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Wuhan International Conference on e-Business

5-26-2012

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Recommended Citation

Peng, Jianping; Zhang, Shaoling; Quan, Jing; and Wei, Zenghui, "Effectiveness of Mobile Phone Customer Retention Strategies" (2012). Eleventh Wuhan International Conference on e-Business. 63. https://aisel.aisnet.org/whiceb2011/63

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Effectiveness of Mobile Phone Customer Retention Strategies

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Abstract: Using the 419,194 customers of a mobile operator as the sample, this research investigates the effectiveness of the company's retention strategies. It examines the effect of such strategies on extending customer life cycle. We find that the retention policies and the incremental average revenue per user (ARPU) in the retention period over the month prior are positively correlated. In addition, the correlation between the retention policies and the increments of consumer consumption variables, such as the number of calls, the number of short messages and the value-added services, are also positive. Moreover, the significantly positive interaction terms between the retention bonus and the consumption increments suggest that the bonus affects the relative ARPU through the consumption variables. Finally, the retention strategies demonstrate the different effectiveness according to the three different calling plans. The managerial implications of our findings are discussed.

Key words: customer retention, customer relationship, customer life cycle

1. INTRODUCTION

As the landscape for the mobile phone industry becomes increasingly competitive, the mobile operators have escalated their effort to retain existing customers and competition for new customers. The expected pressure forces the operators to not only develop new markets but also need to pay more attention to keeping the existing customers. How to strive to improve customer loyalty and customer value is a key factor for the sustainable growth [1][13].

The current stubbornly high churn rate in the mobile communications has increasingly become a major bottleneck for the healthy growth of a mobile operator and its further expansion. Although the huge user base, the ARPU (Average Revenue Per User) is relatively low for the 2G customers. With the 3G service still in the phase of net investment and negative profit, the 2G networks constitute the main business source of profit. As large-scale customers move in and out of the networks each month, the firm performance fluctuates greatly. How to effectively extend the life cycle of customers and enhance customer value is the major issue facing the mobile operators.

Affected by a variety of factors, customer satisfaction in the service sector is difficult to assess ^[5]. So, operators are most willing to use the increase of switching cost to retain customer. To Increase customer switching costs is to increase the threshold of leaving and the stickiness of the network, so that customer cannot easily choose to leave ^[2]. Customer loyalty program point system is a typical example. And discounts for long time customers and bonus minutes with recharging are other common retention activities ^[7].

In recent years, extensive research has been done in the areas of customer retention strategies in the service sector, particularly in the telecommunications industry [12]. Most of the studies focus on the attributes of the churn customers, investigate the factors causing them to leave, and make policy recommendations accordingly. This research adopts a new approach by identifying early warning signs of the potential loss of existing customers and focusing customer behavior after the customers receive incentives to remain in the network. It investigates the effectiveness of the retention policies in the mobile industry. The findings can be

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used by the mobile phone companies to design effective customer retention strategies to better service their customers and maintain more stable profitability.

The remainder of the paper is organized as follows. The literature review is presented next, followed by the discussion of the company's case, research design and data. Model estimation and discussion of the results are given afterward. Finally, conclusion remarks are presented.

2. LITERATURE REVIEW

How to maintain customer relationships is the current major common concern of firms. Based on the classification of the 87 papers on customer relationship management (CRM) in 24 journals published through 2000 to 2006, Ngai (2009) establishes four dimensions of customer relationship management: customer identification, customer attraction, customer retention, and customer development [12]. He also proposes data mining based CRM classification structure that helps firms better manage customer relationships through various mining tools and techniques.

In the area of mobile customer relationship management research, Chuang (2011) uses a logit model to explore the factors affecting the Taiwan Mobile user's preferences, usage and turnover. He finds that the promotions used by new operators enable mobile users to remain in the existing networks ^[4]. Similarly, using binomial logistic regression, Keramati and Ardabili (2011) investigate the effects of variables such as customer's dissatisfaction, their amount of service usage and certain demographic characteristics on their decision to remain or churn ^[8]. When the service satisfaction and switching costs do not have significant impact on users, the user preferences are the determining factor for users to choose the current carrier. Kettinger (2009) discovers that in the leisure social network the service quality of information systems (IS) is directly related to the reuse of the services and stresses the prediction role of service quality for reuse behavior ^[9]. Kim (2010) discusses the relationships between corporate image, plan awareness, service prices, service quality, customer service and support, and customer loyalty and explores the main drivers for establishing and maintaining customer loyalty for mobile service operators ^[10]. The study finds that corporate image, plan awareness, and service prices and quality are closely correlated with customer loyalty in South Korea's mobile phone market.

By establishing a dynamic model of customer relationship lifecycle, Chen (2001) shows the interrelationships of the four key factors of customer value, customer satisfaction, customer trust and switching cost with customer retention in the different phases of the lifecycle [11]. Cai, al et. (2005) propose the sales funnel model for customer identification and retention [14]. Sun (2008) establishes the evaluation system for measuring customer relationship strength [16]. Xu al et. (2010) use fuzzy Bayesian network model to better predict the probability of the loss of customers in the case of fuzzy information [3]. Wong (2011) finds that mobile customers subscribing to the wrong rate plans are churning faster than those with optimal ones [15].

Eshghi (2007) suggests that contrary to the industry practice of 'locking in' customers wireless service providers are better off improving customer satisfaction than minimizing customer churn rate [6].

However, little research has been done to evaluate effectiveness of a particular promotion policy for retaining customers. In reality, an effective implementation of customer relationship management policy is a process, and the final effect of this process is reflected in whether the desired results can be achieved. In general, in order to extend the customer life cycle companies will introduce the policies for persuading customers to stay and the effectiveness of these policies is the basis for the next policy-making. This research studies the effectiveness of the customer retention promotions of a provincial mobile phone operator XYZ for its 414,733 customers in three different calling plans.

3. XYZ COMPANY

XYZ provides 2G, 3G mobile and fixed data services. The 2G business has been developed for many years with a strong user base. It is the leader in terms of user size and income scale. From the data about XYZ user size in 2011, the user size in 2G service occupied 70.54% share of the user base, while the rest 13.66% and 15.80% were shared by 3G service and fixed data service respectively. Therefore, the scope of the study is limited to the 2G business.

XYZ offers three main different calling plans, namely A, B, and C. The designs of the three plans are different. Calling plan A targets mainly the local customers with cheapest local call charges but highest roaming charges. Plan C focuses more on travelers who frequently go out of the coverage area with higher local call rates than the plan A, but the roaming charges and local rates remaining the same. Plan B is designed primarily for the campuses with relatively cheap short message service (SMS) charges and the call charges being between A and C.

The users of the three plans are the prepaid intelligent network users. They pay to charge the SIM card first, and then calling expenses are deducted real-time. Because they do not provide any credit information initially, the billing and charge information are done in real time by intelligent network system and there is no monthly statement. As a result, there is no possibility for arrears. The problem is that because no specific user's personal attribute data is made available, the company cannot conduct research on the relationships between personal characteristics and behavior.

To maintain customer relationships and the churn rate, an early warning model can be built to identify the high-risk customers. And then, retention policies can target these customers to deter their intention of leaving. We used data to draw the chart about the fluctuation of customers ARPU value before and after the retention period. The chart showed the obvious differences before and after the retention promotion based on the two types of possible customer churns for the past three years. It showed clearly that before the retention promotion the monthly ARPU value had been stable first before started the gradual decline. This is in line with customer life cycle theory. When the early-warning model detected that a customer gradually entered the decline, the company took action to retain the customer. The ARPU of the customers who accepted the promotion rebounded somewhat and after a certain period then started again the decline phase. For those who refused to accept the retention offer, the ARPU decreased rapidly, entering the decline phase. If no other external factors are in play, the customers were bound to leave the network termination within a certain period.

Therefore, the users who were given the promotion actually extend their stay in the network, but those who were not given the corresponding promotion quickly left. Meanwhile, there was no distinct difference in the monthly ARPU value between these two types of customers before and after the retention period. So the effectiveness of company's retention strategy is very important to help the company to develop more rational promotions in the future.

4. RESEARCH DESIGN

The key to the effectiveness of a particular retention policy is whether the introduction of such a bonus increases customer ARPU or not. Accordingly, we define dependent variable as the relative ARPU (rARPU) before and after the retention incentive is taken. Specifically, it is the ratio of ARPU of the period of retention is place to that of a month prior. A positive rARPU implies that the customers increase their consumption of the network. Obviously, this will have a positive impact on the performance of the operator. A negative rARPU, however, will have an opposite effect on the performance.

$$rARPU = \frac{ARPU \text{ during the retention} - ARPU \text{ in prior month}}{ARPU \text{ in prior month}}$$

The independent variables are the increments of the number of monthly phone calls (x_1) , the number of short messages (x_2) , value-added services (x_3) , and monthly fee (x_4) of the retention period over the prior month. According to Keramati and Ardabili (2011), the amount of service usage is one of the most influential factors for customer's decision to churn [8]. In addition, we also include the retention amount taken by the customer (z), and the total number of months when the customer in the network (w). Assuming a linear relationship between the dependent variable and independent variables, we express the model as follows:

$$rARPU = \alpha + \sum_{i=1}^{n} \beta_{i}x_{i} + \gamma z + \rho w + \epsilon \qquad (1)$$

Because these variables have a wide range of values and use different units, we standardize them first before the regression analysis.

Since no attribute data of customers is available on the intelligent network, the company determines its retention strategy mainly based on the usage and communication behavior of the customers. The most commonly used method is to offer cash for calling minute to increase the switching cost. Hence, it is important to analyze the effect of the bonus prior to and during the retention period on consumer behavior. For this, we include the interactions between the average bonus and the increments of the number of phone calls, text messages, and value-added services. The extended model is shown below.

$$y = \alpha + \sum_{i=1}^{4} \beta_i x_i + \gamma z + \sum_{i=1}^{3} \delta_i z x_i + \varepsilon$$
 (2)

5. DATA

Taking into account the time span retention policy being valid for three to six months (maximum up to 10 months), we collected the data from XYZ Company from July 2009 to June 2006. As the retention activity is ongoing, it is possible that not long after the expiration of a retention period, another becomes effective. To effectively assess the impact of the policies in one retention period on customer value, the customers repeatedly participated in retentions needed to be removed. This ensures that the impact on the value of customers is affected only by one time retention participation. We define the monitoring periods before and after the retention policy to be three months. Meanwhile, to obtain more complete data, the cutoff for our data set is January 2011. The eligible data points were the 2G intelligent network customers who took part in one and only one retention activity in July 2009 to June 2010. The latest expiration of retention activities was October 2010.

Based on the definition for data collection above, we obtained an effective sample of 419,194, after removing the abnormal and incomplete data.

r							
Brand	Users Number	Average time span in net	One mont	h before retention	Effective retention period		
			ARPU	Bonus Percentage	ARPU	Bonus Percentage	
A	95800	12.41	69.36	0.79%	68.18	7.76%	
В	31720	14.42	64.02	0.81%	61.10	9.93%	
С	287213	15.90	44.91	1.04%	43.58	11.79%	

Table 1. The descriptive statistics of the sample data

We used SPSS to standardize the data set and to perform correlation analysis. The results are reported in Table 2. Recall that in this study the dependent variable (y) is the relative increment of ARPU and dependent variables are the relative increments of the number of calls (x1), short messages (x2), value-added services (x3), and monthly payment (x4), the retention bonus (z), and the duration of customers remained in the network (w). The correlation matrix in Table 2 shows the significantly positive correlation between y and the six dependent variables.

	у	x1	x2	x3	x4	Z	w
у	1	-	-	-	-	-	-
x1	.295(**)	1	-	-	-	-	-
x2	.148(**)	.098(**)	1	-	-	-	-
x3	.158(**)	032(**)	.098(**)	1	-	-	-
x4	.079(**)	142(**)	050(**)	.056(**)	1	-	-
Z	.075(**)	.047(**)	.029(**)	.089(**)	.004(**)	1	-
W	.028(**)	.023(**)	.006(**)	.016(**)	087(**)	.044(**)	1

Table 2. The correlations of variables

6. MODEL ESTIMATION

We use SPSS to estimate model 1 after standardizing the variables. The results are reported in Table 3 below.

	Descriptive statistics of sample		Brand A		Brand B		Brand C		
	Mean	Std. Deviation	Std. Beta	VIF	Std. Beta	VIF	Std. Beta	VIF	
# of phone calls	-140.118	2,181.212	0.501*	1.058	0.147*	1.004	0.325*	1.078	
# of SMs	-44.041	703.064	0.137*	1.070	0.091*	1.025	0.119*	1.014	
Value-added service	-28.245	788.314	0.168*	1.049	0.088*	1.024	0.169*	1.036	
Monthly fee	173.642	701.466	0.297*	1.038	0.009	1.003	0.109*	1.064	
Retention bonus	622.507	627.266	0.036*	1.010	0.021*	1.003	0.045*	1.017	
Customer tenure	15.029	11.746	0.017*	1.032	0.004	1.006	0.020*	1.009	
\mathbb{R}^2	-		0.413		0.042		0.147		
Adj R ²	-	-		0.413		0.042		0.147	
F	-		11215.150*		234.204*		8245.725*		
Sample size	414733		95800 31720		287213				

Table 3. Regression Results

The results in Table 3 show that the same retention policy has various impacts on rARPU of the customers of the three plans. In addition, their explanation power on the overall model also has large discrepancies. The company's policy has the largest impact on plan C (0.045), followed by Plan A (0.036), and Plan B (0.021). In terms of the goodness of fit, Model A has the largest adjusted R2 (0.413), followed Model C (0.147) and Model B (0.042). Overall, the retention policy worked the best for the customers of Plans A and C. We next examine whether the retention effort has any different effect on the two plans. To do this, we define two dummy variables A and C, where A = 1, if Plan A = 0, otherwise; and C = 1, if Plan C = 0, otherwise. The estimation results are reported in Table 4.

^{**}Significant(2-tailed) at the 1% level

^{*}Significant at the 1% level.

	Model 1	Model 1		Model 2		
Variables(Coefficients)	Std. Coefficients VIF		Std. Coefficients	VIF		
# of phone calls	0.306*	1.035	0.303*	1.033		
# of SMs	0.108*	1.049	0.110*	1.023		
Value-added service	0.120*	1.039	0.145*	1.023		
Monthly fee	0.169*	1.050	0.124*	1.037		
Retention bonus	0.026*	1.007	0.042*	1.016		
Customer tenure	0.010*	1.030	0.025*	1.022		
A	0.006**	1.024	-	-		
С	-	-	0.022*	1.022		
\mathbb{R}^2	0.16	0.16		0.143		
Adj R ²	0.16	0.16		0.143		
F	3483.811*	3483.811*		7067.352*		
Sample size	127520	127520		414733		
1.01 1.01 1.1						

Table 4. The results of regression by entering control variables

Table 4 shows that Plan A is different for Plan B and C, and Plan C is different from Plans A and B. This demonstrates that the retention policy has various effects on the customers in the different calling plans.

To understand the effects of the retention policy on the consumer behavior, we use SPSS to estimate Model 2 and the results are given in Table 5.

	Brand A		Brand B Brand C				
Variables(coefficients)	Std. Coefficient	VIF	Std. Coefficient	VIF	Std. Coefficient	VIF	
# of phone calls	0.501*	1.059	0.154*	1.650	0.324*	1.082	
# of SMs	0.137*	1.070	0.088*	1.521	0.119*	1.014	
Value-added service	0.168*	1.057	0.084*	1.522	0.169*	1.038	
Monthly fee	0.297*	1.039	0.009	1.003	0.108*	1.065	
Retention bonus	0.035*	1.055	0.020*	1.053	0.048*	1.069	
Customer tenure	0.017*	1.032	0.004	1.007	0.020*	1.009	
Bonus*phone calls	-0.007	1.123	-0.011	1.703	0.013*	1.268	
Bonus*SM	0.004	1.117	0.006	1.563	0.008*	1.014	
Bonus*value added	-0.003	1.075	0.008	1.553	0.011*	1.232	
\mathbb{R}^2	0.413	0.413		0.043		0.147	
Adj R ²	0.413		0.042		0.147		
F	7478.364*		156.659		5507.644*		
Sample size	95800		31720		287213		

Table 5. The results of regressing by entering interactive items

Table 5 shows that for plan C the interactions of the retention bonus with the increments of phone calls, short messages and value added services have positive effects on rARPU. Moreover, the bonus has the largest effect on the relative ARPU through the increment of the number of phone calls, and smallest effect through the increment of the number of short messages.

7. DISCUSSION

The regression analysis shows that the company's retention policies had an impact on consumption behavior of the customers with the warning signs of leaving by altering the customer lifetime value. Had the company not had the corresponding policy in place, the departure of the customers would have resulted

^{*}Significant at the 1% level.

^{**}Significant at the 5% level.

^{*}Significant at the 1% level

in the loss of revenue. This can be seen directly from Figure 2 that shows that customers who did not participate in the retention activities had quickly left the network. Thus, the current retention policy was effective.

However, the effect of the company policies was different for the three calling plans. It was the most effective for the customers with calling plan A, followed by calling plan C, while the regression model had virtually no explanation power for calling plan B, indicating that the policies offered little effect for the customers. Therefore, to make retention polices more effective for extending the customer lifecycle, mobile operators should design different bonus systems based on the different calling plans.

The divergence of the explanation power of the regression models on the three calling plans can be attributed to the special features of each plan. Because the customers of calling plan A primarily reside locally, their behaviors were relatively stable. Such stability could be best explained by the linear regression model. Calling plan B were mainly for campus markets with young students. Their consumption behaviors were greatly affected by student's unique traits and habits. Because their consumption level was more difficult to predict, the explanation power of the model was very weak accordingly. Calling plan C was designed for the type of customers somewhere in between. The customers often traveled outside their calling region and their level of consumption, affected by the roaming charges and a variety of other social factors, exhibited various patterns of fluctuations. This led to the weaker explanation power of the model than that of calling plan A.

The retention policies significantly affected customers' consumption behaviors both during the after the valid retention period. When customers entered the retention period, their consumption level would be higher than that in the month prior. This was the retention bonus led behavior change. It was obvious that if the customer did not use up the bonus value, it would a "waste" for the customer. When the retention period was over, customer's consumption level, with a certain lag effect, usually did not immediately appear significantly weakened. The spending habits established during the retention would be maintained for some time. This implied that the retention polices still exerted certain influence on ARPU after the retention period expired.

In customer retention, the amount of bonus played a very important role. The more a customer prepaid, more bonus were given. As a result, the customer would naturally consume more. This shows that the retention bonus had a significant positive influence on the relative ARPU incremental. However, the monthly grants were usually controlled at relatively low levels, and always lower than the customer's normal consumption levels. This explains why the standard coefficients (0.020 for Calling Plan B, 0.035 for A, and 0.048 for C) of the retention bonus in the regression models were relatively small.

How to determine the duration and amount of retention bonuses for different calling plans is worthy of further in-depth study. Although increasing the amount and duration would increase the switching cost for customers, it would also result in weakened customer perception of the retention policies and weakened power of the policies for attracting new customers. This would make retention fail to achieve desired results. Moreover, increasing the amount of monthly grants would increase operational cost and develop a customer's dependence on grants, resulting in a decline in company's cash flow.

Based on the above discussion, we believe that a dynamic model is needed to investigate the relationships between calling plans and the retention bonuses, which is the key to the effectiveness of any retention policy. How to design the retention system to retain customers, develop customer loyalty, and obtain maximum profit with a small increase of the cost is a challenging problem facing mobile operators in the current competitive environment. It is also an interesting future research direction for us to pursue.

8. CONCLUSION

Using the 419,194 customers of a mobile operator as the sample, this research constructs the econometric

models to investigate the effectiveness of the company's retention strategies. We find that such strategies have certain effects on extending customer life cycle. Use the relative ARPU, defined as the incremental ARPU in the retention period over the month prior, as the indicator of customer value, and we find that the retention policies are positively correlated with the customer value. In addition, the correlations between the retention polices and the increments of consumer consumption variables, such as the number of calls, the number of short messages and the value-added services, are also found significant and positive. Moreover, the interaction terms between the retention bonus and the consumption increments are significantly positive, suggesting that the bonus affects the relative ARPU through the consumption variables. Finally, the effectiveness of the retention strategies is different for the three different calling plans. This suggests that mobile operators should design their retention policies according to their calling plans to increase the retention effectiveness.

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