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The Impact of Price Discount, Product Complementarity and Relational Investment on Customer Loyalty: Empirical Evidence from China's Telecommunications Industry

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Abstract: This study attempts to examine the impact of bundling on customer loyalty from a relational perspective. Based on the investment model, we propose an integrated model incorporating price discount, product complementarity and relational investment in the bundling-loyalty process. The model is tested with the consumer dataset provided by China Telecom. By controlling for age, gender, commitment to values and prior spending records, the findings confirms a moderated mediation model in that either price discount or product complementarity elicits an indirect and positive impact on customer loyalty via relational investment. However, with higher levels of complementarity of bundle components, the effect of price discounts on customer loyalty are attenuated. Theoretical contributions and managerial implications are also discussed.

Key words: Bundle, price discount, product complementarity, relational investment, retention and telecommunications

INTRODUCTION

Telecommunications service providers have long been challenged by customer retention, the maintaining of user-provider relationships (Chang and Tayi, 2009; Ranganathan *et al.*, 2006; Sharpe and Staelin, 2010). To solve this problem, service providers have relied heavily on service contracts to lock in their customers for a definite time period; however, contracts are no longer being favored by many users in changing competitive dynamics (Ranganathan *et al.*, 2006). Instead, bundling which is defined as the practice of marketing two or more products and services in a single package for a special price (Guiltinan, 1987) has become a widespread marketing practice adopted particularly by telecommunications companies (Musico, 2010; Sheng *et al.*, 2007). It is argued that bundling large numbers of unrelated information goods is surprisingly profitable because bundling can create “economies of aggregation” for information goods (Sheng *et al.*, 2007, p. 53). More importantly, bundling-usually featuring price discounts and product complementarity-is found to affect customer loyalty.

Although a number of previous studies (Balachander *et al.*, 2010; Chang and Tayi, 2009; Lacey, 2007) have investigated how bundling affects customer loyalty, the findings have

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remained inconsistent. For example, Ferguson and Brohaugh (2008) interviewed managers who had adopted bundling strategies in their marketing practice and customers who had bought bundled products. They found that bundling strategies increased the level of customer loyalty in a sustainable and competitive market environment. In contrast, Sheng *et al.* (2007) found that bundling did not consistently support customer retention, because when an individual bundled component reduced the total price, customers' overall evaluations of the bundle would be greatly lowered and thereby led to more switching behaviors.

One possible explanation may clarify the rationale underlying the above discrepancies. The bundling-loyalty process is dynamic, during which a number of factors have simultaneously played an important role, such as price discounts, product complementarity and personal expenses. However, prior studies have not provided an integrated model comprehending the dynamic nature of the bundling-loyalty process which might have resulted from a lack of behavior data (e.g., consumer database) that can objectively reflect the interaction of multi-variables. Instead, past studies have focused on either the impact of a single factor on loyalty (e.g., price discount, Balachander *et al.*, 2010; Lacey, 2007) or the inter-relationships between any two of the factors involved in the bundling-loyalty process (e.g., price discount versus product complementarity, Sheng *et al.*, 2007). Findings are therefore very limited and sometimes reveal contradictions.

To deepen the understanding of the dynamic bundling-loyalty process, this study adopts the investment model (Rusbult, 1980, 1983) as a conceptual framework, integrating price discounts, product complementarity and personal expenses (also referred to as relational investment as implied by the investment model)-in the bundling-loyalty process. The dynamic relationship between factors is then tested with an actual consumer dataset provided by one of the largest telecommunications service providers in China. The adoption of a consumer database for hypothesis testing may rule out possible subjective biases (e.g., memory, self-reported intentions to stay/leave behavior) resulting from surveys, experiments or interviews. More importantly, it may be a relatively objective assessment of the dynamic process in which price discounts, product complementarity, relational investment and customer loyalty simultaneously interact with each other.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

Prior research has adopted various theoretical frameworks to examine the relationship between bundling and customer loyalty, such as price discrimination theory (Dassiou and Glycopantis, 2006), transaction utility theory (Yadav and Monroe, 1993) and mental accounting theory (Sheng *et al.*, 2007). These studies focus on how user-attributes (e.g., perception of price) affect customer loyalty (Chen and Hitt, 2002; Wu and Wang, 2005). In contrast, the current study proposes to understand the bundling-loyalty process from a relational perspective, introducing the investment model-a social psychological model used to examine dating relationships (Rusbult, 1980, 1983) to explore how relational investment plays a role in maintaining user-provider relationships in bundling.

The Impact of Relational Investment on Customer Loyalty

The investment model is rooted in the exchange tradition within social psychology (Homans, 1974). It was initially proposed as a means of accounting for the development and deterioration of satisfaction and commitment and as a means of accounting for actual stay/leave behavior in dating relationships (Rusbult, 1980, 1983; Rusbult *et al.*, 1986). Transferred to the customer domain, it is used to measure and predict user-provider

relationships (Reichheld and Teal, 1996; Ranganathan *et al.*, 2006). Prior research (Rusbult, 1983; Rusbult *et al.*, 1986) has indicated that the investment model displays relationships with two primary characteristics: satisfaction and commitment. Specifically, satisfaction refers to positivity of affect or attraction to one's relationship and commitment means the tendency to maintain a relationship and to feel psychologically "attached" to it (Rusbult, 1983). We only consider commitment in this because stay or leave behaviors are believed to be directly mediated by an individual's commitment to maintain his or her relationship (Rusbult, 1983). For example, an individual who is not satisfied with the relationship still remains committed to it and stays involved in it, because he or she may not have a good alternative or has already made vast investments in the relationship.

The above arguments suggest that two key variables influence an individual's commitment to certain relationships: perceived quality of alternatives and investment size. Perceived quality of alternatives (Rusbult, 1983) refers to a person's evaluations of an alternative relationship (e.g., a bundle service plan offered by another service provider). As this aspect relates to user-attributes, which is not the concentration of our research, we focus only on investment size in this study. Investment size refers to the resources a person puts into the relationship (Rusbult, 1980, 1983). It has intrinsic investment-resources that are put directly into the relationship (e.g., time) and extrinsic investment-resources that initially are extraneous but become inextricably connected to the relationship (e.g., shared memories). Because extrinsic investment is subjective and relatively hard to collect, we limit our research effort to intrinsic investment in this study. Also termed as relational investment, intrinsic investment refers to the investments that are specific to the user-provider relationships (e.g., learning about products or services, see (Ranganathan *et al.*, 2006).

Prior research (Bolton and Lemon, 1999; Keaveney and Parthasarathy, 2001; Reichheld and Teal, 1996; Stremersch and Tellis, 2002) has explored the impact of different intrinsic investments on customer loyalty from various perspectives. For example, Ranganathan *et al.* (2006) conducted a study based on consumers' perception of switching costs. They found that relational investments increased switching costs (economic and non-economic costs) and discouraged users from migrating to a different service provider. Similarly, Hoch and Deighton (1989) explicated the issue by drawing upon consumer learning theory. They proposed that the more bundle components a customer chooses, the more time or efforts he/she would put into learning, which enhanced the locking-in effects and maintained customer loyalty at a certain, stable level.

The above review of past studies suggests that intrinsic investments are positively correlated with customer loyalty. In the current study, we operationalize relational investment as customers' expenses on bundles. As one type of intrinsic investment, customers' actual expenses are thus expected to positively affect customer loyalty. As expectation disconfirmation theory (Oliver, 1980) posits, customers' expenses may attenuate the disconfirmation resulting from the differences between expectation and perceived corporate performance and thereby enhance customer satisfaction and thus customer loyalty. Hence, we have the following hypothesis pertaining to the effect of relational investment (Fig. 1).

- **H1:** The more (less) a customer spends on service bundles, the more (less) likely he/she would stay involved in the user-provider relationship

The Role of Relational Investment in Mediating the Effect of Price Discount on Loyalty

The investment model also focuses on antecedents of relational investment and suggests that what drives relational investment largely depends on situations (Rusbult,

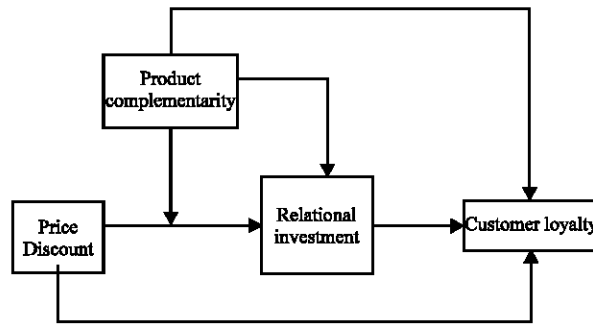


Fig. 1: Theoretical framework: the influences of bundling on customer loyalty

1991). Prior research (Monroe and Petroshius, 1981; Nieuwstraten, 2006; Sheng *et al.*, 2007) has indicated that under the bundling condition, price discount elicits an impact on relational investment. The effect of price discount in bundling has been observed from different perspectives, the most prominent among which are attractiveness and reference price. For example, researchers (e.g., Chakravarti *et al.*, 2002) found that partitioning or consolidating the price of products in a bundle can influence the attractiveness of the bundle offer. Likewise, other researchers (Compeau and Grewal, 1998; Kalyanaram and Winer, 1995) proposed that the discounted price of an individual bundle component would decrease a consumer's internal reference price for this product (adaption theory, Helson, 1964). Subsequently, it would increase his/her perceptions of the product quality and thereby enhance the willingness to spend on bundles. More recently, Ranganathan *et al.* (2006) found that mobile users tended to spend more when they were offered greater price discounts. Based on the adaptation theory and the review of past studies, this study predicts that price discount in bundling elicits a positive impact on relational investment. Thus, we arrive at the following hypothesis pertaining to the effect of price discount (Fig. 1):

- **H2:** The greater the bundle price discount, the more customers would spend on service bundles and vice versa

Prior research (Monroe and Krishnan, 1985) has also indicated that price discount influences customer loyalty. However, due to the fact that behavior data is very hard to collect, past studies often use intention or willingness of the customer to assess loyalty which has resulted in substantial findings. For example, Monroe and Krishnan (1985) found that price positively influenced the perception of quality and inversely influenced the perception of value and willingness to buy. Likewise, Yadav (1995) suggested that price discount on an individual bundle component would enhance a customer's purchase intention for this product and thereby drive him/her to purchase the entire bundle of products or services. The above findings suggest that price discount often drives customer loyalty via a mediator.

As postulated in Hypothesis 1 and 2, greater bundle price discount increases a customer's relational investment and higher relational investment will lead to higher customer loyalty. We predict that relational investment mediates the effect of price discount on customer loyalty in that a customer would spend more on bundles when being offered greater price discounts; the same customer would remain committed to and stay involved in the user-provider relationships because of such higher investments. Thus, we have the following hypothesis pertaining to the mediating effect of relational investment (Fig. 1).

- **H3:** Relational investment mediates the effect of price discount on customer loyalty; the greater (less) the bundle price discount, the more (less) the customer would spend on the service bundle, which thereby enhances (attenuates) customer loyalty

The Role of Investment in Mediating the Effect of Product Complementarity on Loyalty

Product complementarity, an important issue pertinent to bundling, is also addressed in this study. Complementarity refers to the products and/or services that are replaceable, fit and are transferrable with each other (Aaker and Keller, 1990). Prior research (Kim *et al.*, 2001; Park *et al.*, 1991) has shown that when individual bundle components are complementary in terms of attribute, benefit or price, they would enhance customers' perceptions of brand images and thereby transfer brand associations to the extended products/services and vice versa.

More importantly, researchers (Bonini and Rumiati, 2002; Rust *et al.*, 2004; Vogel *et al.*, 2008) proposed that product complementarity elicited an indirect impact on customer loyalty often via a mediator (value assets). Other researchers (Harlam *et al.*, 1995) further pointed out that complementarity of bundle components increased customers' expenses on bundles. As the investment model (Rusbult, 1980) posits, higher relational investment will lead to higher customer loyalty. It is thus predicted that relational investment might play a mediating role in the impact of product complementarity on customer loyalty. Hence, we have the following hypotheses pertaining to the effect of complementarity of bundle components (Fig. 1).

- **H4a:** The more (less) complementarity of bundle components, the more (less) the customers would spend on bundles
- **H4b:** Relational investment mediates the effect of product complementarity on customer loyalty; the more (less) complementarity of bundle components, the more (less) the customers would spend on bundles, which thereby enhances (attenuates) customer loyalty

The Moderating Effect of Product Complementarity

Prior research (Rust *et al.*, 2004; Vogel *et al.*, 2008) has suggested that price discounts and product complementarity are inter-correlated with each other and mental accounting theory can be used to interpret such correlations (Sheng *et al.*, 2007). A mental account is "a set of cognitive operations used by individuals and households to organize, evaluate and keep track of financial activities" (Thaler, 1999) which is notable in explaining consumer evaluations of bundling offers (Johnson *et al.*, 1999; Sheng *et al.*, 2007).

Specifically, the theory has linked product complementarity to price discount by positing that mental accounts could influence acceptance of a price discount (Bonini and Rumiati, 2002) and the complementarity of bundle components influences the selection of mental accounts (Sheng *et al.*, 2007). Sheng *et al.* (2007) further proposed that the impact of price discount on purchase intention was reduced when the bundle components were perceived as being more complementary and vice versa.

As postulated in Hypothesis 2, a greater bundle price discount will lead to higher relational investment. However, with high levels of product complementarity, the impact of price discount on relational investment will be attenuated. We predict that customers will spend more on bundles when being offered complementary bundle components, even when price discount is low. Similarly, as proposed in Hypothesis 3, a greater bundle price discount will elicit higher customer loyalty. However, with high levels of product complementarity, the impact of price discount on customer loyalty will be reduced. We predict that customers will

be more loyal if they are offered complementary bundle components, even when price discount is low (Fig. 1). Thus, we have the following hypotheses pertaining to the moderating effect of product complementarity:

- **H5a:** Product complementarity moderates the effect of price discount on relational investment; price discount would have more impact on relational investment when bundle components are less complementary
- **H5b:** Product complementarity moderates the effect of price discount on customer loyalty; price discount would have more impact on customer loyalty when bundle components are less complementary

BEHAVIORAL DATA APPROACH

Data Set

Present data set came from the customer database provided by China Telecom Corporation Limited (also referred to as China Telecom), the largest fixed line and third largest mobile telecommunications service provider in China. The company provided fixed-line and mobile telephone services to 259 million subscribers as of August 2010 and broadband Internet access to over 60 million subscribers (China Telecom, 2010). China Telecom offered their customers multiple service plans and additional services, such as mobile voice, multimedia messaging, value-added services, integrated information application and data managing and line leasing services, the most prominent among which was “My e-Home,” a bundling program designed for family customers who desired to have multiple but personalized telecommunications services and information applications.

China Telecom started the “My e-Home” program in 2006, offering their customers three different type of bundles. Specifically, the e9 bundle was a bundle of fixed-line, mobile telephone and broadband Internet access; the e8 included fixed-line telephone and broadband Internet services; and the e6 bundled fixed-line and mobile telephone services. China Telecom provided their customers an option to enroll either in the e6, e8, or e9 bundle with a fixed monthly fee (also referred to as commitment to values); and each service plan specified the total calling time minutes and/or surfing time minutes. Customers were charged an additional fee on a per-minute basis if they exceeded the minutes allotted by their service plan. Customers with specific service plans had the option to include additional services offered by China Telecom, such as multimedia messaging, in their plan for an additional fee.

Sampling Procedures

We randomly selected a dataset of a provincial capital located in Eastern China from China Telecom’s “My e-Home” database for statistical analysis. This set was panel data. The sampling was conducted in three steps. The first batch of data was selected from July 15 to August 15, 2009, that is, all individuals who had enrolled in any of “My e-Home” bundles during this period of time were included in the sample. The key variables in this dataset then were age, gender, Resident Identification Card number (ID number), type of “My e-Home” bundles, discount rate (in percentage), product complementarity, relational investment (in Renminbi Yuan, RMB), bundle price (in RMB), actual monthly expenses (in RMB) and prior spending records (in RMB). The second batch of data was collected from August 16, 2009 to February 15, 2010; and the sampled customers remained the same as in the first batch. In addition to the same variables as in the first batch, customer loyalty was closely observed in the second batch of data. A sample of 43,038 customers was obtained after the first two-step procedure.

Finally, we cleaned up the data based on three criteria. First, this study removed all customers who had signed an annual service contract with China Telecom from the sample to rule out the influences of forced usage on customer loyalty. Second, this study eliminated all customers who had never enrolled in any stand-alone services offered by China Telecom prior to the sampling period from the sample to better observe the control variable prior spending records. Third, this study excluded all customers who had switched their bundle service plan within the “My e-Home” program from the sample to ensure that analysis was constrained at the brand level (e.g., China Telecom). A sample of 12,449 customers was finally obtained and ready for further analyses.

Measure of Variables

We defined customer loyalty as the duration of user-provider relationships. Adopted from Ranganathan *et al.* (2006) study, we assessed customer loyalty as a binary variable indicating if a customer continued with the company (referred to as 1) or had disconnected the service (referred to as 0).

We operationalized relational investment as the total money a customer spent monthly on “My e-Home” bundles, including the fixed monthly fee and any additional fee for overtime usage. It was measured by averaging the customer’s monthly expenses during the sampling period. Compared to past studies (Hoch and Deighton, 1989; Ranganathan *et al.*, 2006) which used the number of bundle products or services to assess relational investment, the current measurement has enhanced the research validity.

We defined price discount as the percentage of the bundle price discounted from a sum of original prices for each individual bundle component (Sheng *et al.*, 2007). This study generated a series of price discounts varying from 8 to 55%. It was treated as a continuous variable for further statistical analysis.

We operationalized product complementarity as the level of functional relatedness and dependence between bundle components (Sheng *et al.*, 2007). Treated as a categorical variable, product complementarity was varied from high, medium, to low based on the type of “My e-Home” bundles. Specifically, this study coded the e9 bundle as high complementarity, e8 as medium complementarity and e6 as low complementarity.

In addition, we controlled for age, gender, commitment to values and prior spending records in this study. Age and gender were found to affect customers’ attitudes (Okazaki, 2006) and loyalty (Ranganathan *et al.*, 2006) and recoded from the sample’s Resident ID number¹ for further statistical analyses. We defined commitment to values as the fixed monthly fee that a customer should pay based on the choice of a certain service plan. It was measured by how much money on average a customer should pay monthly for the service plan they chose during the sampling period.

The last control variable was prior spending records, which was referred to a customer’s expenses on telecommunication services prior to the sampling period. This study treated prior spending records as a control variable to rule out its impact on consumers’ current purchasing behavior (Vogel *et al.*, 2008). Specifically, prior spending records were measured by how much money on average a customer would spend monthly on telecommunication services in the six months (January 15 to July 14, 2009) prior to the sampling period.

Analysis Procedures

To test these hypotheses and the model, this study conducted hierarchical regression analyses in three steps. In the first step, we observed whether the interaction between price

¹Every Chinese citizen has a series of eighteen digits as their identification number (ID number). The first three digits represent location (province and city); the 4-6th digits show the district of the city; the 7th-14th digits indicate date of birth and the last four digits are the serial number

discount and product complementarity (also referred to as discount *complementarity) was statistically significant when customer loyalty was a dependent variable and price discount, product complementarity and discount *complementarity were factors. In the second step, we observed whether the interaction between price discount and product complementarity was statistically significant when relational investment was a dependent variable and price discount, product complementarity and discount *complementarity were factors. In the third step, we observed whether relational investment was statistically significant when loyalty was a dependent variable and price discount, product complementarity, discount* complementarity and relational investment were factors. The model would be confirmed as a moderated mediation model if the above three observations were significant (Baron and Kenny, 1986).

RESULTS

Among the sampled 12,449 customers, female customers (52%) were slightly greater than male customers (48%). The average age was 38.8 years old and over 80% of sampled customers were in the age bracket of 25 through 34 (29.4%), 35 through 44 (29.4%) and 45 through 54 (21.5%). The average duration of the user-provider relationships in our dataset was about 4.91 months and the average discount rate offered to the sample customers was 38%. In addition, on an average, customers spent US \$ 21.11 (RMB 143.76) per month on bundle services, which was about 19.99% higher than the fixed monthly fee they should have paid (averaging US \$ 17.62 [RMB 119.81]), indicating that on average, the sample customers used more minutes than their service plans allowed.

The Impact on Loyalty

Regression analysis 1 was conducted to examine the impact of price discount, product complementarity and discount *complementarity on customer loyalty. It consisted of four rounds of tests. The statistical models were reported as follows:

$$\text{Loyalty}_{ij} = \alpha_{11} * \text{age}_k + \alpha_{12} * \text{gender}_k + \alpha_{13} * h_j + \alpha_{14} * p_{\text{month}j} + \varepsilon^{1\alpha}_{ij} \quad (\text{Model 1})$$

$$\text{Loyalty}_{ij} = \alpha_{21} * \text{age}_k + \alpha_{22} * \text{gender}_k + \alpha_{23} * h_j + \alpha_{24} * p_{\text{month}j} + \alpha_{25} * \text{discount}_j + \varepsilon^{2\alpha}_{ij} \quad (\text{Model 2})$$

$$\text{Loyalty}_{ij} = \alpha_{31} * \text{age}_k + \alpha_{32} * \text{gender}_k + \alpha_{33} * h_j + \alpha_{34} * p_{\text{month}j} + \alpha_{35} * \text{discount}_j + \alpha_{36} * \text{complement}_j + \varepsilon^{3\alpha}_{ij} \quad (\text{Model 3})$$

$$\begin{aligned} \text{Loyalty}_{ij} = & \alpha_{41} * \text{age}_k + \alpha_{42} * \text{gender}_k + \alpha_{43} * h_j + \alpha_{44} * p_{\text{month}j} \\ & + \alpha_{45} * \text{discount}_j + \alpha_{46} * \text{complement}_j + \alpha_{47} * \text{discount}_j * \text{complement}_j + \varepsilon^{4\alpha}_{ij} \end{aligned} \quad (\text{Model 4})$$

First, this study ran the analysis controlling for age, gender, commitment to values and prior spending records. Results (Table 1) indicated that gender and commitment to values had a significant impact on customer loyalty. Specifically, this study found that women were more loyal than men ($b = 0.018, p < 0.05$, Model 1); the higher the commitment to values, the more loyal the customers ($b = 0.004, p < 0.01$, Model 1). Meanwhile, age ($b = -0.235, E-05, p = 0.704$, Model 1) and prior spending records ($b = 7.388, E-06, p = 0.624$; Model 1) were found to have no significant impact on customer loyalty. Second, this study included price

Table 1: Results of the first hierarchical regression analysis

Predictors (Independent variables)	Customer loyalty ³				Hypothesis ⁴	Results
	Model 1	Model 2	Model 3	Model 4		
Constant	5.449***	5.343***	4.960***	4.198***		
Age	-0.2.35E-05	-0.2.86E-05	-2.84E-05	-0.2.59E-05		
Gender	0.018*	0.018*	0.017*	0.012		
Prior spending records	7.39E-06	2.40E-06	2.54E-06	4.59E-07		
Commitment to values	0.004***	0.002**	-0.001***	0.001***		
Price discount	0.729***	0.976***	2.034***			
Product complementarity	0.365***	0.463***				
Discount *complementarity			-0.580***		H5b	Supported
R ²	0.03	0.06	0.073	0.195		
ΔR ²	0.03	0.03	0.012	0.122		
F	97.53***	159.70***	162.42***	430.86***		
ΔF	97.53***	396.00***	165.45***	1893.29***		

Note: *p<0.01; **p<0.05; ***p<0.001; ³R² = R Square, which indicates the proportion of the variability in the dependent variable which is accounted for by the regression model; ΔR² estimates the variance explained by the total effects of that variable. F = F value, the test statistic used to decide whether the model as a whole has statistically significant predictive capability; ΔF measures the significance of the change in R² at this step. Negative sign means the impact of independent variables on the dependent variable is negative; ⁴H5b = Hypothesis 5b

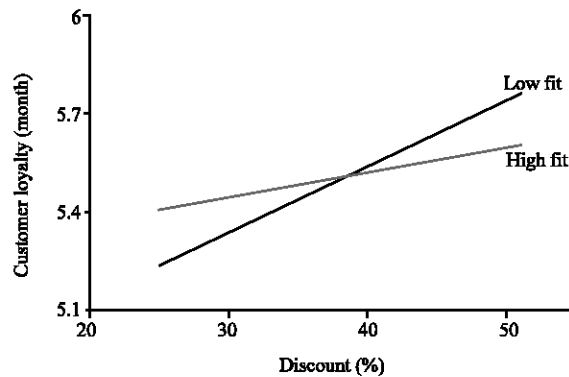


Fig. 2: The interaction effects of price discount and product complementarity on customer loyalty

discount in the model. Results (Table 1) revealed a significant positive impact of price discount on customer loyalty; the greater the bundle price discount, the more loyal the customers and vice versa ($b = 0.729, p < 0.001$, Model 2).

Third, this study included product complementarity in the model. Results (Table 1) showed that product complementarity had a positive impact on customer loyalty. That is, the more complementary the bundle components, the more loyal the customers and vice versa ($b = 0.365, p < 0.001$; Model 3). Finally, this study observed whether price discount and product complementarity had a joint impact on customer loyalty. Findings (Table 1) indicated significant interaction effects of price discount and product complementarity on customer loyalty ($b = -0.580, p < 0.001$; Model 4). As shown in Fig. 2, price discount had a greater impact on customer loyalty under the low-than under the high-complementarity condition. Thus, H5b was supported.

The Impact on Relational Investment

Regression analysis 2 was used to explore how price discount, product complementarity and discount * complementarity affected relational investment. It consisted of four rounds of test. The statistical models were reported as follows:

Table 2: Results of the second hierarchical regression analysis

Predictors (Independent variables)	Relational investment ⁵				Hypothesis ⁶	Results
	Model 1	Model 2	Model 3	Model 4		
Constant	-13.555	-41.357***	25.973*	-26.538*		
Age	0.012	0.01	0.01	0.01		
Gender	2.179	2.241	2.428	2.073		
Prior spending records	0.025***	0.024***	0.024***	0.024***		
Commitment to values	1.276***	0.906***	1.510***	1.606***		
Price discount		191.339***	147.986***	220.879***	H2	Supported
Product complementarity			64.085***	57.320***	H4a	Supported
Discount *complementarity				-39.971***	H5a	Supported
R ²	0.053	0.081	0.086	0.094		
ΔR ²	0.053	0.028	0.005	0.008		
F	174.233***	220.024***	196.194***	185.275***		
ΔF	174.233***	381.859***	70.868***	109.497***		

Note: * p<0.01; ** p<0.05; *** p<0.001; ⁵R² = R Square, which indicates the proportion of the variability in the dependent variable which is accounted for by the regression model; ΔR² estimates the variance explained by the total effects of that variable. F = F value, the test statistic used to decide whether the model as a whole has statistically significant predictive capability; ΔF measures the significance of the change in R² at this step. Negative sign means the impact of independent variables on the dependent variable is negative. ⁶H² = Hypothesis 2. H4a = Hypothesis 4a. H5a = Hypothesis 5a

$$Invest_{kj} = \beta_{11} * age_k + \beta_{12} * gender_k + \beta_{13} * h_j + \beta_{14} * p_{monthj} + \epsilon_{kj}^{16} \quad (\text{Model 1})$$

$$Invest_{kj} = \beta_{21} * age_k + \beta_{22} * gender_k + \beta_{23} * h_j + \beta_{24} * p_{monthj} + \beta_{25} * discount_j + \epsilon_{kj}^{26} \quad (\text{Model 2})$$

$$Invest_{kj} = \beta_{31} * age_k + \beta_{32} * gender_k + \beta_{33} * h_j + \beta_{34} * p_{monthj} + \beta_{35} * discount_j + \beta_{36} * complement_j + \epsilon_{kj}^{36} \quad (\text{Model 3})$$

$$Invest_{kj} = \beta_{41} * age_k + \beta_{42} * gender_k + \beta_{43} * h_j + \beta_{44} * p_{monthj} + \beta_{45} * discount_j + \beta_{46} * complement_j + \beta_{47} * discount_j * complement_j + \epsilon_{kj}^{46} \quad (\text{Model 4})$$

First, this study conducted the analysis controlling for age, gender, commitment to values and prior spending records. Results (Table 2) showed that prior spending records (b = 0.025, p<0.001; Model 1) and commitment to values (b = 1.276, p<0.001, Model 1) had a significant positive impact on personal investment; however, age (b = 0.012, p = 0.485; Model 1) and gender (b = 2.179, p = 0.357, Model 1) were found to have no significance. Second, this study included price discount in the model. Findings (Table 2) indicated that price discount had a positive impact on relational investment, that is, the greater the bundle price discount, the more money the customers would spend and vice versa (b = 191.339, p<0.001; Model 2). Hence, H2 was supported.

Third, this study included product complementarity in the model. Results (Table 2) revealed a significant positive impact of product complementarity on relational investment (b = 64.085, p<0.001; Model 3). Specifically, the more complementary the bundle components, the more money the customers would spend and vice versa. Hence, H4a was supported. Finally, this study observed whether price discount and product complementarity jointly affected relational investment. Results (Table 2) indicated significant interaction effects of price discount and product complementarity on relational investment (b = -39.971, p<0.001; Model 4). Specifically, as show in Fig. 3, price discount had a greater impact on relational investment when the individual bundle components were less complementary. Thus, H5a was supported.

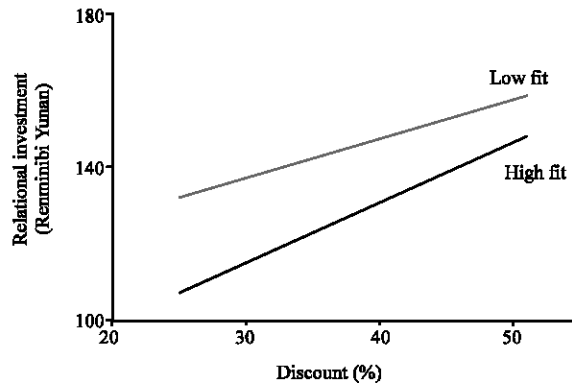


Fig. 3: The interaction effects of price discount and product complementarity on relational investment

Table 3: Results of the third hierarchical regression analysis

Predictors (Independent Variables)	Customer loyalty ⁷					Hypothesis ⁸	Results
	Model 1	Model 2	Model 3	Model 4	Model 5		
Constant	5.449***	5.343***	4.960***	4.198***	4.203***		
Age	-0.235E-05	-0.286E-05	-2.84E-05	-0.259E-05	-2.80E-05		
Gender	0.018*	0.018*	0.017*	0.012	0.012		
Prior spending records	7.39E-06	2.40E-06	2.54E-06	4.59E-07	-4.32E-06		
Commitment to values	0.004***	0.002**	-0.001***	0.001***	0		
Price discount		0.729***	0.976***	2.034***	1.989***		
Product complementarity			0.365***	0.463***	0.475***		
Discount *complementarity				-0.580***	-0.572***		
Relational investment					0.054***	H1	Supported
R ²	0.03	0.06	0.073	0.195	0.198		
ΔR ²	0.03	0.03	0.012	0.122	0.003		
F	97.53***	159.70***	162.42***	430.86***	383.443***		
ΔF	97.53***	396.00***	165.45***	1893.29***	41.669***		

Note: * p<0.01, ** p<0.05, *** p<0.001. ⁷R² = R Square, which indicates the proportion of the variability in the dependent variable which is accounted for by the regression model; ΔR² estimates the variance explained by the total effects of that variable. F = F value, the test statistic used to decide whether the model as a whole has statistically significant predictive capability; ΔF measures the significance of the change in R² at this step. Negative sign means the impact of independent variables on the dependent variable is negative, ⁸H1: Hypothesis 1

A Moderated Mediation Model

Regression analysis 3 aimed to identify the role of relational investment in the bundling-loyalty process. Controlling for age, gender, commitment to values and prior spending records, this study included price discount, product complementarity, discount *complementarity and relational investment in the analysis. It consisted of five rounds of tests, four among which were identical to those in regression analysis 1 and the fifth model included variable relational investment. The statistical model of the fifth round of test was reported as follows:

$$Loyalty_{kj} = \alpha_{s1} * age_k + \alpha_{s2} * gender_k + \alpha_{s3} * h_j + \alpha_{s4} * p_{monthj} + \alpha_{s5} * discount_j + \alpha_{s6} * complement_j + \alpha_{s7} * discount_j * complement_j + \alpha_{s8} * invest_k + \epsilon_{kj}^{5\alpha} \quad (Model 5)$$

Results (Table 3) showed a significant impact of relational investment on customer loyalty (b = 0.054, p<0.001; Model 5), that is, the more money a customer spent on service

Table 4: Results of mediated moderating effects

Predictors	Moderating effects			Hypothesis ^o	Results	Direct vs. indirect effects
	Direct effects on eoyalty	Direct effects on relational investment	of relational investment on loyalty			
Relational investment	0.054					
Price discount	1.989	220.879	11.927	H3	Supported	5.997
Product complementarity	0.475	57.32	3.095	H4b	Supported	6.516
Discount *complementarity	-0.572	-39.971	-2.158			3.773

^oH3 = Hypothesis 3. H4b = Hypothesis 4b

bundles, the more likely he/she would stay involved in the user-provider relationships and vice versa. Hence, H1 was supported.

Results also indicated that price discount and product complementarity had a significant interaction effect on customer loyalty (b = -0.572, p<0.001; Model 5, Table 3) and the Beta value of relational investment revealed a significant relationship as well (b = 0.054, Table 4). Along with the results of regression analyses 1 and 2, these findings suggested that the bundling-loyalty model was a mediated moderating model by which the interaction of variables (e.g., price discount and product complementarity) elicited an impact on the dependent variable (e.g., customer loyalty), however, the effects were partially transferred via the moderator (e.g., relational investment).

In addition, this study also examined the moderating effect of relational investment by listing all regression Beta-value (the first two columns in Table 4), computing the effects elicited by the mediator on the dependent variable via the moderator (see the third column in Table 4) and comparing the indirect to the direct effects (the sixth column in Table 4). Results (Table 4) showed that either price discount or product complementarity, or discount *complementarity elicited an indirect impact on customer loyalty via relational investment and the indirect impact was greater than the direct one. The findings suggested that relational investment played a strong mediating role in the process of how bundling attributes affected customer loyalty. Hence, H3 and H4b were supported.

CONCLUSION AND DISCUSSION

Based on the investment model (Rusbult, 1980, 1983), we propose an integrated model and test it with the consumer dataset provided by China Telecom. Findings confirm that it is a moderated mediation model in that either price discount or product complementarity elicits an indirect and positive impact on customer loyalty via relational investment. However, with higher levels of complementarity of bundle components, the effect of price discount on customer loyalty are attenuated.

The current study has extended the existing literature in several aspects. First, this study introduces relational investment (Rusbult, 1980) to the bundling-loyalty process, providing a fresh perspective to examine how bundling affect customer loyalty. In previous studies, relational investment was often treated as an independent variable and found to elicit an impact on dating behaviors (Rusbult, 1980, 1983, 1991; Rusbult *et al.*, 1986) or switching behaviors (Ranganathan *et al.*, 2006). Findings of this study concur with the aforementioned studies in that relational investment is found to positively affect users' staying in the relationship. Beyond this, this study has advanced the existing theory by proposing that when relational investment is applied to the bundling situation, it mediates the process of how price discount or product complementary influences customer loyalty.

Second, this study proposes that the effect of price discount on customer loyalty is elicited via two different routes, the direct versus the indirect. Past studies (Dodson *et al.*, 1978; Monroe and Petroshtius, 1981; Nieuwstraten, 2006; Ranganathan *et al.*, 2006; Sheng *et al.*, 2007) have argued that price discount has a direct impact on customer loyalty, that is, the greater the bundle price discount, the more loyal the customers would be. The results of the current study concur with this argument in that price discount elicits a positive impact on customer loyalty. In addition, by introducing relational investment to the process, this study finds that price discount also yields an indirect impact on customer loyalty via relational investment. More importantly, the indirect impact is found to be greater than the direct one, suggesting that greater bundle price discount encourages customers to spend more money on the bundle and thereby enhances their commitment to stay involved in the user-provider relationship.

Third, this study proposes that product complementarity negatively mediates the effect of price discount on customer loyalty. The findings of the current study are consistent with prior research (Bonini and Rumiati, 2002; Sheng *et al.*, 2007; Vogel *et al.*, 2008) in that product complementarity yields a positive impact on customer loyalty. However, unlike prior research (Bonini and Rumiati, 2002; Vogel *et al.*, 2008) which has investigated the role of product complementarity in bundling independently from price discount, the current study has advanced the literature by arguing that price discount and product complementarity jointly affect customer loyalty and the effect is elicited via relational investment. It is further proposed that price discount has a greater impact on customer loyalty when the bundle components are less complementary. The above arguments suggest that price discount is not always a means to enhance loyalty in bundling; one should integrate product complementarity and relational investment in the process to further execute the strategy.

Finally, this study employs a consumer dataset for hypothesis testing, which is believed to be an objective assessment of the impact of price discount, product complementary and relational investment on customer loyalty. Compared to other research methods, such as experiments (Sheng *et al.*, 2007), surveys (Janiszewski and Cunha, 2004) and interviews (Ferguson and Brohaugh, 2008) the use of actual consumer datasets provide relatively accurate results and enhance research validity (Seiders *et al.*, 2005). In addition, using the actual consumer datasets can better assess an integrated model, reflecting a dynamic process in which price discounts, product complementarity, relational investment and customer loyalty simultaneously interact with each other.

The current study has three major managerial implications for telecommunication marketers: First and essentially, telecommunication companies should provide their customers price discounts in bundling to maintain longer user-provider relationships. The current study suggests that the greater the bundle price discount, the more the customers would spend on the bundle and thereby enhance customer loyalty. It is further suggested that price discount should be the top priority for telecommunication companies to execute bundling strategies, because price discount is found to play a greater role than product complementarity in the bundling-loyalty process.

Second and alternatively, telecommunication corporations should offer their customers complementary bundle components, because it is found in the current study that the more complementary the bundle components, the more the customers would spend on the bundle and thereby enhance their loyalty to the company.

Third and most importantly, telecommunication companies should consider the dynamic relationship between price discount and product complementarity before allocating resources for bundling strategies. If the company is able to offer their customers highly complementary

bundle components, there is no necessity to rely heavily on price discount, because product complementarity attenuates the impact of price discount on customer loyalty. Alternatively, if the company is unable to provide their customers complementary bundle components, the company should offer greater price discounts to maintain longer user-provider relationships.

This study is subject to certain limitations. First, this study selects one of the datasets provided by China Telecom to test the model and the data may reveal common method variance, which might bias the results. Future research should adopt more powerful analytical procedures to avoid any biases. Second, this study uses the existing dataset provided by China Telecom; the lack of certain demographic variables (e.g., marital status) may bias the results. Future studies should incorporate more variables in the datasets to better understand the dynamic bundling-loyalty process.

Third, this study proposes the bundling-loyalty model based on the investment model; however, it includes only the dimension *investment size* and the results should be interpreted with caution. Future research should also focus on other dimensions (e.g., customer satisfaction, perceived quality of alternatives) to deepen the understanding of the effect of investment on maintaining user-provider relationships in bundling.

Finally, this study observes a dataset from one city provided by one single corporation and the results seem limited. In the future, we should expand the dataset to include various cities and telecommunication companies. In addition, this study focuses only on the telecommunication industry; findings might not generalizable to other industries. We should also expand the research to other industries (e.g., banking, fast food) in future studies.

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