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A Study of Online Auction Sellers' Intention to Switch Platform: The Case of Yahoo!Kimo Versus Ruten_eBay*

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ABSTRACT

The study of consumers' switching from one service provider to another has a long tradition in economics, information systems, and marketing. The emergence of electronic commerce presents new challenges in understanding consumers' switching intentions in the context of e-commerce in general and online auctions in particular. With the abundance of literature on online auctions, there is a surprising lack of research on auction sellers' intentions to switch from one online auction platform to another. Using the competition between Yahoo!Kimo and Ruten_eBay, two leading auction platforms in Taiwan, as the backdrop, we developed a research model and collected empirical data based on this real case to study what factors influence auction sellers to switch to a competing service provider. We find that the higher the procedural switching costs, financial switching costs, relational switching costs, site design quality, or interaction quality, the lower the intention of an auction seller to switch to a competing auction service provider. A higher perceived transaction fee, however, leads to a higher switching intention. [Submitted: October 11, 2010. Revised: May 16, 2011; August 28, 2011. Accepted: October 5, 2011.]

Subject Areas: Lock-in, Online Auction, Switching Costs, Switching Intention, and Web Site Quality.

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INTRODUCTION

The competition between eBay and Yahoo! auctions is a classic example of tipping, more commonly known as winner-take-all, a phenomenon in the market of strong network effects where new users tend to favor the auction platform with a larger network of existing users, making the larger platform larger and the smaller one smaller. This self-reinforcing nature of network effects eventually tips the market to have either eBay or Yahoo! as the only auction platform, usually the one that enters the market first to build the network. For example, eBay started up as an online trading community in the United States in 1995, built up a strong network of users, and became one of the few profitable e-commerce companies in 1998, while Yahoo! entered the online auction business much later, in September 1998. Ultimately, Yahoo! was forced to shut down its online auction operations in the United States in the summer of 2007. A similar outcome occurred in the European market. Interestingly, the outcome was reversed when Yahoo! entered the Japanese market just five months earlier than eBay in 1999. By 2001, Yahoo! was the dominant auction platform with more than 90% of the market share compared with less than 5% for eBay. A year later, eBay conceded and exited the Japanese market in 2002.

Yahoo! acquired Taiwan's biggest portal, Kimo.com, in November 2000 and started Yahoo!Kimo (http://tw.yahoo.com/) online auctions in 2002. Yahoo!Kimo's revenue grew rapidly at an annual compound rate of 50% from its inception to 2006 in Taiwan. In 2006, eBay formed Ruten_eBay (http://Ruten.com.tw/), a joint venture with the second largest portal of Taiwan PChome Online, to challenge the market leader Yahoo!Kimo. Yahoo!Kimo appeared to be on track to repeat the feat in Japan and become the only dominant auction platform in the Taiwan market until Yahoo!Kimo instituted an additional 3% transaction handling fee on top of the listing fee for all products sold via its auction Web site in September 2006 (Nystedt, 2006a, 2006b). Following the implementation of this additional transaction handling fee, auction sellers on Yahoo!Kimo switched to Ruten_eBay in droves. As a result, Yahoo!Kimo's market share in Taiwan remained stagnant between 58.8% and 61.8% although Ruten_eBay's market share surged from a measly 5% in September 2006 to 28.9% a year later. Unlike all other online auction markets, the network effects have not led to the tipping or winner-take-all result in Taiwan.

There exists an abundance of literature on online auctions, with the overwhelming majority of studies focusing on the buyer side of online auctions. Because online auction service providers receive their revenue from the fees charged to auction sellers, not buyers, it is important to understand what factors contribute to auction sellers' intentions to stay with the current service provider or switch to a competing auction platform. The surprising absence of research on online auction sellers' intentions to switch from one auction platform to another most likely results from the lack of empirical data on auction sellers.

Another possible reason for the lack of research on auction sellers' switching across online auction sites is perhaps because of the dominance of eBay in almost all worldwide online auction markets. This is not the case in Taiwan where the largest online auction site is Yahoo!Kimo, which held a 57.4% market share in

the first quarter of 2006 (Nystedt, 2006a). In July 2006, Yahoo!Kimo announced that an additional transaction handling fee that amounts to 3% of the concluding price of all products sold via its auction Web site would be charged on top of the listing fee effective August 10, 2006 (Nystedt, 2006a, 2006b). Most sellers objected to the new charge, complaining that Yahoo!Kimo should not ask for more fees without providing new services, and naturally looked for alternative online auction platforms.

During the same period, Ruten_eBay, a new joint venture auction Web site that combined eBay and Taiwanese portal operator PChome Online, was formed to compete with market leader Yahoo!Kimo. Ruten_eBay aimed to stay fee free for the next 3 years to snatch market share from Yahoo!Kimo (Nystedt, 2006b). In addition to no fees, Ruten_eBay offered a "Ruten_eBay immigration office" function that transfers auction sellers' usernames and historical records (e.g., ratings) from Yahoo!Kimo to attract users of Yahoo!Kimo to switch.

The foregoing competition between Yahoo!Kimo and Ruten_eBay in Taiwan provides an unprecedented opportunity to empirically examine online sellers' switching decisions. Built upon the theoretical framework on lock-in and customer switching decisions in Liebowitz (2002) and Shapiro and Varian (1999), we developed a research model and collected empirical data from 292 survey samples based on this unique real world case to answer the following questions: What factors influence auction sellers to switch to a competing service provider? How effective are an auction platform's anti-lock-in initiatives to induce auction sellers to switch to its services? Furthermore, did network effects play an influential role in auction sellers' switching intentions?

Our results indicate that the higher the switching costs (including procedural switching costs, financial switching costs, and relational switching costs), the lower the auction sellers' intention to switch to a competing auction platform. The anti-lock-in measures employed by Ruten_eBay are found to mitigate the lock-in effect that arises from all three forms of switching costs. Moreover, the higher the quality of the site design and interaction quality of the auction Web site, the lower the auction seller's intentions to switch to an alternative auction platform will be. After the procedural switching costs, the additional 3% transaction fee imposed by Yahoo!Kimo is the second most significant factor influencing auction sellers' intentions to switch to Ruten_eBay. Finally, a critical finding of our study is that the network effects have no significant effect on auction sellers' intentions to switch auction platforms in the Taiwan market. The absence of the network effects in all likelihood explains the coexistence of both Yahoo!Kimo and Ruten_eBay in Taiwan without the tipping outcome observed in all other online auctions markets.

The rest of this article is structured as follows. We first review the literature studying consumers' switching decisions in e-commerce, and discuss the theoretical background that leads to our research model and the hypotheses we test in this research. We next describe the sampling process, instrument development, and statistical analyses and results. We conclude by summarizing our findings and providing academic and practical implications of our research.

THEORETICAL BACKGROUND

Literature Review of Consumers' Switching in E-Commerce

The study of switching costs and consumers' switching decisions has a long tradition in economics, information systems, and marketing (Heide & Weiss, 1995; Klemperer, 1995; Shapiro & Varian, 1999; Burnham, Frels, & Mahajan, 2003; Lee, Zufryden, & Dreze, 2003; Büschken, 2004; Gupta, Su, & Walter, 2004; Kim & Stoel, 2004; Li, Browne, & Wetherbe, 2006; Whitten & Wakefield, 2006). The emergence of electronic commerce, however, presents new challenges for information systems researchers in understanding customers' switching intentions as electronic commerce has experienced explosive growth since its beginning. The most recent press release of comScore, Inc. (www.comscore.com), a global Internet information provider, reports that e-commerce spending on nontravel items has posted a 21% to 26% annual increase from 2002 to 2007. Moreover, the retail e-commerce sales in the United States alone are predicted by eMarketer to reach $218.4 billion in 2012. The increasing diffusion and penetration of electronic commerce makes the understanding of customer switching in the context of e-commerce more relevant than ever. To date, information systems scholars have published research on consumers' switching across major Internet portals (Lee et al., 2003), factors influencing consumers' intentions to switch from traditional to online channels (Gupta et al., 2004), and what makes consumers stick with specific Web sites as opposed to switching to others (Li et al., 2006).

Lee et al. (2003) apply the Milward Brown panel data to estimate a first-order Markov switching model in which the transitional probabilities are functions of such explanatory variables as dummy variables defined to capture the portal site consumers previously visited, the time of the visit, how long a customer stayed at the previous portal site, and whether the consumer is a heavy Internet user. They find that the probability of switching to a particular site is significantly affected by the variables of the site a consumer previously visited, and Yahoo! has greater consumer retention power than America Online (AOL). As e-commerce makes online shopping a common practice, Gupta et al. (2004) identify five major factors influencing consumers' intentions to switch from offline to online channels, which include channel-risk perceptions, price-search intentions, search effort, evaluation effort, and delivery time. Although Internet users can switch with relative ease from one Web site to another that provides similar products and services, some consumers seem to stick with specific Web sites. Li et al. (2006) propose that the "stickiness" of a Web site reflects a persistent relationship between the Web site and its users. Taking this relational view of user–Web site interactions built upon the investment model from social psychology and commitment–trust theory from relationship marketing, Li et al. (2006) find that commitment to the Web site and trust in the Web site are significantly associated with users' stickiness intentions, explaining more than 60% of the variance.

Theoretical Foundation of Research Model

Shapiro and Varian (1999) indicate that the "friction-free" economy is a fiction despite the lower transaction costs of e-commerce enabled by the Internet.

Customers cannot freely move from one provider to another because of the lock-in effect resulting from the switching costs customers have incurred that are associated with the incumbent provider. In other words, customers will not switch to a new provider if the increased quality of the product from the new provider is not enough to overcome the switching costs. Hence, Shapiro and Varian (1999) point out that the profit from the current customer equals the total switching costs plus quality/cost advantage (Shapiro & Varian, 1999, p. 114) and thus identify total switching costs and product quality/cost advantage as the two most important aspects in customers' switching decision. The total switching costs and product quality/cost advantage constitute the weak lock-in effect classified in Liebowitz (2002). That is, the higher the total switching costs for customers, the lower their intention to switch. Likewise, the lower the quality or the higher the perceived cost (i.e., price and fees) of the new product, the lower the customers' intention to switch to the new provider. Thus, the quality/cost advantage of the new product must offset the total switching costs borne by the customers in order for the switching to a new provider to occur. In sum, customers' switching decisions depend on the confluence of the following three major factors: total switching costs, product quality, and perceived cost of product.

The total switching costs and product quality/cost advantage concepts in Liebowitz (2002) and Shapiro and Varian (1999) have some correspondence to the three main characteristics of innovation in innovation diffusion theory (Rogers, 2003), which include relative advantage, compatibility, and complexity. In essence, the product quality/cost advantage conveys the same interpretation of relative advantage and complexity (the higher the complexity, the lower the quality) of innovation diffusion theory, although switching costs arise when the new innovation is incompatible with existing products.

Built upon the theoretical foundation of Liebowitz (2002) and Shapiro and Varian (1999), our research model thus includes total switching costs, product quality, and perceived cost as the three major constructs in studying auctions sellers' intention to switch from one auction platform to another. We enhance the total switching costs construct by incorporating procedural, financial, and relational switching costs identified in the typology of customer switching costs in Burnham et al. (2003). In the context of online auctions, the "product qualities" associated with the auction platform are the qualities of the auction Web site, which include Web site design quality, information quality, and interaction quality defined in Barnes and Vidgen (2001a). The perceived cost and fees construct corresponds to the new transaction fees charged by Yahoo!Kimo in our study. To complete the model, we introduce the network effects often observed in the online auction market, and the moderating effects of the anti-lock-in measures initiated by Ruten_eBay to counter the lock-in resulting from switching costs incurred by the auction sellers of Yahoo!Kimo. The following subsections present detailed discussions on each construct of our research model.

Switching Costs Perspective

When online auction sellers switch service providers, they incur various switching costs. Burnham et al. (2003) define switching costs as "the onetime costs that

customers associate with the process of switching from one provider to another." Burnham et al. (2003) also find evidence for eight distinct switching cost facets, which include economic risk, evaluation, learning, setup, benefit loss, monetary loss, personal relationship loss, and brand relationship loss costs. These eight facets can be further organized in Table 1 as three higher order switching cost types: procedural switching cost, financial switching cost, and relational switching cost. Detailed operational definitions of all the switching costs used in this study are described in Table 1.

When online auction sellers switch to a different auction platform, they may incur procedural switching costs (e.g., the new auction provider might not work as well as expected, learning to use the features offered by a new auction provider takes time and effort, and new account setup with a new auction provider is costly), financial switching costs (e.g., switching to a new auction provider will lose sellers' usernames and rating, and benefits of being a long-term seller with the incumbent auction sites are lost), and relational switching costs (e.g., the cost of breaking the bond with people and the brand name of the current auction provider). Therefore, we postulate that:

H1a: The higher the procedural switching cost incurred in switching to a new online auction provider, the lower the intention to switch providers.

H1b: The higher the financial switching cost incurred in switching to a new online auction provider, the lower the intention to switch providers.

H1c: The higher the relational switching cost incurred in switching to a new online auction provider, the lower the intention to switch providers.

Product Quality/Cost Advantage (Fee) Perspective

In the first exploratory study on consumer switching in service industries, Keaveney (1995) found that "price" was mentioned by 30% of respondents as the reason for switching services. The price as a reason for consumers to switch services can be further classified into high prices, price increases, unfair pricing practices, and deceptive pricing practices. Prices are deemed too high or unfair by consumers when those prices are too high relative to the services received or too high relative to competitive prices. When customers are dissatisfied with the value provided or perceive the price to be unfair, the perceived high price becomes the antecedent to their intention to switch suppliers (Campbell, 1999; Homburg, Hoyer, & Koschate, 2005). This reason particularly applies to the case of sellers switching from Yahoo!Kimo to Ruten_eBay when Yahoo!Kimo announced an additional transaction handling fee that would charge 3% of the concluding price of all products sold via Yahoo!Kimo although Ruten_eBay vowed to remain fee-free.

Since opening the beta version in late September 2006, Ruten_eBay has attracted hundreds of new sellers who aren't happy with the higher fees Yahoo!Kimo charges. The early success of the new Ruten_eBay.com site in attracting Yahoo!Kimo sellers is an example of how quickly users can adjust to unwanted fees and switch to a new service provider in the e-commerce era (Nystedt, 2006a). In our research model, the increased transaction handling fee reduced the product

Table 1: Typology of switching costs and corresponding operational definitions (adapted from Burnham, Frels, & Mahajan, 2003).

Construct		Operational Definition	References
Procedural switching cost	Economic risk costs	Economic risk costs are the costs of accepting uncertainty with the potential for a negative outcome when adopting a new provider about which the consumer has insufficient information.	Klemperer (1995); Burnham, Frels, and Mahajan (2003)
	Evaluation costs	Evaluation costs are the time and effort costs associated with the search and analysis needed to make a switching decision.	Samuelson and Zeckhauser (1988); Burnham et al. (2003)
	Setup costs	Setup costs are the time and effort costs associated with the process of initiating a relationship with a new auction service provider or setting up a new account for initial use.	Guiltinan (1989); Klemperer (1995); Burnham et al. (2003)
	Learning costs	Learning costs are the time and effort costs of acquiring new skills or know-how to use a new auction site effectively.	Eliashberg and Robertson (1988); Guiltinan (1989); Klemperer (1995); Burnham et al. (2003)
Financial switching cost	Benefit loss costs	When switching to a new provider, benefit loss costs are the costs associated with the lost benefits that have accumulated with the incumbent firm.	Guiltinan (1989); Burnham et al. (2003)
	Monetary loss costs	Monetary loss costs are the one-time financial outlays incurred in switching the auction providers (e.g., deposits, initiation fees for new customers, or set-up fees).	Jackson (1985); Guiltinan (1989); Kerin, Varadarajan, and Peterson (1992); Heide and Weiss (1995); Burnham et al. (2003)
Relational switching cost	Personal relationship loss costs	Personal relationship loss costs are the effective losses associated with breaking the bonds with the employees and customers of the incumbent provider.	Guiltinan (1989); Klemperer (1995); Burnham et al. (2003)
	Brand relationship loss costs	Brand relationship loss costs are the effective losses associated with breaking the bonds with the brand of the incumbent company.	Aaker (1992); Burnham et al. (2003)

quality/cost advantage of Yahoo!Kimo and strengthened auction sellers' intention to switch to rival Ruten_eBay. Accordingly, we postulate that:

H2: The higher the degree to which the auction sellers perceive that the charged fee is unfair, the greater their intention to switch auction sites will be.

Web Site Quality Perspective

An online marketplace is a Web application that acts as an intermediary between market participants (e.g., sellers and buyers; Ref. Hahn, 2001). Online auction sites are essentially the market place where sellers and buyers can transact goods and services. To accomplish the transactions, online auction providers must provide good quality information and interactions to satisfy Web site users (Ahn, Ryu, & Han, 2007). Customers must be satisfied with their experience with the Web site, or they will not return (Kim & Stoel, 2004).

The Web site quality is an aggregation of multidimensional constructs. Different dimensions are important for different types of Web sites. For example, the navigation dimension is important for all sites, whereas privacy is critical only for e-commerce (Zhang & von Dran, 2001). To evaluate Internet bookshop Web sites, Barnes and Vidgen (2001a) developed WebQual 2.0 as an instrument for assessing the quality of Internet sites from the perspective of the customer. Integrating the information quality of WebQual 1.0 and the interaction quality of WebQual 2.0, Barnes and Vidgen (2001b) further propose a WebQual 3.0 that views quality in three dimensions: information quality, interaction quality, and site design quality. WebQual 3.0 has been tested in the domain of online auctions and shows a high degree of reliability.

After consultations with ten field experts in designing auction sites, we adapt the constructs of WebQual 3.0 in Barnes and Vidgen (2001b) for our study as shown in Table 2.

For providers of e-commerce services, quality is a major driving force on the route to long-term success (Fassnacht & Koese, 2006). Keaveney (1995) also suggests that service quality is a major factor in consumers' switching service providers. As the Web site quality is important for auction sellers in online auctions, we hypothesize that:

H3a: The higher the site design quality of an online auction provider, the lower the intention of auction sellers to switch providers.

H3b: The higher the information quality of an online auction provider, the lower the intention of auction sellers to switch providers.

H3c: The higher the interaction quality of an online auction provider, the lower the intention of auction sellers to switch providers.

Anti-lock-in Perspective

In the information economy, Shapiro and Varian (1999) suggest that switching costs are the norm, not the exception. They identify seven types of lock-in and associated switching costs. We summarize in Table 3 the various switching costs

Table 2: Web site quality and corresponding operational definitions (adapted from Barnes & Vidgen, 2001b).

Construct	Variables	Actual Auction Situation
Site design qualities	Site navigation	Auction Web site is easy to find. Procedure to upload items is simple and easy.
	Site look and feel	Categories are clear and let users know where they can sell and find suitable items.
Information qualities	Information	Appropriateness of the information for the tasks at hand. After the transactions, notification and feedback to both sellers and buyers runs smoothly.
Interaction qualities	Trustworthiness	Credibility and freedom from risk or doubt in exchanging personal information or transacting with the site to buy and sell items. In case of fraud, auction service provider can deal with the incidents efficiently.
	Customer relationship	Service provider answers questions promptly and users can contact service provider through phone and e-mail. Customizations and user community are available.

Table 3: Types of lock-in and associated switching costs (adapted from Shapiro & Varian, 1999).

Type of Lock-In	Switching Costs
Contractual commitments	Some clothing and accessory sellers signed with Yahoo!Kimo, and thus could not switch to Ruten_eBay.
Durable purchases	Not applicable.
Brand-specific training	Costs associated with learning the rules and operations of a new platform, both direct costs and lost productivity.
Information and databases	1. Converting product data in Yahoo!Kimo to the new format of Ruten_eBay. This cost tends to rise over time as collection grows. 2. Yahoo!Kimo refuses to forward e-mails.
Specialized suppliers	Some capabilities of the auction platform are hard to find in the new supplier.
Search costs	Search functions of Ruten_eBay are not as good as those of Yahoo!Kimo.
Loyalty programs	Benefits of the Yahoo!Kimo Loyalty program are lost when switching to Ruten_eBay.

incurred by auction sellers switching from Yahoo!Kimo to Ruten_eBay (i.e., eBay of Taiwan) using the framework of Shapiro and Varian (1999).

To counter the lock-in effect imposed by Yahoo!Kimo, Ruten_eBay implemented several anti-lock-in measures. For example, the design of a Ruten_eBay auction mimics that of Yahoo!Kimo to minimize the brand-specific training lock-in effect. The most notable anti-lock-in strategy employed by Ruten_eBay is the Ruten Immigration Office which allows Yahoo!Kimo auction sellers to transfer their usernames and ratings to Ruten_eBay. Further, Ruten_eBay users can search

for Yahoo!Kimo sellers from within Ruten_eBay's Web site and check whether their desired sellers have switched to Ruten_eBay.

When auction sellers find that Ruten_eBay's anti-lock-in measures are useful, convenient, or important, the effect of switching costs on switching intention will be reduced, leading to a higher intention of auction sellers to switch platform. Accordingly, we propose the following hypotheses.

H4a: The relationship between procedural switching costs and switching intention is moderated by the anti-lock-in mechanisms such that the stronger the anti-lock-in mechanisms, the weaker the effect of procedural switching costs on the switching intention.

H4b: The relationship between financial switching costs and switching intention is moderated by anti-lock-in mechanisms such that the stronger the anti-lock-in mechanisms, the weaker the effect of financial switching costs on the switching intention.

H4c: The relationship between relational switching costs and switching intention is moderated by anti-lock-in mechanisms such that the stronger the anti-lock-in mechanisms, the weaker the effect of relational switching costs on the switching intention.

Network Effects Perspective

Katz and Shapiro (1985, 1986) first defined network externality as any case in which "the utility that a user derives from consumption of a good increases with the number of other agents consuming the good." When the market price internalizes the benefit of a positive network externality or the loss of a negative network externality, there is no longer an externality and "network effect" is a better term to reflect the phenomenon in which the value of a product to a user increases as more users adopt the same product (Katz & Shapiro, 1994). Telephone (or fax for this matter) is a classic example of network effects because the value of the telephone increases as more people use telephones to communicate. Network effects have been shown to be prominent in the spreadsheet market (Brynjolfsson & Kemerer, 1996), the bank's ATM network (Kauffman, McAndrews, & Wang, 2000), the Web server market (Gallaugher & Wang, 1999), and the adoption of open interorganizational standards (Zhu, Kraemer, Gurbaxani, & Xu, 2006).

The online auction platform exhibits a two-sided network effect in that the value of an auction Web site to a new buyer is proportional to the number of sellers already on that particular auction Web site. Likewise, more buyers bidding on an auction Web site make it more worthwhile for an auction seller to list items for auction. Thus, we postulate that the perceived network size of the new Ruten_eBay auction Web site will positively influence a current Yahoo!Kimo auction seller's intention to switch. Furthermore, the total benefit derived from the network effect for an auction seller depends in part on the number of buyers who adopt the same auction Web site in the future. That is, an auction seller in the market today cares about the future number of buyers in the same auction Web site. This "rational expectation" process leads to self-propelling or endogenous network growth (Economides & Himmelberg, 1995), suggesting that a current Yahoo!Kimo auction

seller's intention to switch to the new auction platform Ruten_eBay is positively influenced by his or her expectation of the future network size of Ruten_eBay. We thus propose the following hypotheses.

H5a: The new auction Web site's perceived network size positively influences an auction seller's intention to switch to the new auction Web site.

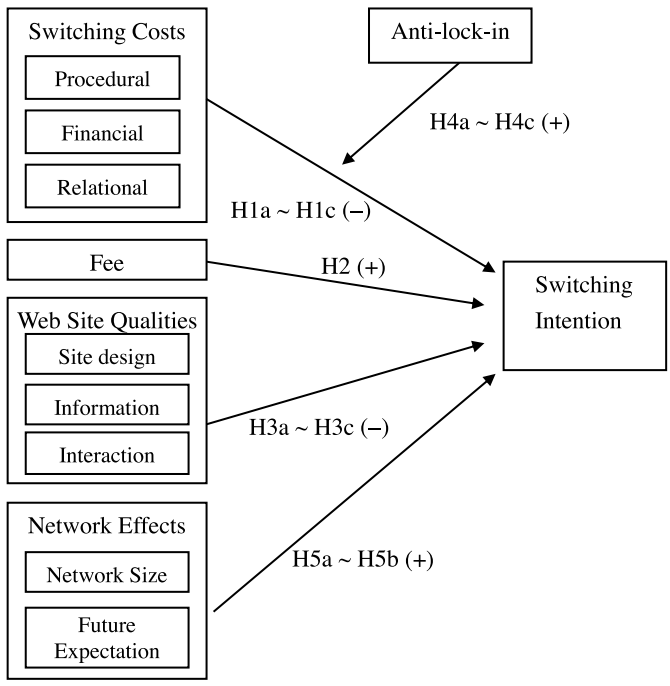
H5b: The future expectation of the new auction Web site's network size positively influences an auction seller's intention to switch to the new auction Web site.

Research Model

Using the case of Yahoo!Kimo versus Ruten_eBay as the backdrop, our research model in Figure 1 summarizes the factors influencing auction sellers' switching intention among competing auction platforms discussed in the previous section. This research model is comprised of four constructs: switching costs, Web site quality, product quality/cost advantage (fee), and network effect. In addition, anti-lock-in is the moderating factor from switching costs to switching intention.

To investigate the relationships among different constructs in this research model, we derive the hypotheses according to both the theories of relevant literature and the analyses of auction sellers' response to the competition dynamics between Yahoo!Kimo and Ruten_eBay when Yahoo!Kimo began to charge a new transaction

Figure 1: Research model of online auction sellers' switching intentions.



fee in 2006. We collected empirical data to test the proposed hypotheses. In the subsequent subsections, we describe the sampling process of participants in this research and instrument validation and pilot study.

RESEARCH METHODOLOGY

Participants and Sampling Process

We developed a Web-based survey and posted the online questionnaire in the discussion boards of Yahoo!Kimo. We further searched the blogs of those Yahoo!Kimo auction sellers who had not yet switched to Ruten_eBay and left messages to invite them to participate in our study about their intention to switch. To increase the response to our Web-based survey, we offered gift certificates and prize drawings to those who filled out complete and valid questionnaires.

Of 400 questionnaires collected, 292 were valid responses. The samples we collected in this study come from sellers with a range of years of auction selling experience as well as a variety of sellers' ratings, from low, to medium, to high. For example, in terms of the years of auction experience, 15.8% of respondents had less than 1 year of experience, 38.7% of respondents had 1–3 years, 27.4% had 3–5 years, and 18.2% had more than 5 years of experience. The majority of respondents' auction ratings were either under 50 (43.8 %), between 51 and 100 (22.6 %), or between 101 and 500 (28.8%). Our samples are commensurate with those in prior literature in terms of the distribution of auction sellers experience and ratings.

Instrument Development

We developed a questionnaire (available in the Appendix) to test the proposed hypotheses. As the questionnaire had to be administered in Chinese for auction sellers in Taiwan, it was translated from the original English version. Backward translation was therefore used to ensure consistency between the Chinese and the original English versions of the instrument. Three English-major research assistants were employed in this effort; versions were then compared and discrepancies resolved by a committee including an English professor and a management information systems (MIS) professor.

A pretest of the Chinese questionnaire was performed on ten experts in the online auction field (three MIS professors, two online auction service provider managers, and five experienced online auction sellers) to assess its logical consistencies, ease of understanding, sequence of items, and contextual relevance. The comments collected from these experts led to several minor modifications of the wordings and item sequence. The questionnaire was designed for auction sellers who have active auction accounts in Yahoo!Kimo and have visited Ruten_eBay several times. The items for the questionnaire were drawn from prior literature where available, with new ones specifically created for this research (Table 4).

Statistical Analyses (Reliability and Validity)

Descriptive statistics and critical reliability indicators of the measurement were calculated and shown in Table 5. In general, our measurement of scale has good

Table 4: Sources of measurement constructs.

Construct	Type	Subconstruct	Type	Source	Item
Switching costs	Formative	1. Procedural witching cost (PSC)	Reflective	Burnham, Frels, and Mahajan (2003)	12
		2. Financial witching costs (FSC)	Reflective		4
		3. Relational witching costs (RSC)	Reflective		5
Web site qualities	Formative	1. Site design qualities (SDQ)	Reflective	Barnes and Vidgen (2001b)	5
		2. Information qualities (INF)	Reflective		3
		3. Interaction qualities (INT)	Reflective		4
Fee (FEE)	Reflective			Developed for this study	4
Network effects (NE)	Formative	1. Perceived network size (NS)	Reflective	Katz and Shapiro (1985, 1986); Economides et al. (1995)	3
		2. Future expectation (CE)	Reflective		3
Anti-lock-in (ALI)	Reflective			Developed for this study	4
Switching intention (SI)	Reflective			Developed for this study	3

Note: Table 4 abbreviations used in Tables 5, 6, 7, and 9.

reliability. All Cronbach's αs measuring the item reliability are greater than .7 suggested by Nunally (1978), and exceed the acceptable value of .5 recommended by Hair, Anderson, Tatham, and Black (1992). The internal consistency of the measurement model was assessed by computing the composite reliability. Consistent with the recommendations of Bagozzi and Yi (1988), all composite reliabilities are above the .6 benchmark. The average variance extracted (AVE) for all constructs exceeds the threshold value of .5 recommended by Fornell and Larcker (1981). Because the values of reliability are above the recommended thresholds, the scales for evaluating the constructs are deemed to exhibit convergence reliability.

To examine the validity of our research constructs, we applied confirmatory factor analysis (CFA) to carry out the validity test. We analyzed the results of convergent validity, the degree to which multiple attempts to measure the same concept are in agreement, for constructs by examining the factor loading within each construct. The results of the CFA are included in Table 6. The strength of the measurement model was demonstrated through convergent and discriminant validity. To determine item-construct loadings, we conducted the factor

Table 5: Descriptive statistics ($n = 292$) of all constructs.

Construct Item	Mean	*SD*	Cronbach's α	Composite Reliability	AVE
FEE_1	2.85	1.13	.829	.87	.96
FEE_2	2.72	1.20			
FEE_3	2.89	1.16			
FEE_4	2.98	1.09			
PSC_1	5.34	1.25	.887	.76	.77
PSC_2	5.47	1.23			
PSC_3	5.49	1.30			
PSC_4	5.38	1.33			
PSC_5	5.35	1.32			
PSC_6	5.41	1.36			
PSC_7	5.45	1.39			
PSC_8	5.36	1.31			
PSC_9	5.40	1.34			
PSC_10	5.33	1.30			
PSC_11	5.39	1.32			
PSC_12	5.42	1.37			
FSC_1	5.68	1.40	.748	.71	.81
FSC_2	5.71	1.42			
FSC_3	5.82	1.45			
FSC_4	5.75	1.40			
RSC_1	5.47	1.39	.850	.80	.79
RSC_2	5.51	1.42			
RSC_3	5.53	1.38			
RSC_4	5.52	1.36			
RSC_5	5.49	1.33			
ALI_1	5.11	1.11	.950	.91	.93
ALI_2	5.05	1.02			
ALI_3	5.02	.98			
ALI_4	5.08	1.04			
SDQ_1	5.22	1.23	.889	.84	.78
SDQ_2	5.26	1.25			
SDQ_3	5.38	1.30			
SDQ_4	5.32	1.28			
SDQ_5	5.40	1.32			
INF_1	4.17	1.38	.907	.87	.92
INF_2	3.87	1.34			
INF_3	4.09	1.35			
INT_1	3.92	1.31	.871	.86	.85
INT_2	5.20	1.20			
INT_3	5.24	1.22			
INT_4	5.27	1.25			
NS_1	4.02	1.37	.836	.75	.76
NS_2	4.07	1.35			
NS_3	3.94	1.29			
CE_1	4.09	1.25	.812	.77	.78
CE_2	4.18	1.24			
CE_3	3.98	1.22			
SI_1	3.13	.90	.962	.89	.95
SI_2	2.95	.86			
SI_3	2.88	.81			

Table 6: Item loading and factor analysis.

	Component										
Item	1	2	3	4	5	6	7	8	9	10	11
FEE_1	**.964**	.022	.359	.029	.016	.018	.017	.017	.018	.017	.421
FEE_2	**.956**	.019	.374	.033	.018	.019	.018	.019	.021	.019	.416
FEE_3	**.947**	.020	.368	.028	.016	.020	.020	.020	.023	.019	.419
FEE_4	**.928**	.021	.363	.031	.014	.021	.020	.022	.020	.018	.420
PSC_1	.025	**.660**	.148	.136	−.270	.019	.021	.021	.018	.017	.375
PSC_2	.034	**.639**	.136	.135	−.262	.017	.022	.020	.016	.016	.373
PSC_3	.026	**.689**	.135	.140	−.260	.016	.021	.018	.017	.016	.370
PSC_4	.033	**.710**	.134	.139	−.268	.017	.020	.018	.018	.016	.374
PSC_5	.025	**.640**	.138	.137	−.257	.016	.019	.019	.015	.019	.373
PSC_6	.030	**.638**	.140	.138	−.261	.018	.021	.022	.017	.019	.367
PSC_7	.035	**.797**	.137	.135	−.269	.019	.023	.022	.020	.020	.370
PSC_8	.031	**.812**	.133	.136	−.264	.020	.023	.021	.019	.021	.373
PSC_9	.030	**.736**	.139	.141	−.261	.021	.022	.019	.020	.019	.368
PSC_10	.029	**.709**	.138	.142	−.264	.020	.020	.017	.019	017	.367
PSC_11	.026	**.714**	.136	.137	−.266	.019	.018	.018	.019	.017	.371
PSC_12	.025	**.776**	.136	.138	−.259	.018	.019	.019	.021	.018	.369
FSC_1	.325	.248	**.742**	.259	−.284	.019	.018	.018	.022	.019	.387
FSC_2	.404	.263	**.765**	.260	−.281	.021	.020	.020	.020	.021	.380
FSC_3	.379	.270	**.777**	.256	−.283	.022	.023	.020	.018	.018	.385
FSC_4	.409	.262	**.809**	.258	−.279	.020	.025	.019	.017	.018	.382
RSC_1	.134	.183	.175	**.761**	−.274	.018	.021	.018	.181	.020	.371
RSC_2	.125	.200	.213	**.773**	−.276	.016	.017	.018	.183	.021	.373
RSC_3	.127	.188	.186	**.807**	−.279	.017	.015	.019	.179	.021	.369
RSC_4	.129	.196	.182	**.815**	−.277	.017	.016	.022	.182	.020	.373
RSC_5	.123	.185	.204	**.818**	−.275	.019	.016	.022	.184	.019	.369
ALI_1	.078	−.244	−.222	−.285	**.939**	.009	.011	.011	.011	.011	−.220
ALI_2	.084	−.258	−.218	−.296	**.920**	.010	.013	.013	.014	.012	−.233
ALI_3	.077	−.253	−.216	−.293	**.950**	.008	.015	.014	.013	.011	−.229
ALI_4	.088	−.241	−.225	−.291	**.943**	.011	.014	.015	.016	.013	−.230
SDQ_1	.024	.039	.036	.027	.020	**.861**	.225	.235	.030	.239	−.323
SDQ_2	.030	.038	.033	.028	.021	**.830**	.230	.238	.032	.240	−.320
SDQ_3	.026	.036	.030	.024	.018	**.825**	.232	.240	.029	.238	−.314
SDQ_4	.029	.037	.031	.026	.019	**.767**	.229	.237	.026	.241	−.315
SDQ_5	.028	.035	.032	.025	.022	**.761**	.231	.241	.025	.239	−.320
INF_1	.024	.023	.025	.023	.021	.236	**.928**	.336	.024	.019	−.289
INF_2	.020	.022	.027	.024	.022	.239	**.930**	.335	.021	.022	−.285
INF_3	.021	.020	.024	.025	.022	.232	**.897**	.340	.020	.020	−.281
INT_1	.022	.018	.021	.021	.026	.337	.325	**.882**	.019	.185	−.330
INT_2	.023	.015	.020	.019	.024	.341	.327	**.894**	.018	.186	−.326
INT_3	.026	.016	.023	.021	.022	.339	.329	**.886**	.016	.186	−.329
INT_4	.025	.017	.020	.020	.025	.338	.330	**.862**	.017	.180	−.326
NS_1	.023	.020	.018	.019	.018	.019	.018	.022	**.795**	.355	.265
NS_2	.025	.018	.017	.021	.020	.020	.017	.024	**.803**	.359	.267
NS_3	.024	.021	.019	.020	.019	.022	.015	.023	**.806**	.362	.268
CE_1	.020	.017	.022	.019	.021	.021	.019	.018	.365	**.816**	.271
CE_1	.022	.020	.021	.018	.023	.019	.018	.020	.361	**.821**	.269
CE_3	.021	.023	.020	.017	.022	.017	.017	.019	.359	**.820**	.272
SI_1	−.323	−.298	−.360	−.351	.305	.345	.203	.339	.198	.202	**.951**
SI_2	−.334	−.284	−.362	−.347	.307	.342	.211	.337	.201	.207	**.954**
SI_3	−.319	−.279	−.355	−.345	.310	.346	.206	.342	.195	.209	**.939**

Note: Bold-faced values indicate the item loadings for the corresponding component.

analysis using SPSS_12. The resulting loadings were used to compute the internal consistency statistics and a single overall measure of each of the subconstructs. From Table 5, every construct has an average extracted variance well exceeding .5, suggesting that the amount of variance in the items was less than that attributable to the construct.

Applying Partial Least Squares (PLS) to Analyze Constructs

This research is the first large-scale empirical test of a model aimed at understanding auction sellers' switching intentions between two competing platforms. Although all of the subconstructs in the model as well as three of the constructs (fee, anti-lock-in, and switching intention) are operated directly using reflective constructs, the remaining three constructs—switching costs, Web site qualities, and network effects—are modeled using formative constructs (Table 4) that cannot be adequately analyzed using covariance structure analysis because of the assumptions it imposes. PLS, being components based, can incorporate both formative and reflective indicators (Chin, 1998) and becomes the most appropriate technique to analyze constructs of this study.

Because the distinction between formative and reflective constructs is not always clear-cut, the modeling in this research reflects the best judgment of the problem at hand. Reflective indicators are used when a construct is deemed to exist before it is measured, and each item "reflects" this unmeasured latent variable. Because each item reflects the same latent variable, the construct is unidimensional, and the items should be correlated, making measures of internal consistency appropriate.

To determine item-construct loadings, a factor analysis was conducted in PLS using the items and the reflective constructs (Table 7), with no relationships specified between the constructs. The resulting loadings were used for computing

Table 7: Attributes of constructs when modeled as reflective.

	Construct										
Construct	FEE	PSC	FSC	RSC	ALI	SDQ	INF	INT	NS	CE	SI
FEE	.98										
PSC	.19	.88									
FSC	.20	.33	.77								
RSC	.39	.47	.46	.89							
ALI	−.13	−.02	−.07	−.10	.96						
SDQ	.18	.33	.37	.36	−.13	.88					
INF	.26	.45	.48	.52	−.12	.50	.96				
INT	.34	.42	.43	.48	−.09	.55	.54	.92			
NS	.24	.29	.33	.42	.14	.35	.38	.34	.87		
CE	.23	.31	.34	.39	.15	.37	.40	.36	.35	.88	
SI	.25	−.46	−.49	−.47	.33	.39	.45	.40	.42	.41	.97

Note: Diagonal elements are the square root of average variance extracted (AVE), which, for discriminant validity, should be larger than interconstruct correlations (off-diagonal elements).

the internal consistency statistics discussed below, as well as for constructing a single overall measure of each of the subconstructs. These factor scores are used as indicators in the formative constructs of fee, anti-lock-in, and switching intention tested by CFA (Table 6).

Table 7 provides an analysis of the measurement model where the diagonal elements represent the square root of AVE, providing a measure of the variance shared between a construct and its indicators. A rule for assessing discriminant validity requires that the square root of AVE be larger than the correlations between constructs (i.e., the off-diagonal elements in Table 7; Barclay, Higgins, & Thompson, 1995). All constructs meet this requirement. Likewise, the values for internal consistency are all above the suggested minimum of .70 (Fornell & Larcker, 1981). Thus, all reflective constructs and subconstructs in our model display adequate internal consistency and discriminant validity.

In contrast to reflective constructs, formative ones reverse the direction of causality in which the indicators form or cause the latent variable. Thus, the latent variable is a summative index of the items. This reversion of causality requires a significant difference in the interpretation of the measurement model; in particular, internal consistency and unidimensionality cannot be used to judge the quality of the measurement model (Bollen, 1984; Chin, 1998; Chin & Gopal, 1995; Cohen, Cohen, Teresi, Marchi, & Velex, 1990). Therefore, for formative indicators, we examined item weights that can be interpreted as beta coefficients in a standard regression and will normally have smaller absolute values than item loadings. The weights and *t*-statistics for the formative constructs are presented with the results of the model in the next section.

RESEARCH RESULTS

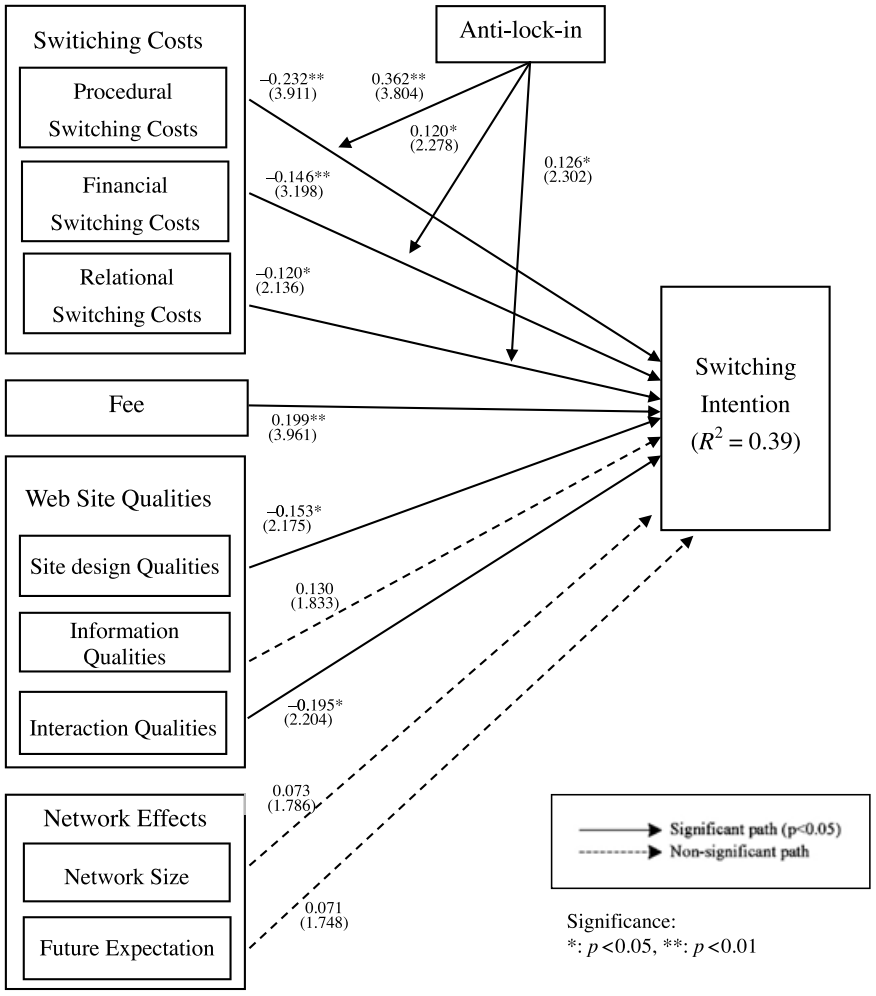
The hypotheses in this study were tested by the PLS approach. PLS generates estimates of standardized regression coefficients for model paths, which can then be used to measure the relationships between latent variables (Avolio, Bass, & Jung, 1999). Chin, Marcolin, and Newsted (2003) indicate that PLS has been gaining interest and adoption among IS researchers in recent years (Aubert, Rivard, & Patry, 1996; Chin & Gopal, 1995; Compeau & Higgins, 1995) because of its ability to model latent constructs under conditions of nonnormality with small to medium sample sizes. Ye, Chen, and Jin (2006) describe two major reasons to opt for PLS:

(i) "PLS can simultaneously assess the measurement model and the structural model. It allows researchers to analyze both how well the measures relate to each construct and how the independent variables influence the dependent variable."

(ii) "PLS makes no prior assumptions about the normality of the data and has a lower demand for sample size compared with covariance-based approaches like LISREL."

Thus, we used SmartPLS Version 2.0.M3 to analyze the data following the Hulland's procedure (Hulland, 1999), which suggests evaluating each model in two

Figure 2: PLS results of the research model.



stages. In the first stage, the individual item reliabilities, convergent validity, and discriminant validity for each measure were calculated. In the second stage, the paths between the constructs in the models were estimated. By applying this methodology, we were able to detect associations that might not be revealed with a more standard regression analysis method. The structural model was evaluated on the basis of R^2 for each endogenous composite latent variable, structural paths, and effect sizes of exogenous composite latent variables. The stability and statistical significance of the structural path estimates were assessed using the bootstrapping resampling method (with $N = 292$ samples generating 879 resamples cases). The results of the PLS analysis of the research model are presented in Figure 2.

Analysis of the Model Path

The proposed hypotheses were tested in a base model and a full model. The base model consists of hypotheses H1a, H1b, H1c, H2, H3a, H3b, H3c, H3d, H5a, and H5b, excluding the moderating effects of the anti-lock-in factor. The full model is comprised of all hypotheses including hypotheses H4a, H4b, and H4c, which capture the moderating effects of anti-lock-in.

The bootstrap resampling procedure was applied to test the significance of the path coefficients. In formulating and testing the effects of moderating variables, we applied the procedure of Chin et al. (2003). First, we standardized all indicators reflecting the predictor and moderator constructs to a mean of 0 and variance of 1. Then, using the standardized indicators of the predictor and moderator variables, product indicators were generated to reflect the latent interaction variables. The PLS procedure was then applied to estimate the latent variable. Moreover, we tested both the full model and the base model which excluded the moderating relationships.

We summarize the path coefficients, their significance levels, and the R^2 values of the research model in Figure 2. The empirical results show that hypotheses H1a, H1b, and H1c are all supported. That is, the procedural switching costs ($\beta = -.232$) and financial switching costs ($\beta = -.146$) have significant negative influence on auction sellers' intention to switch auction platform at the .01 level, and likewise for relational switching costs ($\beta = -.120$) at the .05 level. Hypothesis 2 is also supported at the .01 significance level ($\beta = .199$), indicating a positive relationship between the fee charged by the auction platform and auction sellers' intention to switch platform. Two of the three hypotheses on auction Web site qualities are supported, with Hypothesis 3a of site design quality ($\beta = -.155$) and Hypothesis 3c of interaction quality ($\beta = -.195$) significant at the .05 level. However, Hypothesis 3b of information quality is not supported. The anti-lock-in significantly moderates the relationship between all three types of switching costs (procedural switching costs significantly moderated at .01 level with $\beta = -.362$, financial switching costs significantly moderated at .05 level with $\beta = -.120$, and relational switching costs significantly moderated at .05 level with $\beta = -.126$) and the intention of auction sellers to switch platform. Hence, hypotheses H4a, H4b, and H4c are all supported. Table 8 summarizes the PLS results of the model.

After verifying the PLS results, we next examine the factors that are most influential in each of the four constructs affecting online auction sellers' intentions to switch auction platform.

Fee and anti-lock-in

The item loadings and *t* statistics for the reflective constructs are presented in Table 9. Fee and anti-lock-in, the two reflective independent constructs, display positive loadings and high levels of statistical significance for all items. As almost all of the loadings are of approximately the same magnitude, it is not possible to determine the relative importance of the items in determining the overall level of fee and anti-lock-in.

Table 8: PLS results.

Constructs	Hypothesis	Base Model	Full Model
Procedural switching costs (PSC)	H1a	−.198**	−.232**
Financial switching costs (FSC)	H1b	−.107*	−.146**
Relational switching costs (RSC)	H1c	−.086	−.120*
Fee	H2	.195**	.199**
Site design qualities	H3a	−.135*	−.155*
Information qualities	H3b	.114	.130
Interaction qualities	H3c	−.211*	−.195*
Anti-lock-in moderates PSC	H4a		.362**
Anti-lock-in moderates FSC	H4b		.108*
Anti-lock-in moderates RSC	H4c		.126*
Perceived network size	H5a		.073
Future expectation	H5b		.071

Note: The $R^2 = .334$ (Base Model) and .391 (Full Model).
$^*p < .05$, $^{**}p < .01$.

Table 9: Reflective constructs: loadings and *t*-statistics.

Item	Loading	*t*-Statistics
FEE		
FEE_1	.343**	4.67
FEE_2	.365**	5.02
FEE_3	.352**	4.83
Anti-lock-in		
ALI_1	.211*	2.06
ALI_2	.232*	2.15
ALI_3	.244*	2.31
ALI_4	.295**	3.29
Switching intention		
SI_1	.313**	4.02
SI_2	.324**	4.35
SI_3	.319**	4.23

Note: *Indicates that the item is significant at the $p < .05$ level, **indicates that the item is significant at the $p < .01$ level.

Switching costs

Because PLS simultaneously estimates the measurement model and the relationships between constructs, the item weights of formative constructs display the importance of their impact on intention to switch. These weights can be interpreted in a similar fashion as the estimated beta coefficients from a multiple regression analysis. The subconstruct weights and *t* statistics for the formative constructs are presented in Table 10. All three subconstructs of switching costs, which includes procedural switching costs (−.228), financial switching costs (−.143), and

Table 10: Formative constructs: weights and *t*-statistics.

Subconstruct	Weight	*t*-Statistics
Switching costs		
Procedural switching costs (PSC)	−.232**	3.911
Financial switching costs (FSC)	−.146**	3.198
Relational switching costs (RSC)	−.122*	2.136
Web site qualities		
Site design qualities (SDQ)	−.155*	2.175
Information qualities (INF)	−.130	1.833
Interaction qualities (INT)	−.195*	2.204
Network effects		
Perceived network size (NS)	.073	1.786
Future expectations (CE)	.071	1.748

Note: *Indicates that the item is significant at the $p < .05$ level, **indicates that the item is significant at the $p < .01$ level.

relational switching costs (−.119), are negative and significantly influence auction sellers' intentions to switch auction platform.

Web site qualities

Two of the three subconstructs of Web site qualities, site design qualities (−.153) and interaction qualities (−.190), are negative and significantly influence the intention to switch auction platform. The weights on these subconstructs reveal their relative importance in determining Web quality.

Summary of Findings

The results provide qualified support for the theoretical model and most of the hypothesized relationships. The results indicate that switching costs, transaction fee, Web site qualities, and anti-lock-in are important motivators for auction sellers' intentions to switch the online auction service provider. We find that procedural switching costs and transaction fee (with the absolute values of path coefficients of .232 and .199, respectively) are the two most important factors in influencing auction sellers' intentions to switch the auction platform. This implies that the time and effort involved in searching and analyzing the switching decision, initiating a relationship with the new provider, and learning to use the new service effectively has the most significant influence on auction sellers' switching intentions. The transaction fee charged by the auction service provider is the second most important influence factor because this fee directly impacts auction sellers' profitability.

The information quality is found to be nonsignificant in the model. This finding departs from that of previous studies on the influence of information quality of online content providers on users' intentions to switch content Web sites. It seems to suggest that the information quality of Yahoo!Kimo and Ruten_eBay is perceived to be similar by auction sellers. Our study finds that anti-lock-in initiatives exhibit a significant moderating effect on the influence of switching

Table 11: Summary of hypotheses testing results.

	Hypothesis	Results
H1a	The higher the procedural switching cost incurred in switching to a new online auction provider, the lower the intention to switch providers.	Supported**
H1b	The higher the financial switching cost incurred in switching to a new online auction provider, the lower the intention to switch providers.	Supported**
H1c	The higher the relational switching cost incurred in switching to a new online auction provider, the lower the intention to switch providers.	Supported*
H2	The higher the degree to which auction sellers perceive that the charged fee is unfair, the greater their intention to switch auction sites will be.	Supported**
H3a	The higher the site design quality of an online auction provider, the lower the intention of auction sellers to switch providers.	Supported*
H3b	The higher the information quality of an online auction provider, the lower the intention of auction sellers to switch providers.	Not supported
H3c	The higher the interaction quality of an online auction provider, the lower the intention of auction sellers to switch providers.	Supported*
H4a	The relationship between procedural switching costs and switching intention is moderated by the anti-lock-in mechanisms such that the stronger the anti-lock-in mechanisms, the weaker the effect of procedural switching costs on the switching intention.	Supported**
H4b	The relationship between financial switching costs and switching intention is moderated by anti-lock-in mechanisms such that the stronger the anti-lock-in mechanisms, the weaker the effect of financial switching costs on the switching intention.	Supported*
H4c	The relationship between relational switching costs and switching intention is moderated by anti-lock-in mechanisms such that the stronger the anti-lock-in mechanisms, the weaker the effect of relational switching costs on the switching intention.	Supported*
H5a	The new auction Web site's perceived network size positively influences an auction seller's intention to switch to the new auction Web site.	Not supported
H5b	The future expectation of the new auction Web site's network size positively influences an auction seller's intention to switch to the new auction Web site.	Not supported

*$p < .05$, **$p < .01$.

costs on the switching intention. This indicates that the anti-lock-in initiatives implemented by Ruten_eBay effectively reduce the influence of switching costs on the switching intention. That is, Ruten_eBay's anti-lock-in initiatives can increase auction seller's intentions to switch from Yahoo!Kimo. Table 11 summarizes the results of hypothesis testing.

CONCLUSIONS AND IMPLICATIONS

Academic Implications

Using the real-world case of Yahoo!Kimo versus Ruten_eBay as the backdrop, this study presents the conceptual development and empirical validation of a research model that identifies key factors influencing online auction sellers' switching intentions. It contributes to the literature in several ways. First, the proposed research model in this article integrates major theoretical research streams on switching costs and Web site qualities, and two constructs reflecting current event of the time—transaction fee and anti-lock-in initiatives. The model can serve as a foundation for future research studying the consumer switching decision in other e-commerce settings. Second, prior research on the lock-in concept are either case-based descriptive studies (e.g., Shapiro & Varian, 1999) or economic and analytical models (e.g., Schiff, 2003; Parker & Van Alystyne, 2005; Lee & Mendelson, 2007; Choi, Kim, & Lee, 2010; Markovich & Moenius, 2009; Zhao, Xia, Shaw, & Subramaniam, 2009). Our research is among the first to provide empirical validation of the lock-in concept in the context of online auctions. Third, this research contributes to the literature by providing empirical support for the impact of switching costs, Web site qualities, transaction fee, and anti-lock-in on online auction sellers' intentions in switching auction service providers. The results indicate that switching cost is a multidimensional construct that includes procedural switching costs, financial switching costs, and relational switching costs. This research provides a validated measurement scale that can be used in future study on online auctions. Fourth, the anti-lock-in measures employed by Ruten_eBay are found to have significant moderating effects on auctions sellers' intentions to switch platforms. This anti-lock-in construct should be a worthy consideration as an independent or a moderating variable in future research on e-commerce customers' switching decisions.

Practical Implications

Before the incumbent service provider (e.g., Yahoo!Kimo in our study) makes any policy change (e.g., charging a new fee) that may induce customers to switch to a competing provider (e.g., Ruten_eBay), the incumbent should clearly identify what factors contribute to customers' switching costs (e.g., procedural, financial, and relational switching costs in our study). The incumbent provider should assess whether the switching costs are high enough to deter customers from switching because of the negative effect from the new policy. If the switching costs are minimal, the dominant market share of the incumbent will be short lived. A case in point is the disappearance of the Netscape browser after the entrance of Microsoft Internet Explorer (IE). Although Netscape had a commanding lead in more than 80% of the browser market compared with Microsoft IE at the beginning of the browser war, the negligible switching costs eventually doomed the fate of Netscape as the incumbent. Hence, it is of paramount importance for the incumbent provider to create switching costs that are difficult for competitors to overcome, a strategy that will provide long lasting competitive advantage.

It is perhaps equally (if not more) important to identify which factors will not contribute to online auction sellers' intentions to switch to a competitive

auction platform. A very interesting result of our research is that the network effects somehow have no significant influence on auctions sellers' intentions to switch from Yahoo!Kimo (the incumbent service provider) to Ruten_eBay. This finding in all likelihood explains the coexistence of two online auction platforms (Yahoo!Kimo and Ruten_eBay) in the Taiwan market, which defies the tipping (or winner-take-all) outcome for online auction platforms in the rest of the world. If this finding were known to Yahoo!Kimo beforehand, perhaps it would not have implemented the additional 3% fee that led to Ruten_eBay's surge of market share and the eventual coexistence with Yahoo!Kimo in Taiwan. In hindsight, this can be seen as a strategic blunder by Yahoo!Kimo as it was on track to become the only dominant auction platform in Taiwan.

For a newcomer to compete effectively with the incumbent, however, there must be a sufficient product quality/cost advantage to offset the switching costs imposed on the target customers by the incumbent. This quality/cost advantage should follow the "10×" rule proposed by Andy Grove, former CEO of Intel. That is, the product quality/cost advantage of a new comer should be at least ten times greater than the incumbent to attract a substantial number of customers to switch. In addition, the newcomer should develop strategy to help their target customers undercut the incurred switching costs. For instance, our research shows that the Ruten Immigration Office, available to transfer auction sellers' user names and ratings, is an effective measure to counter the lock-in effect from the switching costs.

LIMITATIONS AND FUTURE RESEARCH

Our research has several limitations that could be considered in future research. This study considers auction sellers' intentions to switch platform. Future research is needed to study what factors influence auction buyers' switching decisions and whether interactions exist between auction sellers' and buyers' switching intentions. Furthermore, future research can determine whether there might be other relevant variables that affect auction sellers' switching intentions in addition to the switching costs, transaction fee, and Web site qualities identified in our study. Our study is a cross-sectional study on auction sellers' switching decision under the settings of Yahoo!Kimo and Ruten_eBay competing with each other for auction sellers. It should be useful to conduct a longitudinal study to examine changes of auction sellers' switching behavior over time after the implementation of the additional 3% transaction fee by Yahoo!Kimo. Finally, Ellison, Fudenberg, and Möbius (2004) predicted in a theoretical model that for two competing online auction platforms to coexist, they should have approximately the same price for the same product and similar ratios of buyers to sellers. It would be interesting to test whether the theoretical predictions of Ellison et al. (2004) hold true empirically in the Taiwan market.

REFERENCES

Aaker, D. A. (1992). The value of brand equity. *Journal of Business Strategy*, *13*(4), 27–32.

Ahn, T., Ryu, S., & Han, I. (2007). The impact of Web quality and playfulness on user acceptance of online retailing. *Information & Management*, *44*(3), 263–275.

Aubert, B. A., Rivard, S., & Patry, M. (1996). Development of measures to assess dimensions of IS operation transactions. *Omega*, *21*(6), 661–680.

Avolio, B. J., Bass, B. M., & Jung, D. I. (1999). Reexamining the components of transformational and transactional leadership using the Multifactor Leadership Questionnaire. *Journal of Occupational and Organizational Psychology*, *72*(4), 441–462.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94.

Barclay, D., Higgins, C., & Thompson, R. (1995). The partial least squares approach to causal modeling: Personal computer adoption and use as an illustration. *Technology Studies*, *2*(2), 285–309.

Barnes, S. J., & Vidgen, R. T. (2001a). An evaluation of cyber-bookshops: The WebQual method. *International Journal of Electronic Commerce*, *6*(1), 11–30.

Barnes, S. J., & Vidgen, R. T. (2001b). Assessing the quality of auction Web sites. *Proceedings of the 34th Hawaii International Conference on System Sciences*, Washington, DC: IEEE Computer Society, 1–10.

Bollen, K. A. (1984). Multiple indicators: Internal consistency or no necessary relationship? *Quality and Quantity*, *18*(4), 377–385.

Brynjolfsson, E., & Kemerer, C. (1996). Network externalities in microcomputer software: An economic analysis of the spreadsheet market. *Management Science*, *42*(12), 1627–1647.

Burnham, T. A., Frels, J. K., & Mahajan, V. (2003). Consumer switching costs: A typology, antecedents, and consequences. *Journal of the Academy of Marketing Science*, *31*(2), 109–126.

Büschken, J. (2004). *Higher profits through customer lock-in*. Florence, KY: South-Western Educational.

Campbell, M. C. (1999). Perceptions of price unfairness: Antecedents and consequences. *Journal of Marketing Research*, *36*(2), 187–199.

Chin, W. W. (1998). Issues and opinion on structural equation modeling. *MIS Quarterly*, *22*(1), VII–XVI.

Chin, W. W, & Gopal, A. (1995). Adoption intention in GSS: Relative importance of beliefs. *DATA BASE*, *26*(2-3), 42–63.

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research*, *14*(2), 189–217.

Choi, H., Kim, S.-L., & Lee, J. (2010). Role of network structure and network effects in diffusion of innovations. *Industrial Marketing Management*, *39*(1), 170–177.

Cohen, P., Cohen, J. Teresi, J., Marchi, M., & Velex, C. N. (1990). Problems in the measurement of latent variables in structural equations causal models. *Applied Psychological Measurement*, *14*(2), 183–196.

Compeau, D. R., & Higgins, C. A. (1995). Application of social cognitive theory to training for computer skills. *Information Systems Research*, *6*(2), 118–143.

Economides, N., & Himmelberg, C. (1995). Critical mass and network evolution in telecommunications. In G. Brock (Ed.), *Toward a competitive telecommunications industry: Selected papers from the 1994 telecommunications policy research conference*. Mahwah, NJ: Lawrence Erlbaum Associates, 47–66.

Eliashberg, J., & Robertson, T. S. (1988). New product preannouncing behavior: A market signaling study. *Journal of Marketing Research*, *25*(3), 282–292.

Ellison, G., Fudenberg, D., & Möbius, M. (2004). Competing auctions. *Journal of European Economic Association*, *2*(1), 30–66.

Fassnacht, M., & Koese, I. (2006). Quality of electronic services: Conceptualizing and testing a hierarchical model. *Journal of Service Research*, *9*(1), 19–37.

Fornell, C. R., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50.

Gallaugher, M. J., & Wang, Y. M. (1999). Network effects and the impact of free goods: An analysis of the Web server market. *International Journal of Electronic Commerce*, *3*(4), 67–88.

Guiltinan, J. P. (1989). A classification of switching costs with implications for relationship marketing. In T. L. Childers, et al. (Eds.), *1989 AMA Winter Educators' Conference: Marketing Theory and Practice*. Chicago, IL: American Marketing Association, 216–220.

Gupta, A., Su, B.-C, & Walter, Z. (2004). An empirical study of consumer switching from traditional to electronic channels: A purchase-decision process perspective. *International Journal of Electronic Commerce*, *8*(3), 131–161.

Hahn, J. (2001). The dynamics of mass online marketplaces: A case study of an online auction. *Proceedings of the SIGCHI Conference on Human factors in Computing Systems*, New York, NY: Association for Computing Machinery, 317–324.

Hair, J. F., Anderson, R. E., Tatham, R. L, & Black, W. C. (1992). *Multivariate data analysis with readings*. New York, NY: MacMillan.

Heide, J. B., & Weiss, A. M. (1995). Vendor consideration and switching behavior for buyers in high-technology markets. *Journal of Marketing*, *59*(3), 3–43.

Homburg, C., Hoyer, W. D., & Koschate, N. (2005). Customers' reactions to price increases: Do customer satisfaction and perceived motive fairness matter? *Journal of the Academy of Marketing Science*, *33*(1), 36–49.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, *20*(2), 195–204.

Jackson, B. B. (1985). *Winning and keeping industrial customers: The dynamics of customer relationships*. Lexington, MA: Lexington Books.

Katz, M. L., & Shapiro, C. (1985). Network externalities, competition, and compatibility. *American Economic Review*, *75*(3), 424–440.

Katz, M. L., & Shapiro, C. (1986). Technology adoption in the presence of network externalities. *Journal of Political Economy*, *94*(4), 822–841.

Katz, M. L., & Shapiro, C. (1994). Systems competition and network effects. *Journal of Economic Perspectives*, *8*(2), 93–115.

Kauffman, R., McAndrews, J., & Wang, Y. M. (2000). Opening the "black box" of network externalities in network adoption. *Information Systems Research*, *11*(1), 61–82.

Keaveney, S. M. (1995). Customer switching behavior in service industries: An exploratory study. *Journal of Marketing*, *59*(2), 71–82.

Kerin, R. A., Varadarajan, P. R., & Peterson, R. A. (1992). First-mover advantage: A synthesis, conceptual framework, and research propositions. *Journal of Marketing*, *56*(4), 33–52.

Kim, S., & Stoel, L. (2004). Apparel retailers: Web site quality dimensions and satisfaction. *Journal of Retailing and Consumer Services*, *11*(2), 109–117.

Klemperer, P. (1995). Competition when consumers have switching costs: An overview with applications to industrial organization, macroeconomics, and international trade. *Review of Economic Studies*, *62*(4), 515–539.

Lee, D., & Mendelson, H. (2007). Adoption of information technology under network effects. *Information Systems Research*, *18*(4), 395–413.

Lee, S., Zufryden, F., & Dreze, X. (2003). A study of consumer switching behavior across Internet portal Web sites. *International Journal of Electronic Commerce*, *7*(3), 39–63.

Li, D., Browne, G. J., & Wetherbe, J. C. (2006). Why do Internet users stick with a specific Web site? A relationship perspective. *International Journal of Electronic Commerce*, *10*(4), 105–141.

Liebowitz, S. (2002). *Re-thinking the network economy: The true forces that drive the digital marketplace*. New York, NY: Amacom Press.

Markovich, S., & Moenius, J. (2009). Winning while losing: Competition dynamics in the presence of indirect network effects, *International Journal of Industrial Organization*, *27*(3), 346–357.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw Hill.

Nystedt, D. (2006a). EBay Taiwan site nearly ready, vows no fees for 3 years. *CIO*, accessed August 11, 2010, available at http://www.cio.com/.

Nystedt, D. (2006b). EBay, PCHome launch new auction site in Taiwan plan is to give Yahoo Taiwan a run for its money. *Info World*. Retrieved September 06, from http://www.infoworld.com/article/06/09/06/HNebaypchome_1.html.

Parker, G., & Van Alstyne, M. (2005). Two-sided network effects: A theory of information product design. *Management Science*, *51*(10), 1494–1504.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Samuelson, W., & Zeckhauser, R. J. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, *1*(1), 7–59.

Schiff, A. (2003). Open and closed systems of two-sided networks. *Information Economics and Policy*, *15*(4), 425–442.

Shapiro, C., & Varian, H. R. (1999). *Information rules: A strategic guide to the network economy*. Boston, MA: Harvard Business School Press.

Whitten, D., & Wakefield, R. L. (2006). Measuring switching costs in IT outsourcing services. *Journal of Strategic Information Systems*, *15*(3), 219–248.

Ye, S., Chen, H., & Jin, X. (2006). Exploring the moderating effects of commitment and perceived value of knowledge in explaining knowledge contribution in virtual communities. *Proceedings of the Tenth Pacific Asia Conference on Information Systems*, Paper 25, accessed August 11, 2010, available at http://aisel.aisnet.org/pacis2006/25.

Zhang, P., & von Dran, G. (Winter 2001). User expectations and rankings of quality factors in different Web site domains. *International Journal of Electronic Commerce*, *6*(2), 9–33.

Zhao, K., Xia, M., Shaw M. J., & Subramaniam, C. (2009). The sustainability of B2B e-marketplaces: Ownership structure, market competition, and prior buyer–seller connections. *Decision Support Systems*, *47*(2), 105–114

Zhu, K., Kraemer, K. L., Gurbaxani, V., & Xu, S. (2006). Migration to open-standard interorganizational systems: Network effects, switching costs, and path dependency, *MIS Quarterly*, *30*(SI), 515–538.

APPENDIX: SURVEY QUESTIONNAIRE

Part I: Basic Profile

(1) How many years have you participated in online auctions?
☐ <1 ☐ 1∼3 ☐ 3∼5 ☐ >5

(2) What is your current rating score?
☐ <50 ☐ 51∼100 ☐ 101∼500 ☐ 501∼1000 ☐ 1001∼3000 ☐ >3000

Please answer the following questions based on how much you agree with the statement.

(1) Strongly Disagree
(2) Disagree
(3) Partially Disagree
(4) Neither Agree or Disagree
(5) Partially Agree

(6) Agree

(7) Strongly Agree

Part II: Fee

How do you feel about the new 3% transaction handling fee charged by Yahoo!Kimo? The fee is:

	1	2	3	4	5	6	7
1. Reasonable	☐	☐	☐	☐	☐	☐	☐
2. Fair	☐	☐	☐	☐	☐	☐	☐
3. Acceptable	☐	☐	☐	☐	☐	☐	☐
4. Overpriced	☐	☐	☐	☐	☐	☐	☐

Part III: Switching Costs

How do you feel about switching from Yahoo!Kimo to Ruten_eBay?

	1	2	3	4	5	6	7
Procedural Switching Costs							
1. I worry that the service offered by Ruten_eBay auction won't work as well as expected.	☐	☐	☐	☐	☐	☐	☐
2. Switching to Ruten_eBay will probably involve hidden costs/charges.	☐	☐	☐	☐	☐	☐	☐
3. Switching to Ruten_eBay auction will probably result in some unexpected hassle.	☐	☐	☐	☐	☐	☐	☐
4. I don't know what I'll end up having to deal with while switching to Ruten_eBay auction.	☐	☐	☐	☐	☐	☐	☐
5. The evaluation of Ruten_eBay would be too time-consuming for me.	☐	☐	☐	☐	☐	☐	☐
6. It is difficult to compare Yahoo!Kimo with Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
7. Comparing the benefits offered by the two services requires too much time and effort even if I have sufficient information to do such a comparison.	☐	☐	☐	☐	☐	☐	☐
8. It takes a long time to get familiar with all of the Ruten_eBay features.	☐	☐	☐	☐	☐	☐	☐
9. There is not much involved in understanding Ruten_eBay auction well.	☐	☐	☐	☐	☐	☐	☐
10. Getting used to how Ruten_eBay works would be easy.	☐	☐	☐	☐	☐	☐	☐
11. It is time consuming to go through the steps of switching to Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
12. Switching to Ruten_eBay involves an unpleasant process.	☐	☐	☐	☐	☐	☐	☐

	1	2	3	4	5	6	7
Financial Switching Costs							
13. Would lose a huge amount of profit during the switch to Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
14. Switching to Ruten_eBay would mean losing or replacing points, credits, services, and so on that I have accumulated in Yahoo!Kimo.	☐	☐	☐	☐	☐	☐	☐
15. I would lose the benefits a long-term customer is entitled to if I leave Yahoo!Kimo.	☐	☐	☐	☐	☐	☐	☐
16. Switching to Ruten_eBay would involve some up-front costs (set-up fees, membership fees, deposits, etc.).	☐	☐	☐	☐	☐	☐	☐
Relational Switching Costs							
17. I would miss working with the people at Yahoo!Kimo if I switched to Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
18. I would feel more comfortable interacting with the people working for Yahoo!Kimo auction than I would be if I switched to Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
19. The people at Yahoo!Kimo from whom I currently get my service matter to me.	☐	☐	☐	☐	☐	☐	☐
20. I like talking to the service personnel at Yahoo!Kimo.	☐	☐	☐	☐	☐	☐	☐
21. I like the public image Yahoo!Kimo currently has.	☐	☐	☐	☐	☐	☐	☐

Part IV: Anti-lock-in

How do you feel about the Ruten_eBay Immigration Office, which is used to transfer sellers' usernames and ratings from Yahoo!Kimo?

	1	2	3	4	5	6	7
1. Important	☐	☐	☐	☐	☐	☐	☐
2. Useful	☐	☐	☐	☐	☐	☐	☐
3. Convenient	☐	☐	☐	☐	☐	☐	☐
4. Matters to me	☐	☐	☐	☐	☐	☐	☐

Part V: Web Site Quality

	1	2	3	4	5	6	7
Site Design Qualities							
1. It is easier to find Yahoo!Kimo than Ruten_eBay on the Internet.	☐	☐	☐	☐	☐	☐	☐

	1	2	3	4	5	6	7
2. Yahoo!Kimo has a more attractive appearance than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
3. Yahoo!Kimo has a more appropriate interface than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
4. Yahoo!Kimo generates a sense of competency more so than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
5. Using Yahoo!Kimo creates a more memorable experience than using Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
Information Qualities							
6. Yahoo!Kimo provides more timely information than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
7. Yahoo!Kimo provides more believable information than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
8. Yahoo!Kimo presents the information in a more appropriate format than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
Interaction Qualities							
9. My personal information seems more secure in Yahoo!Kimo than in Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
10. Yahoo!Kimo promotes better communications than Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
11. I can more easily build business communities in Yahoo!Kimo than in Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐
12. The delivery of goods/services promised in Yahoo!Kimo is more dependable than in Ruten_eBay.	☐	☐	☐	☐	☐	☐	☐

Part VI: Network Effects

	1	2	3	4	5	6	7
Network Size							
1. Many people use the new auction site.	☐	☐	☐	☐	☐	☐	☐
2. Many of my customers use the new auction site.	☐	☐	☐	☐	☐	☐	☐
3. Many of my business associates use the new auction site.	☐	☐	☐	☐	☐	☐	☐
Future Expectation							
4. I predict the number of buyers will be larger in the new auction site.	☐	☐	☐	☐	☐	☐	☐
5. I predict the market share of the new auction site will be larger.	☐	☐	☐	☐	☐	☐	☐
6. I predict the new auction site will be the final winner in Taiwan.	☐	☐	☐	☐	☐	☐	☐

Part VII: Switching Intention

	1	2	3	4	5	6	7
1. I intend to switch my business from Yahoo!Kimo to Ruten_eBay.	□	□	□	□	□	□	□
2. I predict I will switch my business from Yahoo!Kimo to Ruten_eBay.	□	□	□	□	□	□	□
3. I plan to switch my business from Yahoo!Kimo to Ruten_eBay.	□	□	□	□	□	□	□

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