

A Longitudinal Analysis of Trust and Customer Loyalty in Online Shopping: The Mediating Effects of Perceived Risk and Commitment¹

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Abstract

The relationship between trust and customer loyalty is time-dependent. Thus, this study uses longitudinal analysis from panel data to establish the dynamic relationship between trust and customer loyalty and demonstrates how the effect of time changes the relative importance of the mediating effects between perceived risk and commitment. As a result, the carryover effects of trust, perceived risk, commitment, and customer loyalty from one period to another are significant. In addition, as a relationship is developed over time, the mediating effect of commitment between trust and customer loyalty increases, while the mediating effect of perceived risk diminishes. In other words, trust begins as a risk reduction mechanism and may evolve over time into a strong relationship with a genuine sharing of commitment, mutuality of interest and concern for customers and e-retailers.

Key Words: Trust, perceived risk, commitment, customer loyalty, online shopping

信任與顧客忠誠在網路購物之縱斷面研究：認知風險及承諾之中介效果

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摘要

信任與顧客忠誠的關係具時間相依性，因此，本研究利用縱斷面的分析資料來建立信任與顧客忠誠之間的動態性關係，並顯示時間如何影響認知風險及承諾中介效果

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的相對重要性。研究結果發現信任、認知風險、承諾及顧客忠誠從一時段至另一時段的遺留效果具顯著效果。除此之外，當關係與時俱進的發展，承諾在信任與顧客忠誠的中介效果會逐漸增加，反之，認知風險的中介效果會因而減弱。換句話說，信任在關係初始階段扮演降低風險機制的角色，惟隨時間推進，信任會演進成為承諾的分享關係、及顧客及網路零售商二者間的互惠與關懷。

關鍵字：信任、認知風險、承諾、顧客忠誠、網路購物

1. Introduction

Online retailing has become commonplace due to the rapid proliferation of the Internet. Specifically, relationship marketing has increased in importance in the context of online retailing, and it has been suggested that customer loyalty is a key success factor for e-retailers (Bart et al., 2005; Reichheld and Scheffer, 2000). One of the most important components of customer relationships moving forward will be the development of trust that further enhances customer willingness to interact with firms (Ganesan, 1994). Thus, trust plays an important role in the evolution of long-term relationships (Svensson, 2001). Studies have documented the relationship between trust and customer loyalty in the context of online shopping (Anderson and Srinivasan, 2003; Flavián et al., 2006); however, to date, few studies have investigated customer relationships from a dynamic perspective (e.g., Johnson et al., 2006; Mittal et al., 1999).

Trust is a dynamic concept that evolves over time. It has been suggested that trust plays a more important role in the later stage of relationship development (Doney and Cannon, 1997). In contrast, some researchers argue that trust is more important in the initial stage (Harridge–March, 2006). For example, in the context of initial online shopping, a customer has no physical interaction with an e-retailer and, therefore, is unable to evaluate effectively the products offered or ensure the identity of an e-retailer (Cho, 2004; Mukherjee and Nath, 2007). Such lack of assurance may result in online shopping being regarded as risky (Harridge–March, 2006). However, if customers have sufficient trust in an e-retailer, this may outweigh the level of risk they perceive (Pavlou, 2003).

Opinion as to whether trust has greater weight with regard to customer loyalty in the initial or later stages of relationship development still remains divided. This study speculates



that whether in the initial or later stages, trust is a crucial element of customer loyalty, but that it may play different roles in affecting this loyalty. In fact, the initial development of e-loyalty is marked by varying levels of perceived risk due to a lack of control on the part of customers with anonymous trading e-retailers and, consequently, the potential for opportunism (Harridge–March, 2006). Jap (2001) argued that trust is more effective in reducing risk and uncertainty during this period. However, as shopping experience is gained and customers are more familiar with firms over time, increased understanding leads to greater confidence in what they can expect to receive from firms (Doney and Cannon, 1997). When customers trust a firm, they will feel committed to the relationship (Morgan and Hunt, 1994).

Given that online shoppers are known to be motivated to maximize relational benefits and minimize perceived risk (Forsythe et al., 2006), perceived risk and commitment of online shopping are expected to play important roles in explaining customers' loyalty behaviors and predicting their intention to continue shopping online. Therefore, it is expected that perceived risk and commitment are key mediating constructs between trust and customer loyalty. Specifically, this study seeks to explore whether the mediating effects of perceived risk and commitment between trust and customer loyalty shift systematically over time. Does trust through the reduction of perceived risk have a greater effect on customer loyalty in the initial stage of relationship development? Moreover, as customers' shopping experience increases over time and perceived risk is reduced, does trust through commitment have a greater effect on customer loyalty?

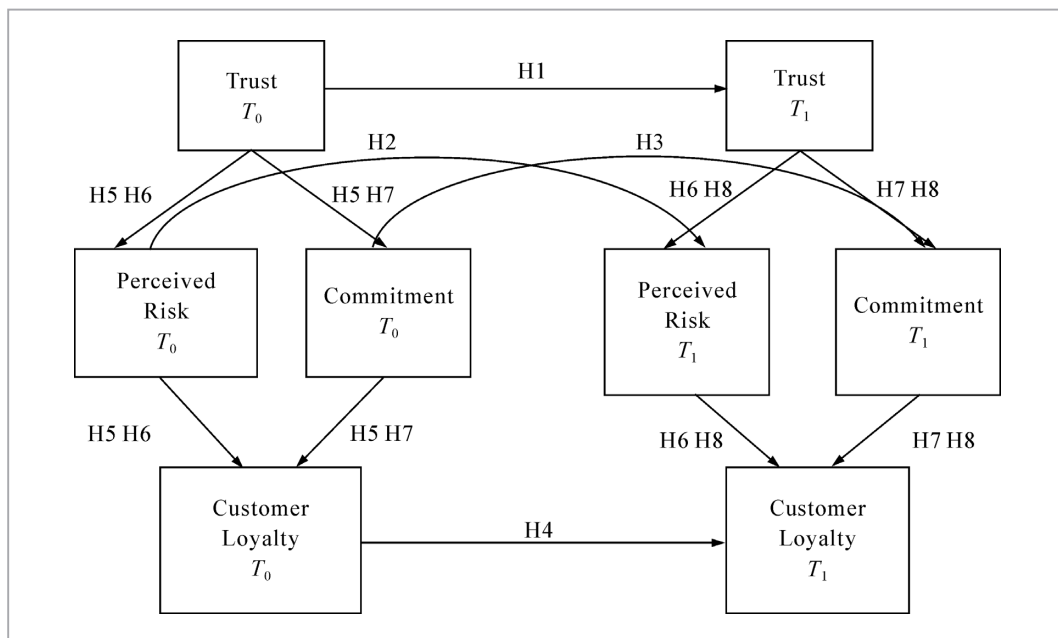
The significance of this study is threefold. First, generating loyal customers in the online retailing context is more difficult than in the offline one (Harris and Goode, 2004). One reason for this is that at present, too little is known regarding the drivers of online loyalty. This study examines the applicability of relationship marketing in the context of online shopping and explores the relationship between online trust and loyalty, along with the two mediating effects. Second, this study contributes to the Internet marketing literature by explaining how customers' trust, perceived risk, commitment, and loyalty vary over time. To date, few studies have examined the relative importance of these effects from one period to another within a single and simultaneous model. This study enables us to consider explicitly how trust plays a key role in this dynamic model, and how the mediating effects of perceived risk and commitment shift over time. Third, most prior studies have used cross-sectional data that describe customer loyalty, and the use of such data may have led to overestimation of a causal relationship. This study analyzes longitudinal data using customer panels to track the dynamic relationship between trust and customer loyalty.



2. Literature Review

2.1 Conceptual framework

This study develops a framework linking trust, perceived risk, and commitment to customer loyalty (see Figure 1). This framework has two main features. First, it examines four carryover effects of trust (H1), perceived risk (H2), commitment (H3), and customer loyalty (H4) from T_0 to T_1 time periods. That is, trust, perceived risk, commitment, and customer loyalty in T_0 time period should affect the same construct in T_1 time period. Second, it examines the mediating effects of perceived risk and commitment between trust and customer loyalty. Most importantly, this study suggests that the mediating effects between trust and customer loyalty are time dependent. At T_0 , trust indirectly through the reduction of perceived risk has a stronger effect on customer loyalty (H5). Particularly, from T_0 to T_1 time periods, as shopping experience increases, trust indirectly through the reduction of perceived risk should have a weaker effect on customer loyalty (H6), whereas more affective attitudes, captured by the commitment, should have a greater influence (H7). At T_1 , trust indirectly through the creation of commitment has a stronger effect on customer loyalty (H8).



▲ Figure 1 Conceptual Framework



In developing such a model, this study adopts the following notation: the baseline time period, in which customers develop the initial relationship with the specific e-retailer, is denoted by T_0 . The subsequent time period, in which customers still repurchase products from the same e-retailer, is denoted by T_1 . The model used in this study, shown in Figure 1, incorporates four carryover effects of trust, perceived risk, commitment, and customer loyalty, and shows how the two mediating effects of perceived risk and commitment shift between T_0 and T_1 time periods.

2.2 Customer loyalty

According to Srinivasan et al. (2002), loyalty is a customer's favorable attitude toward the e-retailer that results in repurchasing behavior. Oliver's (1999) four-stage loyalty model proposes that loyalty consists of cognitive, affective, conative, and action loyalty. Customers are loyal at each phase relating to different elements of the attitude development structure. In other words, the drivers of loyalty are complex and dynamic, and they change and evolve over time (Johnson et al., 2006). Generally, the online shopping customer overcomes the exploratory loyalty stage before carrying out larger transactions with specific e-retailers; customers' shopping experience with the e-retailer will determine their commitment levels and then upgrade their loyalty stage (Reichheld and Schefter, 2000). Basically, loyal customers can lead to increased revenues for firms, become less price sensitive, spread positive word of mouth, and purchase additional products or services (Zeithaml et al., 1996). Building strong loyalty in the context of online retailing may be particularly challenging because severe competition exists and the switching barriers for customers are minimal (Anderson and Srinivasan, 2003; Harris and Goode, 2004). In spite of these challenges, an e-retailer must develop a trustworthy relationship to increase sales on the Internet and foster customer loyalty.

2.3 Trust

Trust is defined as a set of specific relationship intentions dealing primarily with integrity, benevolence, competence, and predictability of an e-retailer (Gefen et al., 2003). Similarly, trust refers to the beliefs in the reliability of an e-retailer and the willingness of the customer to depend on an e-retailer with regard to economic transactions (McKnight et al., 2002). The definition of trust proposed in our study reflects two dimensions: benevolence and integrity. Bart et al. (2005) argued that online trust includes customer perceptions of how an e-retailer would deliver on customers' expectations, how believable its information is, and



how much confidence it commands. Thus, trust is especially important in the context of online shopping; some researchers have started to analyze its influence with regard to Internet marketing because the lack of trust among online customers is considered as the main reason for the low online shopping rates (Gefen, 2000; Jarvenpaa et al., 2000). To engage in online shopping, customers must have trust in an e-retailer itself. Most importantly, trust as a mechanism to mitigate perceived risk is particularly important in the online shopping context relative to an offline environment (Harris and Goode, 2004).

2.4 Perceived risk

Perceived risk is associated with consumers' uncertainty about outcomes and possibly negative consequences associated with a particular choice (Dowling and Staelin, 1994). In addition, perceived risk is attributed to the nature of the specific purchase situation, but it also captures the variability in delivery among providers in the same service (Macintosh, 2002). Basically, perceived risk can be divided into various subcategories, including financial risk, performance risk, physical risk, psychological risk, social risk, and time risk (Murray and Schlacter, 1990). Bobbitt and Dabholkar (2001) proposed that financial, psychological, and performance risks are more applicable to online shopping than to offline shopping contexts. Furthermore, online perceived risk can emanate from the customer's lack of knowledge about the e-retailer's process and from the e-retailers hiding relevant information from customers (Harris and Goode, 2004). Thus, financial risk, product performance risk, and information risk are predominant in the context of online shopping (Bhatnagar et al., 2000). In addition, Forsythe and Shi (2003) found that performance risk is most frequently cited as a reason for not shopping online because customers worry that the product received may not meet their expectation. The product itself poses a performance risk, which is described as disappointment that the product may not perform as well as the customer expects. In offline shopping, the disappointment might have been avoided by trying the product beforehand (Cho, 2004). Similarly, apparel shopping over the Internet exhibits performance risk due to the lack of physical experience with the products before purchasing (Bhatnagar et al., 2000). Generally, many tangible signals of service commonly used by traditional retailers are unobservable in online markets (Pan and Zinkhan, 2006). Thus, online customers encounter more risk than they do in face-to-face exchanges (Van der Heijden et al., 2003).

2.5 Commitment

Commitment has been defined as the enduring desire to maintain a relationship that is



considered important and valuable (Morgan and Hunt, 1994). Commitment has both affective and calculative components in the marketing literature (Gundlach et al., 1995). Affective commitment is defined as a psychological attachment to a firm (Gundlach et al., 1995), whereas calculative commitment emphasizes switching costs, or the difficulty in replacing a relationship (Gundlach et al., 1995). Consistent with that in the study of Morgan and Hunt (1994), commitment in this study is operationalized as affective commitment. Basically, commitment is grounded on emotional bonds or psychological attachment and customers' assurance that remaining in the relationship will yield higher net benefits than terminating it (Gruen et al., 2000).

2.6 Carryover effects

Consistent with the findings of Mittal et al. (1999), this study expects four carryover effects in the online shopping system. When making a judgment on subsequent occasions, customers can recall this prior information to help them make a judgment (Homburg et al., 2006). That is, trust, perceived risk, commitment, and customer loyalty in the previous time period affect the same construct in a subsequent time period. Generally, when making a judgment in a subsequent time period, customers will recall prior shopping experience (Johnson et al., 2006). For example, studies have found that previous satisfaction judgments affect subsequent satisfaction evaluations (Mittal et al., 1999). The underlying reason is that previous shopping experience provides a framework for subsequent evaluations. Therefore, the effect of time facilitates customers' ability to predict firms' behaviors (Doney and Cannon, 1997). Similarly, in the context of online shopping, previous experience was found to have a positive influence on the frequency and number of online purchases (Bart et al., 2005). In the following each of the carryover effects will be discussed in more detail.

Trust may be built incrementally following past experience, and customers may develop trust by starting with small purchases and building up to bigger and more expensive ones as their trust increases (Tan and Sutherland, 2004). In other words, customers' trust will be directly developed through the consistent and predictable behaviors of firms over time (Doney and Cannon, 1997). Committed customers will have relatively intimate relationships with firms. However, this intimacy only develops over the long run (Geyskens et al., 1999). Taken together, cumulative trust and commitment serve as anchors for the subsequent levels of trust and commitment, and they are essential ingredients for a successful long-term relationship (Morgan and Hunt, 1994). In addition, past customer behaviors are indicators of past loyalty, which often translates into future loyalty (Verhoef, 2003). Van Doorn and Verhoef (2008) ar-



gued that past customer share has a positive impact on current customer share. Similarly, Johnson et al. (2006) also indicated that loyalty in the previous time period has a positive effect on the same construct in a subsequent time period. In other words, the development of loyalty is iterative and builds up a cumulative evaluation of past experiences over time. As such, customer loyalty has a carryover effect across the two time periods (Johnson et al., 2006).

On the other hand, perceived risk is usually conceptualized as a main effect in the initial stage of relationship development (Murray and Schlacter, 1990). As shopping experience is gained over the course of a relationship, the initial perceived risk associated with a particular firm may be reduced (Bhatnagar and Ghose, 2004). Moreover, Park and Stoel (2005) demonstrated that online shopping experience reduces the perception of risk when shopping online, and fosters online purchase intentions. This means the negative carryover effects of previous perceived risk with regard to subsequent perceived risk evaluations are achieved. Based on the above reasoning, trust, commitment, perceived risk, and customer loyalty in the previous time period should affect the same construct in a subsequent time period. Therefore, it is hypothesized that:

H1: Trust at T_0 will have a positive effect on trust at T_1 .

H2: Perceived risk at T_0 will have a negative effect on perceived risk at T_1 .

H3: Commitment at T_0 will have a positive effect on commitment at T_1 .

H4: Customer loyalty at T_0 will have a positive effect on customer loyalty at T_1 .

2.7 The mediating effect of perceived risk between trust and customer loyalty

The literature has different views of the relationships between trust and perceived risk. One of the relationships is that perceived risk precedes trust. For example, Corritore et al. (2003) argued that perceived risk negatively affects trust. On the other hand, trust precedes perceived risk. For example, Pavlou (2003) contended that trust negatively affects perceived risk. Similarly, Jacobs et al. (2001) proposed that trust enhances relationships because it reduces the perceived risk associated with uncertainty. Selnes (1998) also noted that the important role of trust in reducing perceived risk facilitates relationship enhancement. Likewise, the negative effect of trust on perceived risk has also been empirically supported in the literature on Internet marketing (Grabner-Kräuter and Kaluscha, 2003; Pavlou and Gefen, 2004). Recently, Chang and Chen (2008) revealed that the relationship between trust and perceived risk is reciprocal. This study adopts Pavlou's (2003) view because trust reduces in-



format on complexity and lowers the perceived risk of the online transaction. Hence, trust can be seen as a mechanism that reduces the uncertainty of technological infrastructures for the exchange of information (Chang et al., 2005; Harridge–March, 2006). In an online banking context, customers trusting their e-banks will be less concerned about the perceived risk and will subsequently adopt the online service (Rexha et al., 2003). Overall, when an e-retailer acts in a way that builds customers' trust, perceived risk with regard to that e-retailer is likely reduced, thus enabling customers to make confident predictions of an e-retailer's future behavior (Kim et al., 2008).

In the context of online shopping, empirical evidence supports the existence of a negative relationship between perceived risk and customer loyalty (Chang et al., 2005; Forsythe and Shi, 2003; Pavlou, 2003; Pavlou and Gefen, 2004; Shen and Chiou, 2010). The justification for perceived risk in online shopping includes the inability to physically examine the product before purchase and concerns about the possibility of receiving defective or mis-specified goods (Cho, 2004). On the other hand, low perceived risk provides an incentive for customers to develop a stronger relationship, as they are more confident in establishing ties with those firms from whom they have already purchased products (Macintosh, 2002). Pavlou (2003) developed a model with perceived risk as well as TAM model and trust, and found a mediating role of perceived risk between trust and intention to transact. In other words, through the risk reduction process, customers become more inclined to maintain loyalty with their e-retailers.

2.8 The mediating effect of commitment between trust and customer loyalty

Trust is found to be an important antecedent to commitment in a buyer-seller relationship (Morgan and Hunt, 1994). It is reasonable to think that the trust-commitment relationship must be similar to the context of online retailing (Corritore et al., 2003; Mukherjee and Nath, 2007). Customers who trust their firms will translate their beliefs into expressions of higher commitment toward a relationship. In addition, trust leads commitment because it creates exchanges in a relationship that are highly valued. Siguaw et al. (1998) advocated that trust is a necessary prerequisite to developing commitment in a buyer-supplier relationship, and argued that commitment to a relationship would not be established without a foundation of trust.

A substantial body of research has demonstrated that commitment positively affects customer loyalty (Park and Kim, 2006; Sheth and Parvatiyar, 1995), in that committed customers are less likely to patronize other firms (Morgan and Hunt, 1994). In addition, com-



mitted customers are more likely to increase their customer share (Verhoef, 2003). The meta-analytic study by Palmatier et al. (2006) showed that commitment has the greatest influence on customer loyalty. To sum up, the results of these studies show that trust is an important contributor to the kind of commitment that leads to long-term customer loyalty.

2.9 Longitudinal shifts in the mediating effects of perceived risk and commitment

Trust is found to be of particular importance in the initial stage of relationship development, when there is a high level of perceived risk (Harridge–March, 2006; Johnson, 1999; Selnes, 1998). This is because the initial relationship stage represents certain situations in which customers face some degree of uncertainty or ambiguity. In such a risky situation, customers are more motivated to look for a trustworthy firm as a determining criterion to avoid high perceived risk (Delgado-Ballester and Munuera-Aleman, 2001). Meanwhile, when customers regard a firm as trustworthy, the perceived risk associated with it is reduced (Selnes, 1998). Therefore, without a trusting climate and constant nourishing efforts from each side, relationships can easily deteriorate. Trust-reducing perceived risk is particularly important in the case of online shopping, where customers and e-retailers are physically separated and contingencies are difficult to predict (Mukherjee and Nath, 2007).

On the other hand, it will take time and cumulative rather than short-term experience to build up a strong commitment to a relationship so that trust translates into customer loyalty (Siguaw et al., 1998). To gain customers' commitment, a firm's strategy must be long-term and based on mutual benefits. As such, the mediating effect of commitment between trust and customer loyalty must be weaker in the initial stage of relationship development. Thus, this study assumes that in this initial stage, the key determinant of customer loyalty is successful risk reduction rather than the development of commitment. As a result, in the initial stage of relationship development, the mediating effect of perceived risk between trust and customer loyalty will be stronger than the mediating effect of commitment between trust and customer loyalty. Therefore, it is hypothesized that:

H5: At T_0 , the mediating effect of perceived risk between trust and customer loyalty will be stronger than the mediating effect of commitment between trust and customer loyalty.

The lack of physical presence of the product and the lack of physical interaction between the customer and the e-retailer render online shopping a unique environment, in which trust is of dominant importance (Mukherjee and Nath, 2007). In other words, trust reduces perceived risk, especially in the initial stage of relationship development in which customers



feel highly uncertain. However, increased shopping experience thus reduces the uncertainty involved with the shopping situation and consequently the perceived risk (Bhatnagar and Ghose, 2004). This implies that the effect of trust as a mechanism to reduce perceived risk declines with increased shopping experience. Similarly, Johnson (1999) argued that perceived risk in customers' behavior should be minimized in the later stage of relationship development. Therefore, the mediating effect of perceived risk between trust and customer loyalty must be weaker in this later stage. Therefore, it is hypothesized that:

H6: From T_0 to T_1 , the mediating effect of perceived risk between trust and customer loyalty will be weaker.

Trust increases with shopping experience as customers come to rely on the predictability and consistency of a particular firm's behaviors (Maltz and Kohli, 1996). In line with this, service encounters and repeated interactions between customers and firms breed trust and allow them to move through the initial relationship stage (Swan and Nolan, 1985). Customers are more committed to the relationship due to this learning process (Gounaris and Venetis, 2002). In other words, the effect of time intensifies the association between trust in a firm and commitment to a relationship. Similarly, Ganesan (1994) found that the long-term orientation is affected by the extent to which customers trust a firm, leading to increased commitment to a relationship. The underlying reason is that commitment has a temporal dimension, indicating that a relationship endures over time (Gundlach et al., 1995). In short, the longer a customer and a firm have interacted with each other, the greater a customer's commitment to a firm (Mukherjee and Nath, 2003). Therefore, the mediating effect of commitment between trust and customer loyalty must be stronger in the later stage of relationship development. Therefore, it is hypothesized that:

H7: From T_0 to T_1 , the mediating effect of commitment between trust and customer loyalty will be stronger.

Commitment expands as a result of the gradual enhancement of the relationship through the development of trust (Siguaw et al., 1998). A relationship oriented toward the later relationship stage will more likely deepen and grow to be characterized by commitment. In other words, trust begins as a risk reduction mechanism, and may evolve over time into a strong relationship with a genuine sharing of commitment, mutuality of interest, and concern for the needs of the other party. Therefore, it is hypothesized that:



H8: At T_1 , the mediating effect of commitment between trust and customer loyalty will be stronger than the mediating effect of perceived risk between trust and customer loyalty.

3. Methodology

3.1. Data Collection and Sampling

The survey was administered to a convenience sample of university students during scheduled classes in Taiwan. One of the reasons for using a student sample as the panel data is that it is easy to track a sample of respondents from one period to another. To reduce sampling bias and maintain the heterogeneity of the respondents, sample selection was drawn from four freshman, four sophomore, four junior, and four senior classes. Furthermore, respondents were selected from the colleges of management, social sciences, engineering, and arts to make the final sample more heterogeneous. Brown et al. (2005) employed a three-month span between two survey collections. Van Doorn and Verhoef (2008) developed a period of one year between two survey collections. In this study, the survey covered the two time periods that were approximately eight months apart. The first data collection was conducted at the beginning of fall semester classes in 2008, and the second data collection was completed at the end of spring semester classes in 2009. This study expects that a time span of eight months is feasible for longitudinal analysis. All the questions asked pertained to the most frequently visited online shopping website of the respondent. At T_0 , customer survey data were collected from a sample of 600 students from one university in Taiwan who all had less than one year of experience in online shopping.

Although age distribution of this sample was not totally in line with the distribution of the population, university students are very active Internet users and participants in online activities and thus represent the target market for online shopping context (Sen et al., 2006). This sample is particularly relevant and appropriate. In addition, the population of university students is younger and better educated than the population of conventional customers and closely resembles the online customer population (McKnight et al., 2002). Taken together, student samples should continue to yield meaningful results in the context of understanding online behaviors (Gallagher et al., 2001).

To confirm consistent data collection and ensure whether some of respondents switched to other e-retailers during the interval between T_0 and T_1 , in the second data collection at T_1 ,



the respondents were also asked to report their frequently visited online shopping website. If the respondents' frequently visited online shopping website on T_1 was not same as that on T_0 , then the survey process was discontinued. Only 483 respondents were still willing to participate in the survey (an 85% retention rate). To assess nonresponse bias at T_1 , this study followed Verhoef (2003) to test whether respondents and nonrespondents differed significantly with respect to customer loyalty at T_0 . A t-test does not reveal a significant difference. Thus, there is no nonresponse bias. Another 71 respondents were removed from the sample because they had shopped online less than once in the previous eight months. This left a sample of 412 respondents with usable responses in each period. Up to 57% of the respondents were women. In other words, this study included only those respondents who participated in at least two subsequent iterations of the survey and in which the same respondents filled the surveys.

The following is the respondents' age distribution: 36.26% were 19 years old; 34.83% were 20 years old; 23.42% were 21 years old; and 5.49% were 22 years old. Major purchases of the sample in this study were consumer electronic products (33.05%); entertainment products (27.63%); clothing (17.21%); books (14.32%); cosmetic products (10.13%); and travel services (9.58%). This is consistent with the results of Okazaki and Skapa (2008), who argued that the most popular items in online shopping are electronics, books, tickets, and travel services.

3.2 Measure Development

The customer loyalty, trust, commitment, and perceived risk constructs used a five-point Likert-type scale with the descriptive equivalents ranging from Strongly Disagree (1) to Strongly Agree (5). For the measurement of customer loyalty, three items were adopted from Srinivasan et al. (2002) and Zeithaml et al. (1996), while the measure of commitment included three items taken from Morgan and Hunt (1994). The three items that measured trust were adopted from Doney and Cannon (1997) and Pavlou and Gefen (2004), while the three items used to measure perceived risk came from and Pavlou and Gefen (2004).

3.3 Validation of Measures

In line with the two-step approach suggested by Anderson and Gerbing (1988), this study developed the measurement model by conducting confirmatory factor analysis at first. The structural equation model was then estimated for hypotheses testing. In assessing reliability, the composite reliabilities and the Cronbach's alpha for each construct were also com-



puted. The Cronbach's alphas of customer loyalty, trust, commitment, and perceived risk at T_0 and T_1 were all greater than 0.80, supporting the reliability of these measurements. In addition, all composite reliability estimates at T_0 and T_1 were greater than 0.80, and all average variance extracted (AVE) estimates at T_0 and T_1 were greater than the recommended value of 0.50 (Fornell and Larcker, 1981).

As evidence of convergent validity, all the items at T_0 and T_1 had significant loadings on their respective constructs (Anderson and Gerbing, 1988). Discriminant validity was assessed for two constructs by constraining the estimated correlation parameter between two constructs to a value of 1.0, and then performing a chi-square difference test on the values for the constrained and unconstrained model (Anderson and Gerbing, 1988). A significantly lower χ^2 value for the unconstrained model at T_0 and T_1 was found, thus indicating that discriminant validity was achieved. Table 1 shows the means, standard deviations, and correlations matrix for the constructs. Table 2 summarizes the results of the item description, factor loading, AVE, and reliability test.

▼ Table 1 Means, Standard Deviations, and Correlations

Variables	Mean		SD		1	2	3	4
	T_0	T_1	T_0	T_1				
1. Trust	2.579	3.259	0.807	0.739		-0.024	0.506*	0.354*
2. Perceived risk	3.422	2.603	0.869	0.862	-0.612*		-0.028	-0.039
3. Commitment	2.727	3.596	0.709	0.911	0.361*	-0.387*		0.445*
4. Customer loyalty	3.023	3.998	0.773	0.926	0.363*	0.382*	0.239*	

* $p < 0.05$

Note: T_1 above diagonal; T_0 below diagonal

Due to the self-reported nature of the data, there was a potential for common method variance, and so the Harman one-factor test was conducted to determine the extent of this. The unrotated factor analysis showed that the first factor accounted for 36.83 percent of the variance at T_0 and 31.27 percent of the variance at T_1 . Based on the results of the Harman's one-factor test, the common method variance was not considered significant (Podsakoff et al., 2003).



▼ Table 2 Measurement Item Description and Confirmatory Factor Analysis

Item	Coefficient Alpha		Composite Reliability		Average Variance Extracted	
	T_0	T_1	T_0	T_1	T_0	T_1
Trust	0.90	0.89	0.90	0.90	0.75	0.75
This online store keeps the promises it makes to me.						
This online store has high integrity.						
This online store is always honest with me.						
Perceived risk	0.94	0.95	0.95	0.96	0.85	0.88
There is a considerable risk in purchasing products from this online store.						
There is a high potential for loss involved in purchasing products from this online store.						
My decision to purchase products from this online store is risky.						
Commitment	0.86	0.93	0.87	0.94	0.69	0.85
I intend to maintain this relationship indefinitely.						
The relationship that I have with this online store deserves my maximum effort to maintain it.						
I feel a strong sense of belonging with this online store.						
Customer loyalty	0.91	0.94	0.95	0.96	0.86	0.88
To me, this online store is the best one to do business with.						
I seldom consider switching to another online store.						
I will do more business with this online store in the future.						

4. Analysis and Results

4.1 Structural Equation Model

The proposed model was tested on the basis of a structural equation model using LISREL 8.52, and the fit was found to be acceptable (chi-square (240) = 945.053, $p = 0.00$, GFI = 0.86, CFI = 0.96, NFI = 0.95, RMSEA = 0.08, RMR = 0.08). The results of the structural equation model are reported in Table 3.

4.2 Test of the Hypotheses

Hypotheses 1, 2, 3 and 4 stated that trust, perceived risk, commitment, and customer loyalty in the previous time period would affect the same construct in a subsequent time period. All four carryover effects from T_0 to T_1 were significant, as follows: trust ($\gamma = 0.519$, $t = 12.155$), perceived risk ($\beta = -0.191$, $t = -3.509$), commitment ($\beta = 0.344$, $t = 6.043$),



and customer loyalty ($\beta = 0.190$, $t = 3.136$). Of the four carryover effects, those of trust, commitment and customer loyalty were positive, but that of perceived risk was negative. This indicates that customers who have high levels of cumulative trust, commitment and customer loyalty in the previous time period will have higher levels of trust, commitment, and customer loyalty respectively in a subsequent time period. In contrast, perceived risk is reduced over time. Thus, H1, H2, H3, and H4 were supported.

Hypothesis 6 proposed that from T_0 to T_1 , the mediating effect of perceived risk between trust and customer loyalty would be weaker. Conversely, Hypothesis 7 stated that from T_0 to T_1 , the mediating effect of commitment between trust and customer loyalty would be stronger. As shown in Table 3, trust had a negative effect on perceived risk at T_0 ($\gamma = -0.694$, $t = -14.029$) and at T_1 ($\gamma = -0.090$, $t = -1.275$). Meanwhile, perceived risk had a negative effect on customer loyalty at T_0 ($\beta = -0.300$, $t = -6.680$) and at T_1 ($\beta = -0.053$, $t = -1.047$). The mediating effect of perceived risk between trust and customer loyalty was reduced from 0.208 (-0.694×-0.300) at T_0 to 0.005 (-0.090×-0.053) at T_1 . Therefore, H6 was supported. On the other hand, trust had a positive effect on commitment at T_0 ($\gamma = 0.387$, $t = 8.707$) and at T_1 ($\gamma = 0.498$, $t = 9.164$). Meanwhile, commitment had a positive effect on customer loyalty at T_0 ($\beta = 0.153$, $t = 2.489$) and at T_1 ($\beta = 0.494$, $t = 6.374$). The mediating effects of commitment on customer loyalty was increased from 0.059 (0.387×0.153) at T_0 to 0.246 (0.498×0.494) at T_1 . Therefore, H7 was supported.

Hypothesis 5 asserted that at T_0 , the mediating effect of perceived risk between trust and customer loyalty would be stronger than the mediating effect of commitment between trust and customer loyalty. Conversely, Hypothesis 8 stated that at T_1 , the mediating effect of commitment between trust and customer loyalty would be stronger than the mediating effect of perceived risk between trust and customer loyalty. Consistent with H5, at T_0 , the mediating effect of perceived risk between trust and customer loyalty ($-0.694 \times -0.300 = 0.208$) was stronger than the mediating effect of commitment between trust and customer loyalty ($0.387 \times 0.153 = 0.059$). Therefore, H5 was supported. At T_1 , in contrast, the mediating effect of commitment between trust and customer loyalty ($0.498 \times 0.494 = 0.246$) was stronger than the mediating effect of perceived risk between trust and customer loyalty ($-0.090 \times -0.053 = 0.005$). Therefore, H8 was supported.



▼ Table 3 Path Coefficients of LISREL

Proposed Path	T_0		T_1	
	Coefficient	t value	Coefficient	t value
Trust → perceived risk	−0.694*	−14.029	−0.090	−1.275
Trust → commitment	0.387*	8.707	0.498*	9.164
Perceived risk → customer loyalty	−0.300*	−6.680	−0.053	−1.047
Commitment → customer loyalty	0.153*	2.489	0.494*	6.374
Mediating Effects				
Trust → perceived risk → customer loyalty	0.208		0.005	
Trust → commitment → customer loyalty	0.059		0.246	
Carryover Effects	Coefficient		t value	
Trust	0.519*		12.155	
Perceived risk	−0.191*		−3.509	
Commitment	0.344*		6.043	
Loyalty	0.190*		3.136	

* $p < 0.05$

5. Conclusions

5.1 Discussion

This study provides three important contributions to the understanding of customer loyalty over time. First, most of the prior studies of relationship marketing were conducted in the context of offline shopping. This study thus aims to develop and extend existing research into the online shopping behaviors through proposing a dynamic model of e-loyalty. Second, this study makes an empirical contribution through supplying a greater understanding of how the effect of time changes the relative importance of mediating effects between perceived risk and commitment. Third, longitudinal data rather than cross-sectional data is used to establish the causal relationship between trust and customer loyalty. From a methodological standpoint, the use of longitudinal data from a panel of customers to examine this model is meaningful, because customer relationships are likely to evolve over time.

First, customers' prior shopping experience acts as reference level for subsequent assessments (Mittal et al., 1999; Verhoef, 2003). Cumulative levels of trust, perceived risk, commitment, and customer loyalty are developed with supplementary positive inputs adding to the base level of the original ones. Consistent with this perspective, customers who have high levels of trust, commitment, and customer loyalty with an e-retailer in the previous time



period have high levels of those in a subsequent time period. Most importantly, as online shopping experience increases, customers acquire increasing amounts of information on the product. Thus, perceived risk can decline over time (Bhatnagar and Ghose, 2004).

Second, the development of customer loyalty is fraught with customer-perceived risk. Reducing perceived risk is a critical factor affecting customer loyalty, especially in the initial stage of relationship development. Without a doubt, customers at such a relationship stage are likely to seek a trustworthy relationship that helps reduce perceived risk and uncertainty. Consistent with Chang et al. (2005), Pavlou (2003), and Pavlou and Gefen (2004), the development of trust can be seen as part of a risk reduction process. Trust does reduce perceived risk, especially in the initial stage of relationship development, and the risk reduction process is crucial because it can transform trust into customer loyalty.

Obviously, as online shopping experience increases, the mediating effect of commitment between trust and on customer loyalty also rises, whereas the mediating effect of perceived risk diminishes. This is consistent with the notion that commitment is developed over time and generally viewed as a critical factor in the development of an enduring desire to maintain a long-term relationship (Siguaw et al., 1998). Moreover, Selnes (1998) argued that as the relationship between customers and firms develops over time, both sides gain experience and learn to have a commitment to each other. The long-term process of building trust through commitment likely provides a strong base for increased customer loyalty. In short, customers with high levels of trust will intensify loyalty and move the relationship away from just reducing perceived risk to a more committed stage.

5.2 Theoretical Implications

The effect of trust on customer loyalty is complex. This study has shown that it operates in two different ways. First, trust affects customer loyalty by reducing perceived risk. Second, trust affects customer loyalty through commitment. Generally, customers may have different perceptions of risk and commitment from one period to another. In other words, the extent to which risk reduction or commitment is important to customers may shift throughout the course of a relationship. Thus, this study suggests that the relative importance of the mediating effects between perceived risk and commitment may vary significantly over time. Essentially, the results of this study are similar to Morrow et al.'s (2004) model, which suggests that trust develops from being cognition-based to affect-based. In short, cognition-based trust provides a foundation for affect-based trust and therefore the former should exist before the latter develops. Obviously, cognition-based trust corresponds to the mediating effect



of perceived risk between trust and customer loyalty in this study. On the other hand, affect-based trust corresponds to the mediating effect of commitment between trust and customer loyalty. The focus of this study is mainly on the fact that the relative importance of mediating effects between perceived risk and commitment shifts over time.

5.3 Managerial Implications

Given the importance of customer loyalty to the online shopping context, by understanding how trust affects this loyalty over time, managers can deal with such relationships in much more effective ways. Most importantly, this study suggests that the needs of customers with less online shopping experience are significantly different from those with more such experience. Therefore, these findings suggest that e-retailers cannot treat all customers in the same manner, as their perceptions of risk and commitment levels are likely to be significantly different. Thus, e-retailers should use shopping experience as a segmentation variable in designing service strategies across different segments.

Early in the development of the relationship, it is clear that customers have no shopping experience with the e-retailer and therefore are unable to effectively evaluate the products offered. Managers should be able to recognize the perceived risk customers face and take steps to build trust to overcome them. In this respect, there might be no other means than actions in communicating the reliability and predictability of the Internet system (Harridge–March, 2006). Furthermore, managers might devote valuable efforts to design website interfaces with improved usability and security to enhance trust and reduce perceived risk (Flavián et al., 2006). The initial positive effect of trust working through commitment on loyalty is small, but this does not mean that e-retailers should not strive to develop commitment. Any positive effects from commitment on loyalty in the initial stage could result in larger positive effects over the long run (Verhoef, 2003). Throughout the course of a relationship, there is an increasing intimacy between customers and e-retailers, and the increasing richness of customers' impressions of the relationship leads to increasing confidence in the feelings of identification with and attachment and commitment to the e-retailers. Thus, trust has an increasing effect on commitment. This means that commitment is critical in the later stage of relationship development. To this end, managers must consciously and consistently define their website through all types of interaction and communication with customers (Harridge–March, 2006).

Taken together, the results of this study suggest that investing in risk reduction pays off only in the initial stage of relationship development. Nevertheless, it must be noted that a



stronger development of commitment takes more time and effort to build than cognitive loyalty or transactional relationships. Thus, the expansion of commitment should be used as a valuable supplement to an e-retailer's efforts to deepen relationships. Most importantly, relational mechanisms are more important than risk reduction mechanisms, especially in the later stage of relationship development. Thus, a committed relationship should be nurtured and managed effectively through an e-retailer's Internet marketing strategy.

5.4 Limitations and directions for future research

There are some important limitations associated with this study. First, even though this study collected two-stage data, the time frame during which it assesses e-loyalty is only eight months. In future research, a longer time period (between T_0 and T_1) may be required to reflect the patterns of the most truly dynamic aspects of relationship development. Although this study develops a minimum of two time periods over time, which is rather common in longitudinal research within marketing literature (e.g., Mittal et al., 1999; Van Doorn and Verhoef, 2008), it also limits our analysis with respect to longer-term dynamic effects. Johnson et al. (2006) used three time periods between surveys and showed carryover effects in customer perceptions and customer loyalty. Thus, future studies may be fielded at three or more time periods. It is expected that the variance explained will increase as more time periods are added. Consequently, commitment will strongly mediate the effect of trust on customer loyalty as more time periods increase into the model. In short, customers may become loyal to particular online retailers.

Another limitation is that our panel is limited in the use of a convenience sample of students from a single university. Some researchers have stated that such a sample is representative when studying online behaviors (Gallagher et al., 2001; Gefen et al., 2003; McKnight et al., 2002; Meinert et al., 2006; Sen et al., 2006). In addition, student samples afford such a homogeneous sample because they tend to be similar on many levels. Of course, this enhancement in internal validity is a trade-off with external validity. Therefore, the behaviors of these individuals may be different from those of other customers among the Internet population in Taiwan. Thus, the results presented may be limited in generalizability, and it is important to have a broader cross section of a population to enhance the generalizability of the study.

Third, at T_0 , customer survey data from a sample of 600 students had less than one year of experience in online shopping. This criterion is to ascertain that most respondents at T_0 were with limited online shopping experience and their commitment and customer loyalty



may grow and perceived risk may reduce from T_0 to T_1 . For all that, this study may have omitted some variables that could make methodology more accurate. Besides the fact that increasing online shopping experience in the previous eight months would affect the evolution of loyalty, different level of customers' involvement toward a specific online shopping website at T_0 could be considered. Involvement was found to moderate the relationship between website atmosphere and attitude (Eroglu et al., 2003). Thus, highly involved customers should be more likely to form a positive attitude toward the products offered and the website itself. Therefore, it may be interesting to include the role of involvement in the model and thus compare the effects between high involvement and low involvement on online loyalty from T_0 to T_1 .

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