td>
</tr>
</tbody>
</table>
CHAPTER 5. DISCUSSION AND CONCLUSIONS

This chapter summarizes the research findings, and provides interpretations of the findings. Conclusions, implications, limitations, and recommendations of future research are presented.

Summary and Discussion

This study investigated the impact of antecedent factors (i.e., security, connection speed, time consumption, economic gain, playfulness, and social motives) on the extended TAM variables (i.e., perceived usefulness, perceived ease of use, enjoyment, and trust). The extended TAM elements’ influence on consumers’ attitude toward e-auctions also was examined. A summary of the results of hypotheses tested is provided in Table 5.1.

Relationships between Antecedents and Extended TAM Variables

Hypothesis 1 predicted that the perceived security of an online e-auction website would positively affect consumers’ trust of e-auctions. The results supported this hypothesis and aligned with previous research (Chen & Tan, 2004; Vijayasarathy, 2004). As proposed, security features on an e-auction website significantly reduce users’ perceived risk of using this website. As a result, consumers’ trust toward e-auctions is enhanced because they feel safe and protected when bidding and in purchase transactions. From the results of the fully recursive model, security also had a positive influence on consumers’ perceived ease of use of e-auctions. Nowadays, most e-auction websites have a third party payment feature that contains and protects consumers’ credit card and address information. This feature not only
enhances the security of the transaction, but also makes a “one click payment” possible.

Hence, the present researcher believes that security features also reduce the complexity of shopping online for consumers, thus increasing consumers’ perceived ease of use of e-auctions. This result suggests that enhancing security features of an e-auction website significantly encourages consumers to try and adopt e-auctions.

Table 5.1

Summary of Causal Model Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Proposed effects</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Security → Trust</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H2a: Connection speed → Usefulness</td>
<td>+</td>
<td>R</td>
</tr>
<tr>
<td>H2b: Connection speed → Enjoyment</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H3a: Time consumption → Usefulness</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>H3b: Time consumption → Ease of use</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>H3c: Time consumption → Enjoyment</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>H4: Economic gain → Usefulness</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H5: Playfulness → Enjoyment</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H6a: Social motives → Usefulness</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H6b: Social motives → Enjoyment</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H7a: Trust → Usefulness</td>
<td>+</td>
<td>N</td>
</tr>
<tr>
<td>H7b: Trust → Attitude</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H8a: Enjoyment → Usefulness</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H8b: Enjoyment → Attitude</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H9a: Ease of use → Usefulness</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H9b: Ease of use → Attitude</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H10a: Usefulness → Attitude</td>
<td>+</td>
<td>S</td>
</tr>
<tr>
<td>H10b: Usefulness → Behavior intention</td>
<td>+</td>
<td>NT</td>
</tr>
<tr>
<td>H11: Attitude → Behavior intention</td>
<td>+</td>
<td>NT</td>
</tr>
</tbody>
</table>

Note: + = positive effect; - = negative effect; S = significant; N = nonsignificant; NT = not tested; R = significant but in reverse direction to the original hypothesis.
Hypotheses 2a and 2b proposed that the connection speed of an e-auction website would positively affect consumers’ perceived usefulness and perceived enjoyment of e-auctions, respectively. However, the results supported hypothesis 2b but failed to support hypothesis 2a. The results presented a contradictory relationship between connection speed and perceived usefulness; a significant negative relationship was found. The researcher believes this result was caused by the nature of SEM. In SEM, when all related variables were controlled at the same time, the residual left for the path of connection speed on usefulness showed a negative effect. However, the correlation between connection speed and perceived usefulness was positive and significant ($r = .43, p < 0.05$), and a simple regression also demonstrated that connection speed had a positive influence on usefulness ($\beta = .46, t = 7.46, p < 0.01$). Hence, this result should not be interpreted that connection speed negatively affects consumers’ perceived usefulness of e-auctions. As predicted, fast connection speed enhances consumers’ perceived enjoyment of using e-auctions. Hence, hypothesis 2b was supported. This result demonstrated that a fast connection speed can create fluent transitions between webpages and immediate reflections of operations performed. As a result, consumers can be more involved in the website and enjoy their experience of e-auctions. This finding aligned with the concept of flow, indicating that deep involvement will create optimal experiences (Csikszentmihalyi & LeFevre, 1989). This result suggests that investment in website design and server upgrades help to create more enjoyable experience for users of a website.
The fully recursive model presented two more significant paths related to connection speed (Table 4.5). Connection speed was proven to have a positive impact on consumers’ trust and on perceived ease of use of e-auctions. This can be explained by the following. As mentioned before, China’s average Internet connection speed is relatively slow compared to other countries. Thus, if an e-auction website decides to invest in upgrading its servers to increase their capability and consequent speed, it will make a positive impression on consumers. Such investment shows ambition and willingness to take responsibility for establishing a consumer-focused e-auction website. Consumers may perceive such a website to be trustworthy and reliable. As for the positive influence of connection speed on perceived ease of use, the fast connection reduces waiting time between operations and, again, enhances flow. A fast connection provides immediate response and reduces complexity caused by connection lags. As a result, consumers may perceive enhanced ease of use.

Hypotheses 3a through 3c predicted that the level of time consumption of e-auctions would have a negative influence on consumers’ perceived usefulness, ease of use, and enjoyment of e-auctions. The results failed to support any of these hypotheses. The nature of e-auctions requires consumers to spend a considerable amount of time on bidding and monitoring the ongoing auction process. Time consumption was proposed to reduce the flow of and consumers’ involvement in e-auctions and, thus, negatively affect consumers’ perceptions toward e-auctions. However, the present study did not find any evidence to
support these hypotheses. E-auctions were introduced to China in 2003, when China’s online market had just started booming (Qu & Davison, 2009). Before e-auctions, Chinese consumers had seldom experienced any kind of auctions; they had been accustomed to fixed price sale. The mean value of perceived time consumption ($M = 5.18, SD = 1.1$) indicated that respondents perceived e-auctions to be time consuming. The time consuming nature of e-auctions may have been acceptable to Chinese e-auction users because this was natural manifestation of e-auctions from their inception and they offer consumers playfulness and enjoyment, which limits negative associations to time consumption. Overall, the results regarding hypotheses 3a through 3c suggest that the duration time of an ongoing e-auction is perceived as normal and acceptable by Chinese consumers. Hence, time consumption has no significant influence on consumers’ perceptions toward e-auctions.

Hypothesis 4 predicted that economic gain from e-auctions would positively influence perceived usefulness of e-auctions. The results significantly supported this hypothesis. Because a large number of products is available online, e-auction competition for a given product is not too fierce. Furthermore, the final price in an e-auction is usually lower than the retail price, providing good economic value for consumers. As a result, this economic value provided by e-auctions may significantly enhance perceived usefulness of e-auctions. This result suggests that e-auctions are attractive to consumers who like to seek out products offering a good value.
Hypothesis 5 predicted the playfulness associated with e-auctions would have a positive effect on consumers’ perceived enjoyment of e-auctions. The results significantly supported this hypothesis. As proposed, the strategic operations of bidding in e-auctions were perceived to be playful by consumers, and such playfulness would bring enjoyment to consumers. As expected, the gamesmanship associated with the competitive bidding process in e-auctions was perceived as playful and was one key part of the enjoyable experience on e-auction websites. The fully recursive model showed that playfulness had a significant impact on consumers’ perceived usefulness of e-auctions ($\beta = .31, t = 3.24, p < .01$). This path was not proposed. In addition, in the fully recursive model, when all the paths were tested simultaneously, playfulness had a significant positive influence on both usefulness and enjoyment. However, the effect of enjoyment on usefulness, which was significant in the original model, became non-significant in fully recursive model. This result indicates that the playfulness of e-auctions contributes to both hedonic and utilitarian value for Chinese consumers. The playfulness significantly affects utilitarian value in terms of perceived usefulness of e-auctions. And playfulness significantly affects hedonic value of perceived enjoyment of e-auctions, which further affects consumers’ attitude towards e-auctions. As shown in Figures 4.1 and 4.2, most e-auction users were also regular online shoppers who directly purchased products online. E-auctions provide not only an alternative way of shopping, but also a way that consumers can have fun while they are shopping. From this finding one can assume that, for some e-auction users, seeking fun
from the playful operations of bidding could serve as a key reason of their adoption of e-auctions.

Hypotheses 6a and 6b predicted that the social motives related to e-auctions would have a positive effect on consumers’ perceived usefulness and enjoyment of e-auctions. The results significantly supported these two hypotheses. As expected, the social aspect, communication and peer group attraction embedded in the e-auctions, had an influence on consumers. Social interactions were salient in e-auctions. Communication occurs between sellers and buyers, creating a community-like atmosphere. E-auction users can get useful information and share fun facts with others on e-auction websites, enhancing their perceived usefulness and enjoyment of e-auctions. In the fully recursive model, social motives was found positively related to consumers’ trust of e-auctions. This result was not surprising. When consumers are highly involved in an online community e-auction website, they build relationships with other users who are central to the e-auction that produce a level of trust. This finding suggests that e-auction websites should take advantage of this effect and try to build a better online community to attract more users, which in turn would increase the quantity of their transactions.

The first 6 hypotheses were proposed regarding the relationship between antecedents and extended TAM variables. Hypotheses 7 through 11 were proposed regarding relationships among extended TAM variables. These relationships revealed the internal structure of the extended TAM model.
Relationships Among Extended TAM Variables

Hypotheses 7a proposed that consumers’ trust toward e-auctions would have positive influence on their perceived usefulness of e-auctions. The results failed to support this hypothesis and contradicted previous research (i.e., Dahlberg et al., 2003; Pavlou, 2003). This finding suggests that, for Chinese consumers, perceived usefulness is derived mostly from functional aspects, such as economic gain, playfulness, and social interactions associated with e-auctions. Chinese consumers’ trust toward e-auctions does not increase their perceptions of usefulness of e-auctions. Hypothesis 7b predicted that consumers’ trust toward e-auctions would have a positive effect on their attitude toward e-auctions. The results significantly supported this hypothesis. This could be explained by promised safety and protection of personal or financial information provided by e-auction websites. This finding is accordant with previous research (i.e., Chen & Tan, 2004; Suh & Han, 2002). The results of these two hypotheses suggest that, although consumers’ trust toward e-auctions could be built by providing sophisticated security features, their perceived usefulness of e-auctions still depends on other benefits provided.

Hypothesis 8a and 8b predicted that the enjoyment associated with e-auctions would have positive effects on consumers’ perceived usefulness and attitude toward e-auctions. The results significantly supported these hypotheses and were accordant with previous studies (i.e., Venkatesh, 1999; Childers et al., 2001; Van der Heijden, 2003). The results demonstrate that for consumers seeking a hedonic experience, e-auctions are perceived as
useful. Furthermore, consumers, who had pleasant feelings while on e-auction websites, had a favorable attitude toward e-auctions.

Hypothesis 9a and 9b predicted that the perceived ease of use of e-auctions would have a positive influence on consumers’ perceived usefulness and attitude toward e-auctions. The results supported these hypotheses. Technology’s ease of use reduces the time and effort spent achieving a certain goal, which may have enhanced consumers’ perceived usefulness and positive attitude toward e-auctions. This finding also aligns with previous research (i.e., Liaw & Huang, 2003; Ha & Stoel, 2009).

Hypothesis 10a proposed that the perceived usefulness of e-auctions would enhance consumers’ attitude toward e-auctions. The results supported this hypothesis. As proven by many studies, perceived usefulness is the main reason for positive attitudes toward new technology (i.e., Lee et al., 2005; Shih, 2004; Tong, 2010; Yu et al., 2005). Although the present study found evidence of this relationship on e-auctions among Chinese consumers, usefulness was not the most important contributor to attitude according to the standardized path coefficients. Hypothesis 10b and 11 were not tested because of the elimination of the behavior intention variable.

In the proposed model, trust was greatly affected by security ($\beta = .82$), and 68% of the variance of trust was explained by security, indicating that a safe environment created by e-auction websites enhance perceived trust. Playfulness ($\beta = .44$), social motives ($\beta = .31$), and connection speed ($\beta = .20$) were contributors to perceived enjoyment and explained 64%
of the variance for enjoyment. Gamesmanship and social activities associated with e-auctions appear to be main contributors to consumer enjoyment from e-auctions. Usefulness was found to be influenced mostly by social motives ($\beta = .55$), followed by ease of use ($\beta = .27$), enjoyment ($\beta = .24$), and economic gain ($\beta = .21$), indicating that hedonic benefits contributed most to perceived usefulness. These four variables explained 68% of the variance for usefulness. The $R^2$ value shows that 79% of the variance for attitude was explained by trust ($\beta = .39$), enjoyment ($\beta = .38$), usefulness ($\beta = .24$), and ease of use ($\beta = .22$). This shows that trustworthiness and enjoyment provided by e-auctions have more influence on consumers’ attitude than the original TAM variables of usefulness and ease of use, supporting the necessity and robustness of the extended TAM model.

**Conclusions and Implications**

This study examined the effects of various antecedent factors, including website features (security and connection speed) and variables associated with the process of e-auctions (time consumption, economic gain, playfulness, and social motives), on extended TAM variables (trust, enjoyment, usefulness, and ease of use). The results demonstrated the importance of the establishment of good infrastructure for e-auction websites. The security features of e-auction websites not only reduce consumers’ perceived risk in e-auctions, enhancing consumers’ trust toward the websites, but also reduce their effort in the operations of payment, enhancing their perceived ease of use of e-auctions. In addition, the investment in increasing websites’ connection speed was proven to have a positive effect on
consumers’ overall experience on e-auction websites, enhancing their perceived ease of use, enjoyment, and trust of e-auctions. These results suggest that e-auction websites should put more resources into creating a website with security protections, effective and efficient functions, and optimal experience for consumers to help build trust toward and enjoyment from e-auctions. Actually, with the development of the Chinese online market, a well-constructed website is becoming a necessity for any e-auction player.

Because of the inherent nature of e-auctions and what Chinese consumers have experienced since their introduction, their time consuming nature did not adversely affect Chinese consumers’ perceptions. This result suggests that e-auction websites should take advantage of the time users spend on their websites, incorporating more kinds of auctions to expand consumers’ experiences. For example, group auctions (i.e., sellers put a lot of multiple items on auction, and buyers can work together to get the whole lot of items.) and reverse auctions (i.e., sellers compete in order to obtain business from a buyer, such as oltiby.com) may create more fun and economic value for consumers. In addition, other activities like online forum or small flash games with rewards will also keep consumers involved in the community of e-auction websites.

The economic gain associated with e-auctions has been proven to be a key factor affecting consumers’ perceived usefulness of e-auctions. However, the respondents’ online shopping patterns demonstrated that e-auctions are still a niche market compared to the fixed price sale market. Buyers come to e-auction websites for rare, memorable, and vintage
products. These items are usually provided by e-auction users themselves, not online retailers. Hence, the key to maintaining a prosperous e-auction market is to attract more sellers and create an attractive online community among all users. This idea is accordant with the findings in the present study that the social motive was a key antecedent of consumers’ perceived usefulness, enjoyment, and even trust toward e-auctions. The social interaction on e-auction websites is so important that it affects both the utilitarian and hedonic value that consumers seek on e-auction websites.

Another significant antecedent of consumers’ adoption of e-auctions was playfulness, which significantly affects consumers’ perceived usefulness and enjoyment of e-auctions. The gamesmanship and competition associated with the process of an e-auction was proven to be very attractive to Chinese consumers who had adopted e-auctions. This factor also could be enhanced by involving more participants in the auctions. Building a stronger and more interesting online community by incorporating more social activities and rewards programs for e-auction users will attract more users, promote more auctions with more special products, create more participations and discussions, and finally, make the e-auction website even more influential. E-auction users are not only buyers, but also sellers, opinion leaders, and community builders. E-auction websites should pay great attention to online community building, because attracting more interaction among users is the key for the development of an e-auction website.
This study also examined the effects of extended TAM variables on consumers’ attitudes toward e-auctions. As predicted, the extended TAM model was proven to be robust in explaining Chinese online shoppers’ adoption of e-auctions. In the present study, all paths within the extended TAM model were proven to be significant, except for the effect of trust on perceived usefulness. Trust toward e-auctions, along with usefulness, ease of use, and enjoyment associated with e-auctions generate a favorable attitude toward e-auctions. The results suggest that consumers’ adoption of e-auctions is determined by both their utilitarian and hedonic value. This suggests that e-auction websites should enhance their functional features to satisfy consumers’ utilitarian and hedonic needs including social activities, playfulness and the need of acquiring products with good value. As mentioned above, incorporating online forum or twitter like micro-blogs for consumers to share their purchasing experience, adding small flash games with rewards points which can be spent as auction payments, and introducing more kinds of auctions will help e-auction websites enhance consumers’ experience.

This present study contributes to the growing body of research on Chinese consumers’ adoption of e-auctions (i.e., Quaddus et al. 2005; Huang & Dai, 2006; Lu et al., 2009), which explored several antecedent factors that affected Chinese consumers’ adoption of e-actions. The present research confirmed the important influences of security, connection speed, economic gain, playfulness, and social motives on consumers’ adoption of e-auctions in China. The present study found additional influential antecedent factors that could affect
Chinese consumers’ adoption of e-auctions. Specifically, connection speed and social motives were proven to be of great importance. The importance of social interactions on e-auction websites in the present study illustrate for e-auction sites that an engaged online community is a key to their success as suggested by McWilliam (2000). In the situation of e-auctions, the blossom of the online community of one e-auction website indicates large number of potential sellers and buyers, who actually determine the market size of e-auctions. However, this point of view has not been emphasized in past studies on e-auction websites in China. In addition, the present study again proved the robustness of the extended TAM model in explaining new technology adoption and also contributed to the validation of the extended TAM in Asian cultures.

**Limitations and Future Research**

This present study used a sample of college students who had e-auction experiences. Although college students represent a majority of online shoppers in China, this sample from a survey firm’s pool does not represent the general population of online shoppers in China. In the future, researchers should recruit a more representative sample of Chinese online shoppers to participate in the study. Moreover, future researchers should recruit both e-auction users and non e-auction users for a study to compare perceptions of e-auctions. This may be helpful in identifying ways to attract current non-users.

In addition, this study investigated only external factors that may affect Chinese consumers’ adoption of e-auctions; internal factors of Chinese consumers’ personal traits and
shopping styles were not examined. Future researchers should include more internal factors of Chinese consumers to enhance the understanding of Chinese consumers’ adoption of e-auctions.

Lastly, the current researcher developed some of the items used in the questionnaire. Although they were proven to have acceptable reliability and validity in the present study, future studies should be conducted to test the external validity of this measurement scale.
REFERENCES


Sun, H., & Zhang, P. (2006). The role of moderating factors in user technology acceptance. *International Journal of Human-Computer Studies, 64*, 53-78.


APPENDIX A

Survey questionnaire (English)

INFORMED CONSENT DOCUMENT

Title of Study: Antecedents of Chinese consumers' adoption of online auction: An extended-TAM study

Investigators: Rui Li (Master’s student)
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Dr. Telin (Doreen) Chung
Apparel, Events, and Hospitality Management
tdchung@iastate.edu
(515) 294-4022

Please take your time in deciding if you would like to participate.

INTRODUCTION

The purpose of this study is to explore Chinese consumers' use of e-auction websites. For those of you who now use or who have used e-auction websites, you are being invited to participate in this study because you meet the study criteria of being a Chinese college student who is 18 years of age or older and who have experience with e-auction websites. We are very interested to know your views regarding your e-auction experiences.

DESCRIPTION OF PROCEDURES

If you agree to participate, you will be led to a self-administrated online survey. You will be asked questions about your experiences, perceptions and attitudes toward e-auctions. You will also be asked to provide demographic information such as age, major, and monthly expenditure online. It will take less than half an hour for the survey.
RISKS

There are no foreseeable risks from participating in this study.

BENEFITS

If you decide to participate in this study, there are no benefits for you personally. However, there may be benefits for e-auction websites in general, as details of the study may help e-auction websites to improve their websites’ features and provide more pleasant shopping experiences to users.

COSTS AND COMPENSATION

There will be no costs except time consumption for this study. You have the opportunity to enter a draw of three 50 Yuan ($8 value) gift cards if you choose to; this will require that you provide your contact email address in the survey.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide not to participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

All answers will be anonymous, and all demographic information will only be used for sample description purposes. Confidentiality will be maintained. Your email address will only be used for the drawing purpose only and will be immediately deleted after the drawing.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study. For further information about the study, please contact Rui Li, ruili@iastate.edu, (515) 708-8751, 31 Mackay Hall, Iowa State University, Ames, IA or Dr. Ann Marie Fiore, amfiore@iastate.edu, (515) 294-9303, 1062 LeBaron Hall, Iowa State University, Ames, IA. You can also reach Dr. Telin Chung at tdchung@iastate.edu, (515) 294-4022, 31 Mackay Hall, Iowa State University, Ames, IA.

If you have any questions about the rights of research subjects or research-related injury,
please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, IA 50011.

*Do you agree to participate in this study?

_Yes, I Do
_No, I don’t

Section 1:

*1: Are you 18 years old or older?

_Yes, I am
_No, I’m not

*2: Have you ever participated in an e-auction before?

_Yes, I have
_No, I haven’t

Section 2:

Following is a series of questions that explore your perceptions toward e-auction and e-auction websites. Please indicate your degree of agreement or disagreement with the following statement, where 1 indicates strongly disagree and 7 indicates strongly agree.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I feel secure sending personal information such as my address on e-auction websites</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>2</td>
<td>I feel secure sending financial information such as my credit card number on e-auction websites</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>3</td>
<td>I feel safe providing personal information such as my address on to e-auction websites</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Rating</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>4</td>
<td>I feel safe providing financial information such as my credit card number to e-auction websites</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>5</td>
<td>E-auction websites are a safe environment to provide personal information</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>6</td>
<td>E-auction websites are a safe environment to provide financial information</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>7</td>
<td>When I place a bid on e-auction websites, there is very little waiting time between my click and the website’s response</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>8</td>
<td>The web pages on an e-auction website usually loads quickly</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>9</td>
<td>When clicking on pages of an e-auction websites, the transition is usually fast</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>10</td>
<td>Moving between pages when searching products information is usually fast on e-auction websites</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>11</td>
<td>When bidding on e-auction websites, there is usually no lag time</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>12</td>
<td>I need to spend a lot of time to monitor how the e-auction is going after bidding</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>13</td>
<td>An e-auction usually takes a lot of time before the winning bid is determined</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>14</td>
<td>It is time consuming to make a bid on an e-auction website</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>15</td>
<td>I need to bid several times before the winning bid is determined</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>16</td>
<td>The winning bidder usually saves much money on a product</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>17: E-auctions provide opportunities to win desirable products at low prices</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>18: Competitive bidding usually generates reasonable prices</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>19: The final price of a product in an e-auction is usually lower than retail prices</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>20: When bidding on an e-auction website, I do not realize the time elapsed</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>21: When bidding on an e-auction website, I am not aware of any noise</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>22: When bidding on an e-auction website, I often forget the work I must do</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>23: Bidding on an e-auction website is fun to me</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>24: Bidding on an e-auction website stimulates my curiosity</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>25: Bidding on an e-auction website leads to my exploration</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>26: Bidding on an e-auction website arouses my imagination</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>27: Bidding on an e-auction website is interesting and exciting</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>28: Bidding on an e-auction website is like playing a competitive game</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>29: There is a sense of human contact in e-auction sites</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>30: There is a sense of sociability in e-auction sites</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Participating in an e-auction gives me an opportunity to get to know new people</td>
<td>1</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>32</td>
<td>Participating in an e-auction allows me to communicate with others who have similar interests to me</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>Participating in an e-auction gives me an opportunity to learn from others who have similar interests to me</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>E-auction websites are trustworthy</td>
<td>1</td>
</tr>
<tr>
<td>35</td>
<td>E-auction websites keep their promises and commitments</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>E-auction websites keep customers’ best interests in mind</td>
<td>1</td>
</tr>
<tr>
<td>37</td>
<td>I trust e-auction websites</td>
<td>1</td>
</tr>
<tr>
<td>38</td>
<td>I find participating in e-auctions to be enjoyable</td>
<td>1</td>
</tr>
<tr>
<td>39</td>
<td>The actual process of participating in e-auctions is pleasant</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>Overall, I have pleasure participating in e-auctions</td>
<td>1</td>
</tr>
<tr>
<td>41</td>
<td>Using e-auction helps me be more effective in shopping</td>
<td>1</td>
</tr>
<tr>
<td>42</td>
<td>Using e-auction helps me be more productive in shopping</td>
<td>1</td>
</tr>
<tr>
<td>43</td>
<td>Using e-auction makes shopping easier to get done</td>
<td>1</td>
</tr>
<tr>
<td>44</td>
<td>E-auction is useful in shopping</td>
<td>1</td>
</tr>
<tr>
<td>45</td>
<td>It is easy to learn how to bid in an e-auction</td>
<td>1</td>
</tr>
<tr>
<td>46:</td>
<td>It is easy to bid in an e-auction</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>47:</td>
<td>Overall, it is easy to use an e-auction website</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>48:</td>
<td>It didn’t take long to learn how to use an e-auction website</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>49:</td>
<td>Participating in e-auctions is good</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>50:</td>
<td>Participating in e-auctions is beneficial</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>51:</td>
<td>Participating in e-auctions brings benefits for me</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>52:</td>
<td>Overall, I am positive about participating in e-auctions</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>53:</td>
<td>I intend to use e-auctions frequently to do my shopping in the future</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>54:</td>
<td>I intend to use e-auctions whenever appropriate to do my shopping</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>55:</td>
<td>I intend to use e-auctions to do my shopping on a regular basis</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>56:</td>
<td>I intend to keep using e-auctions to do my shopping in the future</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**Section 3:**

Please check the box that describes who you are.

**Gender:**
- Male
- Female

**Age:**
- Less than 18
- 18-22
More than 30

Student level:
_Freshmen
_Sophomore
_Junior
_Senior
_Graduate students

Major:
_Engineering
_Arts and design
_Social sciences
_Natural sciences
_Business and management
_Other

Considering your online shopping experiences other than e-auction experiences:
On average, how many products do you purchase online per month?
_Less than one product a month
_One to three products a month
_Four to six products a month
_More than six products a month

Overall, on average how much do you spend on purchasing online every month?
_Less than 100 yuan
_101 to 250 yuan
_251 to 500 yuan
_More than 500 yuan

On which online shopping site do you have purchasing experience? (select all applicable)
_Taobao.com
_eBay.com
_Eachnet.com
_Paipai.com
_Others___________

Which is the most frequently category for your online purchasing?
Considering your e-auction website experiences:

On average, how many products do you bid on online per month?

- Less than one product a month
- One to three products a month
- Four to six products a month
- More than six products a month

Overall, on average how much do you spend on bidding online every month?

- Less than 100 yuan
- 101 to 250 yuan
- 251 to 500 yuan
- More than 500 yuan

On which online shopping site do you have bidding experience? (select all applicable)

- Taobao.com
- eBay.com
- Eachnet.com
- Paipai.com
- Others

Which is the most frequently category for your online bidding?

- Apparel and accessories
- Electronic products
- Books, magazines and CDs
- Virtual products (online gaming credits, prepaid cell phone credits)
- Collectable items
- Food
- Others
调研题目：中国消费者对网络拍卖的接受度调查

调查研究员：李睿
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amfiore@iastate.edu
(515) 294-9303

Dr. Telin (Doreen) Chung
服装、项目及酒店管理系，爱荷华州立大学
tdchung@iastate.edu
(515) 294-4022

请您仔细阅读以下信息并决定您是否愿意参与此项调查。

简介
此项研究的目的是探索中国消费者对于网络拍卖的使用。您被邀请至此项研究作为一名潜在参与者是因为您是一位中国大学生并年满 18 周岁。您需要正在或者曾经使用过网络拍卖进行购物来完成此项研究。我们对于您的网络拍卖经历非常有兴趣。

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如果您同意参与，您将被指引至一份网络调查问卷。您将被询问关于网络拍卖的经历、见解和态度。您也将被询问关于年龄、专业以及每月用于网络的花费等人口统计问题。完成此项问卷不会超过 30 分钟。

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花费和报酬

参与此项调查不需任何花费。您可以选择参与抽奖并获得价值 50 元的充值卡一张（共三张）作为报酬。您需要提供您的电子邮件地址来进行抽奖。

参与者权利

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*您是否同意参与此项调查？

_是的，我同意
_不是，我不同意
第一部分:

*1: 您是否年满 18 周岁？

- 是的，我年满 18 周岁
- 不是，我未满 18 周岁

*2: 您是否曾经参与过网络拍卖？

- 是的，我曾经参与过
- 不是，我没有参与过

第二部分:

接下来会有一系列的问题关于您对网络拍卖和网络拍卖网站的看法，请您指出您对每种说法的同意程度，1 代表非常不同意，7 代表非常同意。

<p>| 1: 我感觉在网络拍卖网站上发送诸如我的地址等个人信息是保险的 | 1 2 3 4 5 6 7 |
| 2: 我感觉在网络拍卖网站上发送诸如我的信用卡号等财务信息是保险的 | 1 2 3 4 5 6 7 |
| 3: 我感觉向网络拍卖网站提供诸如我的地址等个人信息是安全的 | 1 2 3 4 5 6 7 |
| 4: 我感觉向网络拍卖网站提供诸如我的信用卡号等财务信息是安全的 | 1 2 3 4 5 6 7 |
| 5: 网络拍卖网站是提供个人信息的安全环境 | 1 2 3 4 5 6 7 |
| 6: 网络拍卖网站是提供财务信息的安全环境 | 1 2 3 4 5 6 7 |
| 7: 当我在网络拍卖网站上竞拍时，我的点击和网站的反应之间只有很短的等待时间 | 1 2 3 4 5 6 7 |
| 8: 网络拍卖网站上的网页通常加载的很快 | 1 2 3 4 5 6 7 |
| 9:  | 当点击网络拍卖网站上的页面，转换速度通常很快 | 1 2 3 4 5 6 7 |
| 10: | 当在网络拍卖网站上搜索产品信息时，页面间的转换通常很快 | 1 2 3 4 5 6 7 |
| 11: | 当在网络拍卖网站上竞拍时，网站通常没有延迟 | 1 2 3 4 5 6 7 |
| 12: | 竞拍过后，我需要花费很多时间持续关注拍卖如何发展 | 1 2 3 4 5 6 7 |
| 13: | 在确定竞拍获胜之前，一个网络拍卖通常会花费很多时间 | 1 2 3 4 5 6 7 |
| 14: | 在网络拍卖网站上竞拍是费时的 | 1 2 3 4 5 6 7 |
| 15: | 在确定竞拍获胜之前，我需要竞拍好几次 | 1 2 3 4 5 6 7 |
| 16: | 竞拍获胜者通常在一件商品上节约很多金钱 | 1 2 3 4 5 6 7 |
| 17: | 网络拍卖提供了用低价格赢得心仪商品的机会 | 1 2 3 4 5 6 7 |
| 18: | 竞拍通常会产生合理的价格 | 1 2 3 4 5 6 7 |
| 19: | 一件商品在网络拍卖里的最终成交价格通常低于零售价格 | 1 2 3 4 5 6 7 |
| 20: | 当在网络拍卖网站上竞拍时，我意识不到时间的流逝 | 1 2 3 4 5 6 7 |
| 21: | 当在网络拍卖网站上竞拍时，我觉察不到任何噪声干扰 | 1 2 3 4 5 6 7 |
| 22: | 当在网络拍卖网站上竞拍时，我经常忘记我必须做的事情 | 1 2 3 4 5 6 7 |
| 23: | 在网络拍卖网站上竞拍对我来说很有乐趣 | 1 2 3 4 5 6 7 |
| 24: | 在网络拍卖网站上竞拍引起了我的好奇心 | 1 2 3 4 5 6 7 |
| 25: | 在网络拍卖网站上竞拍促使我去探索 |  |  |  |  |  |  |
| 26: | 在网络拍卖网站上竞拍激发了我的想象力 |  |  |  |  |  |  |
| 27: | 在网络拍卖网站上竞拍是有趣和令人兴奋的 |  |  |  |  |  |  |
| 28: | 在网络拍卖网站上竞拍像是玩一个竞技游戏 |  |  |  |  |  |  |
| 29: | 在网络拍卖网站上有与人交流的感觉 |  |  |  |  |  |  |
| 30: | 在网络拍卖网站上有参与社交的感觉 |  |  |  |  |  |  |
| 31: | 参加网络拍卖给我认识新朋友的机会 |  |  |  |  |  |  |
| 32: | 参加网络拍卖给予我和那些与我有相似兴趣的人交流的机会 |  |  |  |  |  |  |
| 33: | 参加网络拍卖给予我向那些与我有相似兴趣的人学习的机会 |  |  |  |  |  |  |
| 34: | 网络拍卖网站是值得信任的 |  |  |  |  |  |  |
| 35: | 网络拍卖网站信守它们的承诺 |  |  |  |  |  |  |
| 36: | 网络拍卖网站以客户的最佳利益为准则 |  |  |  |  |  |  |
| 37: | 我信任网络拍卖网站 |  |  |  |  |  |  |
| 38: | 我发现参与网络拍卖是一种享受 |  |  |  |  |  |  |
| 39: | 参与网络拍卖的实际过程是愉快的 |  |  |  |  |  |  |
| 40: | 总体来说，参与网络拍卖让我得到快乐 |  |  |  |  |  |  |
| 41: | 使用网络拍卖帮助我提高购物效率 |  |  |  |  |  |  |
| 42: | 使用网络拍卖帮助我更富有成效的购物 |  |  |  |  |  |  |
| 43: | 使用网络拍卖让购物更加简单 |  |  |  |  |  |  |</p>
<table>
<thead>
<tr>
<th>序号</th>
<th>问题内容</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tr>
<td>44</td>
<td>网络拍卖对购物来说很有用</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
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<tr>
<td>45</td>
<td>学习如何在网络拍卖中竞拍很简单</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>46</td>
<td>在网络拍卖中竞拍很简单</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
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<td>47</td>
<td>总体来说，使用网络拍卖网站很简单</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
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<tr>
<td>48</td>
<td>学习如何使用网络拍卖网站并不费时</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>49</td>
<td>参与网络拍卖很好</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>50</td>
<td>参与网络拍卖是有益的</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>51</td>
<td>参与网络拍卖给我带来好处</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>52</td>
<td>总体来说，我对参与网络拍卖持积极态度</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>53</td>
<td>我打算将来在购物时经常使用网络拍卖</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>54</td>
<td>我打算在任何适当的时候使用网络拍卖进行购物</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>55</td>
<td>我打算定期使用网络拍卖购物</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>56</td>
<td>我打算将来在购物时保持使用网络拍卖</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

第三部分：
请选择最能描述您的选项。

性别：
男
女

年龄：
小于 18 岁
18 到 22 岁
23 到 30 岁
大于 30 岁
年级：
大一
大二
大三
大四
研究生

专业：
工程学
艺术设计
社会科学
自然科学
商科和管理
其他：______________________

根据您直接购买而非竞拍所得的网络购物经验：
平均而言，您每月在网络上购买多少件产品？
少于一月一件
一月 1 到 3 件
一月 4 到 6 件
多于一月 6 件

总体来说，您每月平均花费多少在网络购买上？
少于 100 元
101 到 250 元
251 到 500 元
500 元以上

以下哪些网站是您经常光顾的网络购物网站？（选择所有适合的选项）
淘宝
eBay
易趣
拍拍
其他：______________________

哪类产品是您在网络购买中消费最多的？
服装配饰
电子产品
书籍、杂志、cd
虚拟产品（游戏点卡，手机充值卡）
收藏品
食物
其他：

根据您在网络上 拍卖 的经验：
平均而言，您每月在网络上 拍卖 多少件产品？
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中国消费者对网络拍卖的接受度调查

知情同意书

调研目的：中国消费者对网络拍卖的接受度调查

调查研究者：李vt

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您可以在任何时间提出疑问。关于此项研究的任何问题，您可以通过邮件或者电话询问：李菲尔, ruli@iastate.edu, (515) 708-8751, 31 Mackay Hall, Iowa State University, Ames, IA 或者 Dr. Ann Marie Fiore, aamf@iastate.edu, (515) 294-9303, 1062 LeBaron Hall, Iowa State University, Ames, IA。您也可以访问 Dr. Teflin Chung, tdchung@iastate.edu, (515) 294-4022, 31 Mackay Hall, Iowa State University, Ames, IA。

如果您对参与者权利有任何疑问，您可以询问审查委员会管理员，(515) 294-4566, IRB@iastate.edu，或者审查委员会主任，(515) 294-3115，Office for Responsible Research, Iowa State University, Ames, IA 50011。

*您是否同意参与此项调查？

○ 是的，我同意
○ 不是，我不同意

中国消费者对网络拍卖的接受度调查

第一部分:

*1：您是否年满18周岁？

○ 是的，我年满18周岁
○ 不是，我不到18周岁

*2：您是否曾经参与过网络拍卖？

○ 是的，我曾经参与过
○ 不是，我没有参与过
第二部分：
接下来会有一系列的问题关于您对网络拍卖和网络购物网站的使用。请您根据您的感受程度，1代表非常不同意，7代表非常同意。

<table>
<thead>
<tr>
<th>题号</th>
<th>问题描述</th>
<th>1非常不同意</th>
<th>2</th>
<th>3</th>
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<th>7非常同意</th>
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<td>1</td>
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24. 在网络拍卖网站上竞拍引起了我的好奇心
25. 在网络拍卖网站上竞拍使我更加熟悉网络
26. 在网络拍卖网站上竞拍使我更加了解网络
27. 在网络拍卖网站上竞拍使我更加了解网络
28. 在网络拍卖网站上竞拍使我更加了解网络
29. 在网络拍卖网站上竞拍使我更加了解网络
30. 在网络拍卖网站上参与竞拍的感悟
31. 参加网络拍卖给我认识新朋友的机会
32. 参加网络拍卖给我认识新朋友的机会
33. 参加网络拍卖给我认识新朋友的机会
34. 网络拍卖网站是值得信任的
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36. 网络拍卖网站是值得信任的
37. 网络拍卖网站是值得信任的
38. 发现参与网络拍卖是一种享受
39. 参与网络拍卖的实际过程是愉快的
40. 总体来说，参与网络拍卖让我感到快乐
41. 使用网络拍卖更容易提高购物效率
42. 使用网络拍卖更容易提高购物效率
43. 使用网络拍卖更容易提高购物效率
44. 网络拍卖对购物来说很有用
45. 学习如何在网络拍卖中购买很简单
46. 在网络拍卖中购买很简单
47. 总体来说，使用网络拍卖网站很方便
48. 学习如何使用网络拍卖网站并不需要很长时间
49. 参与网络拍卖很容易
50. 参与网络拍卖是有趣的
51. 参与网络拍卖后对网络有好处
52. 总体来说，我对参与网络拍卖持积极态度
53. 我打算将来在购物时经常使用网络拍卖
第三部分，请选择最能描述您的选项。

性别：♀
- 男
- 女

年龄：♀
- 小于30岁
- 30到50岁
- 50到60岁
- 大于60岁

年级：♀
- 大一
- 大二
- 大三
- 大四
- 研究生

专业：♀
- 工程学
- 艺术设计
- 社会科学
- 自然科学
- 商科管理
- 其他：______________________

根据您直接购买或非直接所得的网购购物经验：

平均而言，您每月在网购上花多少钱？♀
- 少于100元
- 100到200元
- 200到300元
- 多于300元
- 多于500元
- 多于1000元
- 多于5000元
- 多于10000元
总体来说，您每月平均花费多少在网络**上？**
- 少于100元
- 101至200元
- 201至500元
- 500元以上

以下哪些网站是您经常光顾的网络**购物**网站？**[多选题]**
- 天猫
- 拍拍
- 其他：请注明...

哪类产品是您在网络**购物**中消费最多的？**
- 服装/配饰
- 电子产品
- 书籍/杂志/CD
- 食品
- 其他：请注明...

根据您在网络上**购物**的经验：

平均而言，您每月在网上购物多少件产品？**
- 少于一件
- 一件到三件
- 一件到十件
- 多于一件

总体来说，您每月平均花费多少在网络游戏**上？**
- 少于100元
- 101至500元
- 501至1000元
- 500元以上

以下哪些网站是您经常光顾的网络游戏**购物**网站？**[多选题]**
- 天猫
- 拍拍
- 其他：请注明...

哪类产品是您在网络**购物**中消费最多的？**
- 服装/配饰
- 电子产品
- 书籍/杂志/CD
- 食品
- 其他：请注明...

如果您希望通过参加90元充卡的抽奖， 请您在下面提供您的电子邮箱地址。您的回答将是完全匿名的。您的电子邮件地址将被用来进行抽奖而非其他任何用途，并将在抽奖后立即被删除。（请填写您的电子邮箱）

非常感谢您的参与，我们非常重视您的意见并且感谢您的努力！
APPENDIX D

Approval of human subject exemption form

Date: 3/29/2013

To: Rui Li
31 MacKey Hall

CC: Dr. Ann Marie Fiore
1082 LeBaron

From: Office for Responsible Research

Title: Antecedents of Chinese Consumers’ Adoption of Online Auction: An Extended-TAM Study

IRB ID: 13-042

Study Review Date: 3/29/2013

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects’ responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.

- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

- Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

- Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Human Subjects Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designee may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please don’t hesitate to contact us if you have questions or concerns at 515-294-4666 or RB@iastate.edu.
ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to those people who have helped and supported me in this research. Without their help and support I could never have done this.

I am grateful to have Dr. Ann Marie Fiore as my major professor, who has given me guidance, help, and encouragement through all my master’s studies. Thanks to her kindness and patience for encouraging me to stick with this project.

I also want to thank my co-major professor Dr. Telin Chung, who is a young and enthusiastic researcher. She helped a lot in the development of the instrument of this study, and also gave me great advices in the research.

Many thanks to my committee members Dr. Mary Lynn Damhorst and Dr. John Wong, for their valuable comments and suggestions to improve the quality of this research.

The last but not the least, I would like to sincerely thank my parents for their consistent loving support, and my classmates and friends for their sweet “when will you graduate?” pressure.