Original Article

Getting what you paid for: Fighting wireless customer churn with rate plan optimization

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ABSTRACT The wireless telecommunication industry is highly competitive and managing customer churn is of great concern to wireless carriers as the market matures. Recent research has indicated that wireless rate plans are complicated and confusing to customers, and that wireless carriers are taking advantage of the situation by charging a very expensive per-minute rate for voice minutes beyond the monthly usage allowance. This article revisits an emerging database marketing strategy known as rate plan optimization and explores the importance of having customers on suitable rate plans. After conducting research on 11 525 residential customers from a Canadian wireless carrier, it is discovered that 55.4 per cent of them are subscribing to the wrong rate plans and these customers are churning faster than those with optimal ones. This article argues that proactively matching customers to optimal rate plans can contribute to customer churn reduction, although short-term profitability has to be sacrificed by the carriers in order to realize these benefits.

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INTRODUCTION

Customer churn is a significant issue faced by carriers in the wireless market. The annual churn rate ranges from 30 per cent to 40 per cent for carriers around the world.[1–3] In the USA, it has been estimated that churn rate for American wireless carriers reach as high as 57 per cent, costing the industry US$19 billion a year.[4] Since acquiring a new customer can be 5–10 times more expensive than retaining an existing one,[5] and that acquisition cost has skyrocketed to over US$300 per customer,[6,7] churn management has become an important topic for the wireless carriers around the globe as they shift their focus from acquiring new customers to retain existing ones in the maturing market.[8]

This article proposes that rate plan optimization, the action of switching customer to use financially optimized rate plan, can be a viable customer retention strategy for wireless carriers. Although previous research has contributed to our knowledge by identifying churn determinants and their relationship to customer loyalty, satisfaction and retention in the wireless industry,[1,3,8–13] and that research has also been conducted to model consumer's reaction to price adjustment of telecommunications services,[14] the idea of using rate plan optimization as a retention strategy is still a new concept to many wireless carriers. In their study of the Korean wireless market, Joo et al[15] have revealed that an alarming 40 per cent of customers are subscribing to non-optimal rate plans and suggested moving some of these customers to optimal ones for retention purpose. Subsequently, Wong[16] has found that approximately 46 per cent of the Canadian wireless customers are also using inappropraite rate plans. This article aims to confirm previous findings in this area using a larger data set and also investigate the impact of rate plan suitability on customer churn rate and lifetime value.

LITERATURE REVIEW

In Canada, wireless customers are finding various rate plans confusing and hard to compare.[17] Rate plans are being revised regularly and often without notice to customers, whereas the wireless carriers are taking advantage of the situation by charging a very expensive per-minute rate for voice minutes beyond the monthly usage allowance.[18] Complicated pricing schemes, together with customers' inability to predict their usage requirements, are the major causes for inappropriate rate plan subscriptions.[15] As noted by Gerpott et al,[13] one of the top two factors that affects customer retention is their assessment of the service pricing; customers have to believe that the prices charged are 'fair and good' or they will churn.[12] This proposition is further confirmed by Kim et al[1] who suggest that dissatisfaction regarding pricing remains important in influencing customers' switching intention. Lee et al[3] argue that wireless carriers should analyze their customers' changes in usage patterns, and provide them with special incentives as a way to increase their satisfaction and loyalty. All of these studies suggest that wireless carriers should focus not only on price setting, but also on matching appropriate rate plans to their customers, which is the core idea behind this study.

Prior literature has pointed out that wireless carriers need to ensure their customers have trust in them, as trust has been identified as one of the key contributing factor of customer loyalty.[19–22] The positive attitude engendered by trust is important for wireless customers to remain with the company to make future purchases.[11] The practice of matching customers to the financially optimal rate plans has not been widely used by wireless carriers as a customer retention strategy because conceptually it involves reduction of short-term profitability. Brewin[23] has suggested that up to 50 per cent of wireless carriers' revenue is contributed by overages and underages. As a result, this article will also investigate to what extent customer's lifetime value is affected by matching customers to the optimal plans.

RATE PLAN SUITABILITY

Canadian wireless carriers offer a wide range of rate plan options at different price points. The majority of these plans belong to the 'bucket' type in which a specific amount of voice call allowance is included in each plan per month. An overage fee will be charged if a customer talks too much and exceeds the monthly limit. Heavy talkers will be overpaying if they subscribe to low-end plans that

include too little minutes. On the other hand, low-usage callers will be overpaying if they subscribe to high-end plans. This is because any unused minutes will not be refunded if they are not consumed by the end of the monthly billing cycle.

In this research, rate plan suitability is determined through a series of steps. The first step involves a comparison of all publicly available rate plans that are offered by the wireless carrier. Through studying of the rate plan specifications, the best range of minute usage for each plan is identified. A customer's actual wireless usage is checked to see if it falls within the plan's optimal range of usage, which results in the lowest monthly expense. If the wireless usage falls outside the optimal range, this customer could have saved money by switching to another rate plan that better fits with his or her wireless needs. As new rate plans are launched by the wireless carrier from time to time, some customers may choose to upgrade or downgrade their plans during the study period. To take into consideration of these changes, the evaluation of rate plan suitability is hence repeated monthly during the 44-month study period. A wireless subscriber is said to be using an optimal plan if he or she has been using an optimal rate plan more than 50 per cent of the time. Otherwise, this customer is being categorized into the non-optimal group. This evaluation process helps to give an overall picture on customer's ability in choosing a financially optimal rate plan.

RESEARCH METHODOLOGY AND HYPOTHESES

Customer retention in the service industry is considered as the key factor to drive a company's superior business performance.[24,25] The focus on customer retention is especially important in the wireless telecommunication industry. This is because customer acquisition cost is very high owing to heavy subsidisation on handset

and aggressive multi-channel marketing programs.[15,12] With customer acquisition cost reaching over US$300 and average monthly revenue of about US$60, Canadian wireless carriers can only realize profits after serving their customers for at least half a year; therefore customer retention is important for them.[6,26] As Gerpott et al[13] argue, the long-term relationship between the wireless carriers and their customers are of greater importance to their success than they are in other service industries. Since we are interested in understanding the importance of rate plan suitability on customer churn, the first hypothesis of this research study is proposed as follows:

Hypothesis 1: Rate plan suitability has significant effect on customer churn.

In order to have a better understanding of the effect of rate plan suitability on customer churn, it is checked in the presence of other factors, such as customer's age, residing location, and the amount of value-added service consumed using the logistic regression function in SPSS 17 (see Figure 1). The use of logistic regression to predict churn is suitable because this dependent variable is dichotomous (churned/not-churned) and the predictor variables are made up of both continuous and categorical ones. A series of T-test will also be carried out to help industry
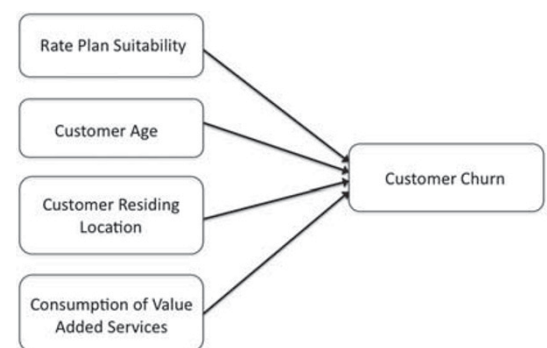
Figure 1: Conceptual framework.

practitioners to understand the characteristics of churned customers.

The second part of this article explores the concept of customer lifetime value (CLTV). Basically, it is the total amount of net profit that a customer contributes to the company during his or her tenure with the company as an active customer.[27,28] As Jain and Singh[29] have pointed out, there are several definitions of CLTV and that all of them have limitations. They suggest that CLTV models can be more robust, simple and easy to understand. For this research study, elements such as customer acquisition costs, service costs, retention costs and discount rate are not included in the calculation of CLTV because these cost information could not be provided by the said wireless carrier. As a result, CLTV in this study is basically the total sum of all monthly revenue that a customer pays to the wireless carrier during the 44-month study period.

In the wireless telecommunication industry, the focus on CLTV is important. This is because a high-paying customer may not be financially beneficial to the wireless carrier if he or she only stays for a few months and then churns to another carrier. Considering the handset subsidies and other promotional incentives that are offered to attract new customers, wireless carriers can no longer have a short-term focus and need to deploy a long-term view when analyzing the financial performance of their customer segments.

As explained earlier in this article, customers belonging to the optimal rate plan group are those who have been able to minimize their monthly wireless expenditure by using suitable rate plans most of the time. Hence, they are likely to achieve a lower CLTV than those of the non-optimal customers who are overpaying for their service. To the wireless carrier, the questions become: (i) to what degree is the revenue difference observed between these two groups; and (ii) is it willing to accept short-term financial loss in exchange of long-term financial gain caused by improvement of customer loyalty? To shed some lights on these questions, the second hypothesis is developed:

Hypothesis 2: Customer lifetime value is different between customers who are using optimal and non-optimal rate plans.

This hypothesis is checked visually using boxplot and then examined using T-test statistical procedure in SPSS.

CHARACTERISTIC OF DATA

A total of 11525 post-paid wireless customers was selected for this research. All of them activated their services in May 2002 and belonged to the consumer market segment. They were using wireless rate plans with similar calling features and value-added services such as WAP browsing and multimedia messaging service. Their historical usage and payment records up to December 2005 were extracted from the wireless carrier's data warehouse for analysis.

The Canadian wireless carrier that provides data for this research study is a national player that provides pre-paid, post-paid and specialized business wireless services. Over 80 per cent of its customers are on post-paid services; this segment is actually made up of three sub-segments, namely residential, small-to-medium sized businesses (SMB) and the corporate. This research study is designed to exclude the SMB and corporate segments as the author believes that the inclusion of these business segments may contaminate the overall cause-and-effect relationship between rate plan suitability and customer retention levels. This is because business customers are not personally responsible for the payment of their wireless service as they can reimburse the service fees with their employers. This research also excludes any customized rate plans as they are not
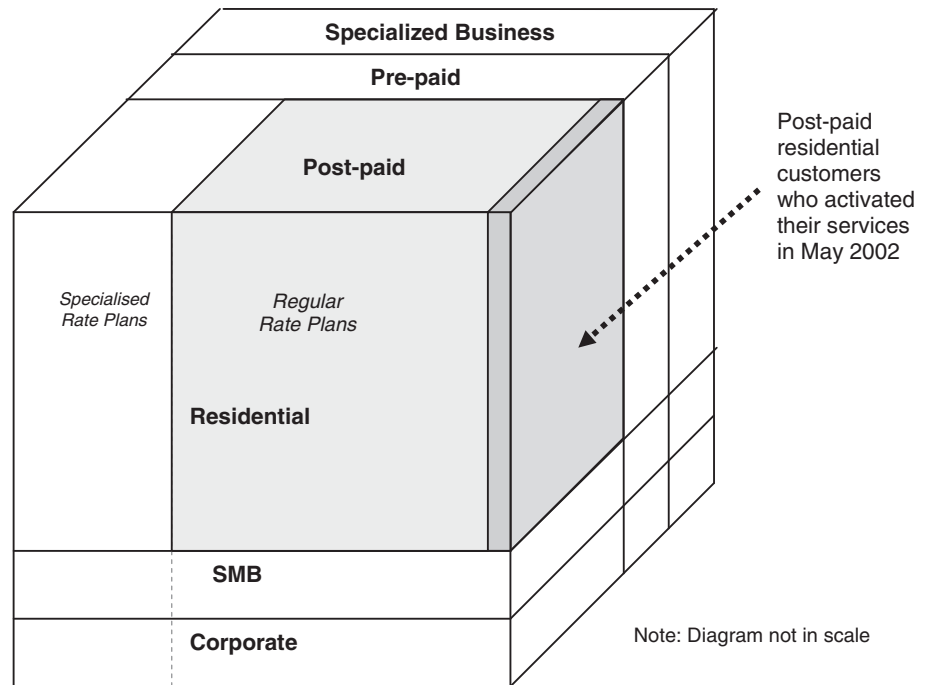
Figure 2: The selected wireless customer segment.
Source: Developed for this study.

directly comparable. Figure 2 illustrates the targeted segment within the wireless customer population that is selected for analysis in this research study.

DATA ANALYSIS AND RESULTS

Descriptive statistics
Out of the total population of 11 525 Canadian wireless customers who are being studied, it is found that 55.4 per cent of the customers are subscribing to non–optimal rate plans. These findings are slightly higher than the previous findings of 40 per cent and 46 per cent for the Korean and Canadian wireless markets, respectively.[15,16] Other descriptive statistics are summarized in Table 1.

Rate plan suitability on churn
As explained earlier, customer churn is an issue faced by companies in service industries, especially those in the wireless industry where competition is fierce,

acquisition costs are high and service offerings are similar.[12,14,30] Hypothesis 1 is tested to provide insight into the effect of rate plan suitability on customer churn, in the presence of other demographic variables. Through the use of logistic regression (see Table 2), it is found that customers who are using non–optimal rate plans is 1.150 times ($P < 0.05$) more likely to churn than those with optimal rate plans. As shown from Table 3, this prediction model has an overall success rate of 58.3 per cent.

The logistic regression also reveals that customers tend to churn less ($\mathrm{Exp}(B) = 0.983$) as they grow older. It has also been shown that customers who are residing in Eastern Canada churn 1.392 times more than those residing in Western Canada. The effect of consumption of value added service on churn is almost irrelevant as its $\mathrm{Exp}(B)$ is only 1.01. These results are statistically significant at the $P < 0.001$ level.

Table 1: Summary of descriptive statistics

Variables	Description	Frequency
Rate plan suitability	Financially optimal	5136 (44.6%)
	Financially non-optimal	6389 (55.4%)
Churn status	Not yet churned	6294 (54.6%)
	Churned	5231 (45.4%)
Customer residing location	Western Canada	6746 (58.5%)
	Eastern Canada	4779 (41.5%)

Variables	Mean	Standard deviation
Customer tenure	33.50 months	12.49 months
Customer age	43.11 years old	14.31 years old
Average monthly out-of-bucket usage	133.62 min	251.79 min
Average monthly value added service charges	$6.10	$8.43

Table 2: Logistic regression result

	B	SE	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B)	
							Lower	Upper
Customer age	−0.017	0.001	136.182	1	0.000	0.983	0.980	0.986
Customer residing location	0.331	0.040	69.648	1	0.000	1.392	1.288	1.504
Consumption of value added service	0.012	0.002	23.044	1	0.000	1.012	1.007	1.017
Rate plan suitability	0.140	0.043	10.337	1	0.001	1.150	1.056	1.252
Constant	0.250	0.078	10.377	1	0.001	1.284	—	—

Table 3: Classification table – Success rate

Observed		Predicted		
		Account status		Percentage correct
		Active (not churned)	Churned	
Account status	Active (not churned)	4568	1726	72.6
	Churned	3078	2153	41.2
Overall percentage	—	—	—	58.3

Churn detection

In order to help industry practitioner to spot out potential churn candidates, a series of *T*-test procedures is performed (see Table 4). Contractory to common belief, high–end rate plan subscribers do not necessarily have a higher tendency to churn. This research has found out the average base rate of wireless rate plan being subscribed is about $33 per month in both active and churned customer segments. Base rate refers to the published rate plan amount; for example, a

'$20 for 200 min' plan has a base rate of $20. As such, a better churn detection approach is to consider the customer's wireless overage (in minutes) and its related overage payment. From Table 4, it can be seen that churned customers consume 181.81 more minutes over their monthly allowance, as compared to 93.57 min for those who are still staying with the wireless carrier. At the same time, the mean monthly overage payment for these churned customers is found to be $13.74, as compared to only $9.62 from

Table 4: *T*-test statistics: Churn detection

Variable	Account status	Mean	SD	t	df	P
Average monthly base rate of plan subscribed	Active (not churned)	$32.55	$18.95	−2.70	10 689	0.007
	Churned	$33.56	$20.85	—	—	—
Average monthly overage fees	Active (not churned)	$9.62	$13.07	−10.13	7248	0.000
	Churned	$13.74	$26.93	—	—	—
Average monthly overage minutes	Active (not churned)	93.57 min	131.53 min	−17.77	6539	0.000
	Churned	181.81 min	338.55 min	—	—	—

the active customers. All of these findings are significant at the $P < 0.01$ level.

Customer lifetime value

An independent samples *T*-test was conducted to compare CLTV in optimal and non-optimal groups (see Table 5). There was a significant difference in the CLTV for optimal group ($M = \$1580.63$, $SD = \$1204.38$) and non-optimal one ($M = \$2734.52$, $SD = \$1527.42$), $t(11\,519) = -45.3$, $P = 0.000$. These results suggest that customers who are subscribing to non-optimal rate plans most of the time yield higher CLTV than the other group in general. Having said that, the boxplot in Figure 3 indicates that data distribution in the optimal rate plan group is highly skewed; some of these customers are observed to generate abnormally high CLTV.

CONCLUSION

Literature has suggested that wireless customers often subscribe to inappropriate rate plans and overpay for their service.[15,16,31] Dissatisfaction on pricing has become one of the major determinants of customer churn in the service industry.[1,32] Faced with high acquisition cost, high customer churn rate and the need to further defend their market position, wireless carriers are seeking improved customer retention strategies to better protect their customer base.

This research study provides wireless carriers with a holistic view on the concept of 'rate plan optimization' in terms of its usefulness in reducing customer churn rate, and explores how this strategy affects the lifetime value of their wireless subscribers. Supported by an analysis of 11 525 post-paid, residential customers' records from May 2002 to December 2005, this article reveals that 55.4 per cent of customers are using non-optimal rate plans. The author argues that rate plan optimization can be used to effectively

Table 5: *T*-test statistics: CLTV

Variable		Mean	SD	T	df	P
Rate plan suitability	Optimal	$1580.63	$1204.38	− 45.34	11 519	0.000
	Non-optimal	$2734.52	$1527.42	—	—	—
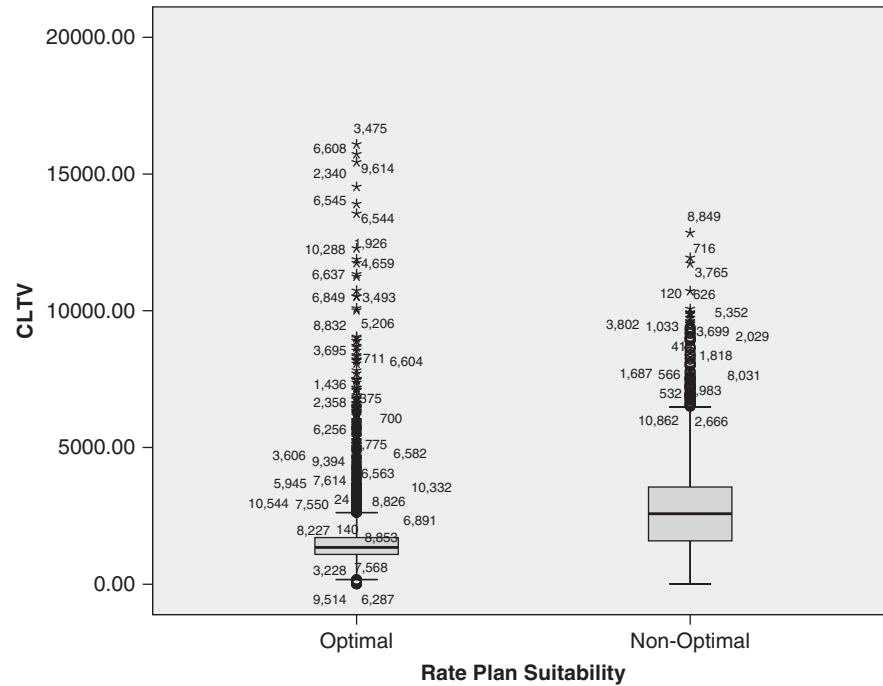
Figure 3: Boxplot showing customer lifetime value.

address churn. This is because the logistic regression has shown that non–optimal rate plan customers are 1.150 times more likely to churn than those with optimal ones. The research also reveals that churn reduces as customers grow older. This implies the need to put more efforts to retain the younger customers. The regression analysis has also demonstrated that customers residing in Eastern Canada have a higher probability to churn than those in Western Canada. This observation warrants additional research by the carrier to pinpoint the underlying cause of churn. Future research can evaluate factors such as roaming arrangement, brand positioning and number of competitors in the region.

To assist industry practitioners to identify potential churn candidates, this research has also compared the characteristics of active and churned customers, in terms of their rate plan type and also their overage situations. This article has shown that on average, churned customers talk 181.81 more minutes over their plan limit per month and they suffer from a mean monthly overage payment of $13.74. Wireless carrier can make good use of this information when setting up threshold to flag potential churn candidates.

Although rate plan optimization is found to be beneficial in churn reduction, wireless carrier has to decide whether it can afford to lose short-term revenue by

having customers on suitable rate plans. This research has revealed that customers with optimal rate plan achieve lower CLTV than those with non-optimal ones (optimal: $1580.63 versus. non–optimal: $2734.52). As Reichheld and Teal[33] have pointed out, loyal customers are important because they not only increase their spending in the long run, but also lower customer acquisition costs by making referrals. Therefore, rate plan optimization can become a feasible solution if these long-term financial benefits offset the short-term revenue gap.

Helping customers to use suitable rate plans has several other managerial implications. At the retail level, wireless carriers can deploy a consultative approach when selling wireless service. For example, an analysis of customer's past wireless bills may be required before service activation. Wireless carrier can also make follow-up service calls (for example 45 days after activation) mandatory to ensure all new customers are satisfied with their service, and allow them to make rate plan adjustments easily if required. In terms of new product development, wireless carrier can also consider launching (i) unlimited and (ii) roll-over minutes plans to help customers minimize billing surprises. For those customers who are having difficulty in predicting their wireless needs, an automatic 'self-adjusting' plan can be launched so that the customer can always enjoy the best rate among all plans based on his or her actual monthly wireless consumption. Wireless carriers can also proactively inform customers about new plans through their integrated marketing communication channels. As part of customer care initiatives, customers' calling pattern and payment record should be regularly reviewed. Helping customers to minimize their wireless expenses can be a sign of goodwill that forms the foundation of a successful long-term business relationship.

Research limitations

There are several limitations that have been identified for this research study. First of all, the author acknowledges that customer churn may be influenced by a wide range of factors. Some factors such as income level, educational background and marital status are not included in this study due to unavailability of the data from the wireless carrier. Future research can consider these variables and make use of structural equation modeling to better assess their relationships and potential moderating effects. In the discussion of CLTV, this research has used revenue as a proxy for profit owing to the lack of cost information at individual customer level (for example acquisition cost, service cost, retention cost), preventing this research from giving a realistic estimation on carrier's profitability levels. Another limitation is that the feasibility of implementing such a marketing strategy cannot be properly assessed because internal costs concerning IT systems, database mining and headcount requirements are not available. For this reason, future research is suggested to include detailed cost information in the discussion of rate plan optimization.

REFERENCES

1 Kim, M.-K., Park, M.-C. and Jeong, D.-H. (2004) The effects of customer satisfaction and switching barrier on customer loyalty in Korean mobile telecommunication services. *Telecommunications Policy* 28(2): 145–159.
2 Barrett, J. (2003) *US Mobile Market Intelligence*. Dallas, TX: Parks Associates.
3 Lee, J., Lee, K. and Freick, L. (2001) The impact of switching costs on the customer satisfaction-loyalty link: Mobile phone service in France. *Journal of Service Marketing* 15(1): 35–48.
4 Nemec, J., Hyman, M. and Grambs, P. (2001) *Winning the Customer Churn Battle in the Wireless Industry*, http://www.boozallen.com/media/file/56757.pdf, accessed 18 April 2011.
5 Lu, J. (2002) Predicting customer churn in the telecommunications industry – An application of survival analysis modeling using SAS. *SAS User Group International (SUGI27) Online Proceedings*, http://www2.sas.com/proceedings/sugi27/p114–27.pdf, accessed 1 August 2009.

6 CWTA. (2006) Wireless facts and figures, http://www.cwta.ca/CWTASite/english/industryfacts.html, accessed 19 May 2009.

7 Brown, K. (2004) Holding onto customers. *Wireless Week* 15: 6.

8 Ahn, J.-H., Han, S.-P. and Lee, Y.-S. (2006) Customer churn analysis: Churn determinants and mediation effects of partial defection in the Korean mobile telecommunications service industry. *Telecommunications Policy* 30(10-11): 552–568.

9 Seo, D., Ranganathan, C. and Babad, Y. (2008) Two-level model of customer retention in the US mobile telecommunications service market. *Telecommunications Policy* 32(3–4): 182–196.

10 Eshghi, A., Haughton, D. and Topi, H. (2007) Determinants of customer loyalty in the wireless telecommunications industry. *Telecommunications Policy* 31(2): 93–106.

11 Aydin, S., Ozer, G. and Arasil, O. (2005) Customer loyalty and the effect of switching costs as a moderator variable: A case in the Turkish mobile phone market. *Marketing Intelligence & Planning* 23(1): 87–103.

12 Kim, H.-S. and Yoon, C.-H. (2004) Determinants of customer churn and customer loyalty in the Korean mobile telephony market. *Telecommunications Policy* 28(9-10): 751–765.

13 Gerpott, T., Rams, W. and Schindler, A. (2001) Customer retention, loyalty and satisfaction in the German mobile cellular telecommunications market. *Telecommunications Policy* 25(4): 247–269.

14 Cha, K.-C., Jun, D.-B., Wilson, A. and Park, Y.-S. (2008) Managing and modelling the price reduction effect in mobile telecommunications traffic. *Telecommunications Policy* 32(7): 468–479.

15 Joo, Y.-H., Jun, J.-K. and Kim, B.-D. (2002) Encouraging customers to pay less for mobile telecommunication services. *Journal of Database Marketing* 9(4): 350–359.

16 Wong, K.K. (2010) Fighting churn with rate plan right-sizing: A customer retention strategy for the wireless telecommunications industry. *The Service Industries Journal* 30(13): 2261–2271.

17 Dalfen, C. (2005) Report to the Governor in Council: Status of competition in Canadian telecommunications markets, http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2005/gic2005.pdf, accessed 10 July 2009.

18 Harris, R. (2007) Wireless TEM: Why managing mobile phones is different. *Business Communications Review* 37(12): 18.

19 Lau, G. and Lee, S. (1999) Consumers' trust in a brand and the link to brand loyalty. *Journal of Market Focused Management* 4(4): 341–370.

20 Fournier, S. (1998) Consumers and their brands: Developing relationship theory in consumer research. *Journal of Consumer Research* 24(4): 343–373.

21 Gundlach, G., Achrol, R. and Mentzer, J. (1995) The structure of commitment in exchange. *Journal of Marketing* 59(1): 78–92.

22 Morgan, R. and Hunt, S. (1994) The commitment-trust theory of relationship marketing. *Journal of Marketing* 58(3): 20–38.

23 Brewin, B. (2002) Don't enrich the cellular carriers. *Computerworld* 36(5): 40.

24 Reichheld, F. and Sasser, W. (1990) Zero defections: Quality comes to services. *Harvard Business Review* 68(5): 105–111.

25 Fornell, C. and Wernerfelt, B. (1987) Defensive marketing strategy by customer complaint management: A theoretical analysis. *Journal of Marketing Research* 24(4): 337–346.

26 Rogers. (2006) First quarter results Q1 2006, http://library.corporate-ir.net/library/80/800/80028/items/194125/Q106RCI(FINAL)%20RELEASE.pdf, accessed 4 May 2006.

27 Yang, A. (2005) Using lifetime value to gain long-term profitability. *The Journal of Database Marketing & Customer Strategy Management* 12(2): 142–152.

28 Blattberg, R. and Thomas, J. (2001) Valuing, analyzing, and managing the marketing function using customer equity principles. In: D. Iacobucci (ed.) *Kellogg on Marketing*. New York: John Wiley & Sons, pp. 302–319.

29 Jain, D. and Singh, S. (2002) Customer lifetime value research in marketing: A review and future directions. *Journal of Interactive Marketing* 16(2): 34–45.

30 Neslin, S., Gupta, S., Kamakura, W., Lu, J. and Mason, C. (2004) *Defection Detection: Improving Predictive Accuracy of Customer Churn Models*. Durham, NC: Teradata Center at Duke University.

31 Wong, K.K. (2009) Potential moderators of the link between rate plan suitability and customer tenure: A case in the Canadian mobile telecommunications industry. *Journal of Database Marketing & Customer Strategy Management* 16(2): 64–75.

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

33 Reichheld, F. and Teal, T. (1996) *The Loyalty Effect*. Boston, MA: Harvard Business School Press.