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Activity– level as a link between customer retention and consumer lifetime value

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Abstract

Customer activity has received more attention due to the increase of social network applications. Moreover, customer activity could be an answer to the research debate about the significant relationship between retention rate and lifetime profitability of customers. Several researchers believe that an increase in the retention rate of customers may enhance their customer lifetime value (CLV), or their lifetime profitability. Other researchers believe that this relationship does not exist or is not significant, and retention rate alone cannot adequately explain lifetime value. This study aims to tackle this challenge and empirically examines the relationship between retention rate and CLV. Moreover, it investigates whether the activity level of customers increases the relationship between retention rate and CLV. This research has been empirically verified in the banking industry; and various techniques including analytic hierarchy process (AHP), mathematical models, and statistical techniques have been used. The empirical results reveal an exponential correlation between the combination of activity level and retention rate with CLV.

Keywords

customer activity, Customer Lifetime Value (CLV), customer retention, relationship marketing.

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Introduction

In the marketing literature and practices, the main focus was on enhancing customer retention (Kumar *et al*., 2010). In the new paradigm of marketing;, however, the structure and drivering of customer activity is now the center of attention (Mickelsson, 2013). Firms support customer value creation through customer-firm interactions and their outcomes (Brodie *et al*., 2011; Kumar *et al*., 2010). Heinonen (2009) studied the effect of customer activity, which he defined as the level of input on a web site based on how many different aspects of the site are used, on customer perception of service value-in-use (Heinonen, 2009). Hope and Wagner (2014) studied how to relate the activity of customers to marketing models for customer base analysis (Hoppe & UdoWagner, 2014). The literature shows a growth in studying customer activity in the social media. Moreover, some authors consider the traditional customer activity as a subject for further research. For example, Tan (2007) studied the effect of customer activity lifecycle on the product lifecycle. He divides customer activity lifecycle into three parts according to the time the customer achieves results: pre, duration, and post. He believes that the mapping of two lifecycles can amplify the value stream (TAN, 2007).

This research considers another debate in relationship marketing. Relationship marketing is based on the idea that selling a product to an existing customer is cheaper than selling the same product to a new one. Thus, exchanges with existing customers are more profitable and products may even be sold at a higher price compared to a new customer (Payne & Holt, 2001; Reinartz & Kumar, 2000). This is why the focus is on increasing the retention rate of customers in order to increase profitability. Indeed, various researchers who indicate empirical results emphasize that a small percentage increase in retention rate could yield a high percentage increase in profitability (Gupta *et al*., 2006; Payne & Holt, 2001).

Soch and Sandhu (2008) found that customer relationship management (CRM) activities have a positive, but insignificant

influence on organizational performance. Indeed, not all researchers believe that retaining customers leads to profitability (Gupta *et al*., 2004; Portela & Menezes, 2010). Reinartz and Kumar (2000) show empirically that lifetime duration has a medium effect on profitability. They believe that lifetime duration alone cannot explain lifetime value, and that increasing the retention rate leads to an increase in customer lifetime value (CLV). However, Ovchinnikov *et al*. (2014) believe that the value of customers depends on capacity limitations. They introduced a new concept of value of an incremental customer (VIC), which is much smaller than CLV when capacity is limited. They discussed that a trade-off between acquisition and retention of customer is necessary. Similarly Reinartz, Thomas and Kumar (2005) focused on balancing acquisition and retention resources so as to maximize profitability. In their proposed framework, customer profitability is influenced by the relationship duration. However, both of these variables are influenced by the actions of the customer.

It has been mentioned in the literature that the value of customers can be significantly influenced by their activity level (Haenlien *et al*., 2007); however, this has not been investigated empirically. This research aims to study the impact of activity level in conjunction with the retention rate on CLV using as subjects, the customers of retail banking in Iran. The increasing competition within banking the industry raises the importance of customer retention (Al-Hawari, 2006; Cohen *et al*., 2007). Banks have a contractual setting for long-term deposits and several kinds of loans, and a non-contractual setting for checking, free interest savings and short-term deposits, and two kinds of loans. However, all contractual settings require the customer to purchase a non-contractual product. For example, in order to have a contract for a long-term deposit, the customer must open a non-contractual deposit. The same rule applies for loans with a contractual setting. Therefore, this study examines the relationship with both the non-contractual setting for customers who have not purchased a contractual product, and the mixed contractual and non-contractual purchase. Three variables, CLV, customer retention rate, and customer activity level are calculated, and then their correlations are

investigated. Next, the associated theories in this regard are explained in the literature review then the concepts of customer activity, retention rate, and CLV are reviewed. The next section is dedicated to research model and hypotheses development. Subsequently, the empirical results are investigated and discussed. Finally, the conclusion of this research and several hints for future research are presented.

Literature review

According to the activity theory, activity is "a mode of existence" or "how people live their lives" (Mickelsson, 2013, p. 14) and, indeed, everything that people do is an activity. From this aspect, it is preferable to center on that customer activity, and how the customers behave rather than on service interaction, or the use of the service/product. Customer activity is rooted in the customer's evaluation of available opportunities in the world. In the same way, customers evaluate the outcomes of their activities based on their own understanding. Because of this, a service is a desired activity for the customer (Mickelsson, 2013). This perspective differs when using traditional goods-dominant logic and service dominant (S-D) logic. In former, the main focus is on the product; in S-D logic, however, the main focus is on service interaction and value-in-use (Chandler & Vargo, 2011), which provides a partial understanding of how service is used from the perspective of service provider. The new era of customer value management focuses on fostering customers' interaction (Kumar *et al*., 2010). Interaction, the core concept in service marketing, is considered the building block of the relationship, and based on that customer activity is directed by services design, or is a result of the customer's input into the relationship (Mickelsson, 2013; Vargo *et al*., 2012). On the other hand, co-creation refers to how customers are encouraged to co-create and personalize the service experience, and focuses on customers' active inputs into the service process (Mickelsson, 2013).

One way of analyzing, customer behavior is based on practice theory, which is dialectic between individualistic and sociological

understanding of human action and motivation. Warde (2005) defines three components of practice theory: (1) comprehending how to carry out something; (2) the real process of actions; and (3) the social engagement that connects the individual to social life. Practice theory is built around the notion of human activity and is becoming increasingly popular in marketing, being "a role of countermovement to individualist and cognitive approach to explaining customer behavior" (Mickelsson, 2013, p. 87).

Practice theory and activity theory form the basis for the third new logic, customer-dominant logic, which focuses on the role of the customer in the service (Heinonen *et al*., 2013). It emphasizes the value-in-experience, customers' activities, and the role of service in them (Helkkula, *et al*., 2012; Mickelsson, 2014), by which it is possible to extend understanding through shifting attention to customer's world. Three types of customer activity are core activity, related activity, and other activity. Core activity is related to all direct interactions of the customer with service provider. Related activity can be considered as supplementary activities such as interaction with other actors. Other activity refers to activities that are not directly involved but still have an effect (Mickelsson, 2013).

"Customer activity is often understood as an unproblematic, self-evident phenomenon that everyone can relate to intuitively" (Mickelsson, 2013, pp.15-16).Customer activity has not been sufficiently studied in the physical world. As it is a key concept in marketing, it should be understood deeply, but there is a severe lack of discussion about the concept of customer activity within service marketing, and marketing in general (Mickelsson, 2014). This study aims to highlight the customer activity role by analyzing customer behavior, and also answering the debate on CLV and retention rate relationship. For the purpose of this research, just the first type of customer activity, core activity, is considered. Subsequently, the three concepts and their calculation in this research are explained in the following.

Customer activity level

Customer choice behavior is a way of understanding customer activity and action. The style of purchasing/using the product could have consequences on customer activity (Heinonen *et al*., 2013). To conceptualize customer activity, researchers highlight the definition of activity as a sequence of acts directed toward a specified purpose. Two main challenges have been introduced for activities analysis. First, defining the activity unit and partitioning activities are challenging. Indeed, partitioning activities is always to some extent arbitrary. Classifying activities in analytically meaningful categories is the second challenge. It could be because of these challenges that customer activity level is considered as 0 to 1, which entails determining whether a customer is active or inactive. The question concerns the level of activity, which certainly varies in different customers. In the banking industry, for example, the activity level of a customer who has a checking account is different from that of someone who only has a long-term deposit, and from that of someone who has a checking account and a short-term deposit and has received a loan. In this study, the activity level of customers is calculated in the range of 0 to 1. The bank managers were interviewed to determine which variables determine the activity level of the customers. Considering the availability of data, the selected variables include the number of active accounts, having a checking account, the number of active loans, and the average number of transactions in the past year. It should be explained that in the case study, there are particularities specific to the opening of a checking account, and the customers must continue to use their checking account to keep it open.

AHP, as a general approach of measurement (Saaty, 2013) and a systematic basic approach for comparing a list of objectives or alternatives, simple pairwise comparisons judgment, which is carried out by decision makers, is used to derive overall priorities for ranking the alternatives (Saaty & Vargas, 2012). Pairwise comparing of two alternatives on a single property without concerns for other alternatives has been known as one of the most effective way of judgment (Saaty, 1990). Three main advantages are mentioned for

AHP: defining relative weights of a criterion, gathering various and different attitudes, and keeping the integrity of comparison (Korsakiene, 2004).

As in AHP, the acceptable consistency index (CI) value is less than/or equal to 0.1, and the judgment of one decision maker has been omitted from the study.

By extracting the weights, the activity level is calculated by $Activity\ Level = \Sigma w_i v_i$ in which v_i refers to normalized variable i, and w_i is the associated weigths.

Retention rate

Customer retention has a significant importance in current business strategies, as it represents an opportunity to increase the value of customers and reduce costs. Reinartz and Kumar (2000) showed that the most loyal customers are not necessarily the most profitable ones. In this study, the bank managers also had such an experience of loyal customers with lower profits as well as newer customers with higher profits.

Retention rate encompasses a degree of fuzziness (Kwon & Kim, 2012). Indeed, it is easy to calculate it in contractual settings, but difficult in non-contractual settings. Retention should be defined and calculated with regard to the business context (Rizal & Francis, 2002). For example, the concept of retention in the banking industry is different from that used in the retail industry. Banking customers do not frequently buy new products.

In this research, based on interviews with bank managers and existing data, the important variables in customer retention are distinguished and defined. Those are: the amount of time that the account has been openned, the total number of active accounts, having a checking account, the total number of received loans, the total number of active loans, the total number of days of delay in term payments, and the average account balance. The next step is to rank these variables and extract their weights.

Again, since the next step is to rank these four, managers are asked to compare in pairs based on AHP approach. Of 10 factors, one CI

value was higher than 0.1, which is omitted. Retention rate is calculated in a similar way to activity level.

Customer lifetime value

CLV is often defined as the net present value of customer contributions to a firm. It fundamentally measures the financial return of the relationship between the customer and the firm (Gupta & Lehman, 2003; Jain & Singh, 2002; Tsai *et al*., 2013). A CLV model based on customer transaction with the firm across the customer's lifetime aims to calculate the value of the customer. As such, the researchers proposed various models with different combinations of variables. The main variables are potential value and relationship benefits. Potential value addresses a customer returning more value to the firm by cross-selling, up-selling and referrals. Relationship benefits are known as hidden values, which can significantly increase the value of the customer for the firm (Abdolvand *et al*., 2014). In order to place a value on the relationship, it is necessary to collect data about customers' behavior and use financial tools to analyze that data (Ryals, 2002). CLV analysis aims to identify profitable customers and then develop marketing strategies to target customers (Tsai *et al*., 2013).

As stated in the literature, making a distinction between profitable and unprofitable customers is one of the earliest applications of CLV models (Villanueva & Hanssens, 2007) and it has been used for segmenting and targeting customers in numerous studies. Optimization of channels, supported by the CLV concept can lead to an increase in the profitability of an organization (Kumar *et al*., 2004). Maximizing CLV can be a useful objective for firms, with managers implementing marketing initiatives that maximize the value of the customer (Bell *et al*., 2002). CLV can be used in the determination of an optimum price for a customer or a customer cohort. In fact, dynamic pricing is one of the suggested applications of CLV (Villanueva & Hanssens, 2007). Gessner and Volonino (2005) suggested using CLV in business intelligence (BI), proposing a model based on the remaining CLV of customers. CLV is also applicable in

calculating return on customers (ROC), an efficient metric in decision making (Peppers & Rogers, 2005). ROC measures the rate at which a business is able to create value from any given customer (Peppers *et al.*, 2006).

For the calculation of CLV, two proposed model are combined. The first model is presented in two papers by Kim *et al*. (2006), and Hwang *et al*. (2004). The second model is presented by Gupta and Lehman (2003). Based on Kim *et al*. (2006) and Hwang *et al*. (2004), CLV can be calculated through the summation of current value and net potential value. The current value is calculated by the net present value (NPV) of the past profit contribution. The potential value is predicted through $Potential\ Value_i = \Sigma^{n}_{j=1}\ Prob_{ij} * Profit_{ij}$.

In the banking industry, as long as the customer is retained, the bank can gain a profit from the purchased products. Gupta and Lehman (2003) used the retention rate for calculating the probability that a customer will be active in the future. Although the retention rate varies in different periods, it is considered constant over time, as it is one of the most difficult metrics to calculate (Gupta & Lehman, 2003). Thus, the CLV is calculated as the summation of past profit contributions and the potential benefit of customers, in which retention rate is considered the probability of profit.

Research model and hypotheses

Customer retention is of significant importance in current business strategies, since it is an opportunity to increase the value of customers and reduce costs (Harrison & Ansell, 2002; Seo, Ranganathan & Babad, 2008). Customer retention is defined as the probability that a customer will re-purchase from a firm (Gupta *et al*., 2006). Various advantages have been mentioned in the literature for retaining customers. First, retained customers have lower costs than new ones (Farquhar, 2004). Second, customer retention generates the opportunity to increase the lifetime value of the customer (Gupta *et al*., 2004; Hwang & Kim, 2007; Onyeaso & Adalikwu, 2008; Reichheld, 1996; Seo *et al*., 2008). Some may object that the relationship between retention and profitability can only be imagined;

but in that case why has it been extended to lifetime value? In fact, a high customer turnover not only decreases the current value of the customer but also loses the potential future revenue from that customer (Seo *et al*., 2008).

Although various researchers believe that retention is the most significant factor in CLV (Gupta *et al*., 2006; Hidalgo *et al*., 2007; Reichheld, 1996), Reinartz and Kumar (2000) show that the most loyal customers are not necessarily the most profitable ones. They argue that the relationship between retention and lifetime value is not based on "*well-documented empirical evidence to substantiate this association*" (Reinartz & Kumar, 2000). In this study, the bank managers also reported loyal customers with lower profits as well as newer customers with higher profits.

In this regard, two hypotheses are defined to investigate whether there is a positive relationship between customer retention and customer lifetime value in both non-contractual and mixed settings (Fig. 1, section A):

H1: There is a high positive relationship between retention rate and lifetime value of customers who have purchased non-contractual based products.

H2: There is a high positive relationship between retention rate and lifetime value of customers who have purchased both contractual and non-contractual based products.

Moreover, several researchers believe that retention rate alone cannot lead to lifetime profitability. In this research, the effect of the activity level of customers on profitability is studied. The value of customers can be significantly influenced by their activity level (Haenlien *et al*., 2007); therefore, the question raises as if a customer with both high retention rate and high activity level has a high lifetime value (Fig. 1, section B). Indeed, this study investigates if a high retention rate and low activity level have a high relationship to the lifetime value of customers. Again, these questions should be examined in both contractual and mixed settings. Thus, the hypotheses are:

H3: There is a high positive relationship between a combination of

retention rate and activity level with the lifetime value of customers who have purchased non-contractual based products.

H4: There is a high positive relationship between a combination of retention rate and activity level to the lifetime value of customers who have purchased both contractual and non-contractual based products.

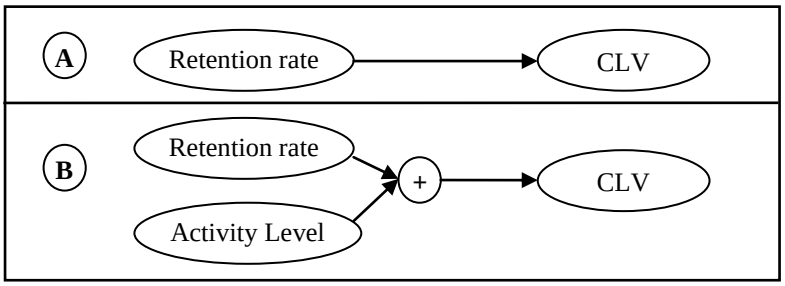


Fig. 1. Investigated relationship in the literature, B. Proposed Model

Data collection

The proposed case study deals with an Iranian bank that had recently been privatized. However, the bank suffers isolated information systems (IS), which made it difficult to obtain all of the required customer information, and led to the incompleteness, inaccuracy, and insufficiency of data on the bank's customers. In discussion with the bank managers, it was decided to narrow the study to 10 branches and 28,000 customers. The customers' records were provided in an excel file which encompass customer number (encrypted for privacy reasons), account type, account opening date, recent transactions, loan type, loan amount, loan status, total number of days of delay in term payment, the number of active loans and the number of total received loans. Moreover, the bank managers determined the required coefficients to calculate the profit of each account and loan.

Results and Discussion

Firstly, the correlation between the retention rate and CLV are investigated in three cases: non-contractual products (H2), mixed products (H2), and for all customers without involving contract

variable (H1). The results are illustrated in Table 1[1]. The results, a correlation coefficient at least 0.23 (for non-contractual products) and 0.3 (for mixed products), reveal that there is no linear relationship between these variables; or at least there is an insignificant relationship.

According to the scatter plot (Fig. 2, section A), the relationship for polynomial functions, including quadratic, cubic, quartic, and exponential, is examined. The best fitted model is an exponential function; hence, subsequent computations are based on this model. Loss function for estimating the model's parameters is a least square method. First, the relationship between CLV and retention rate, according to contract condition (Model 2), is considered. It shows the stronger exponential relationship. The relationship coefficient increases to 0.73 without condition, to 0.75 for contractual products, and almost 0.7 for non-contractual products. Second, another model is considered in which the contract is a variable (Model 3). The coefficient for this equation is 0.7. However, R-squared does not indicate sound confidence (less than 60%) in any of these models.

In testing hypotheses H3 and H4, the linear relationship (Model 4) is firstly considered which reveals a weak relationship or at least a non-linear one for each condition (Table 3). Again, the relationship for polynomial functions, including quadratic, cubic, quartic, and exponential (Fig. 2, section B), is examined. The best fitted model is an exponential function; hence, subsequent computations are based on this model. Again, two cases are considered: in the first, the contract appears as a condition (Model 5); and in the second, it appears as a variable (Model 6). The results of these models in comparison to previous ones (without activity level) show stronger relationships ($R>0.77$). Moreover, these models have a greater confidence interval. In the model where contract is considered as a condition, R-squared is greater than 65%.

1. In this table and all subsequent tables, there is a column titled “condition”. This column shows in which case the relationship is investigated. If there is no condition, then the contract variable is not considered. If it is mentioned, “contractual=1”, it means that the test was run for mixed products. Finally, if “contractual=0”, this means that test was run for non-contractual products.

The results reveal that activity level is an effective variable in relationship between customer retention and their profitability. Indeed, if the retained customers show a higher level of activity, then they can also bring a higher level of profitability.

In Model 5, when non-contractual products are considered, both coefficient and R-squared are increased. It could mainly because contractual products, particularly long-term savings deposits, require a lower level of activity. Customers may open a long-term deposit and a short-term. Their transactions will be limited to a few transactions to get the benefits of their long-term deposits. However, if all models are considered, an insignificant difference could be observed between contractual and mixed settings. In other words, the contract variable can be regretted and the hypothesis is improved as the following:

"There is a high positive relationship between combination of retention rate and activity level with the lifetime value of customers."

Table 1. Results of correlation test between retention rate and CLV

Equation	Condition	R	R^2	b_0	b_1
Model 1: CLV= b_0+b_1*RetentionRate	-	0.28	8%	-1.3+E12	6.9+E12
	contractual =1	0.3	9.35%		
	contractual =0	0.23	5.6%		

Table 2. Result of correlation between retention rate and CLV (exponential relationship)

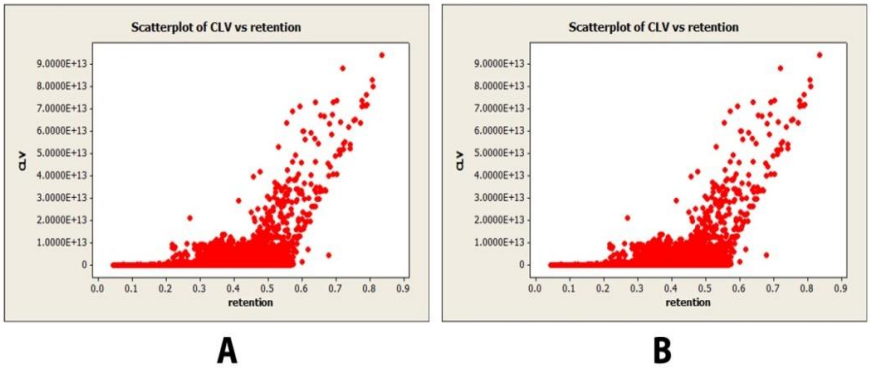
Equation	Condition	R	R^2	C	b_0	b_1	b_2
Model 2: CLV=c + exp(b_0+b_1*RetentionRate)	-	0.73	53.73%	-2.0+E11	23.11	11.34	-
	contractual =1	0.75	56.18%	-2.9+E11	23.15	11.27	-
	contractual =0	0.6977	48.67%	-5.5+E10	20.32	17.2	-
Model3: CLV= c + exp (b_0+ b_1* RetentionRate + b_2*Contractual)	-	0.7	49.49%	-2.9+E10	11.22	11.56	11.70

Table3. Results of linear relationship between retention rate, activity level, and CLV

Equation	Condition	R	R^2	c	b_0	b_1	b_2
Model4: CLV= b_0+b_1*RetentionRate+ b_2*ActivityLevel	-	0.29	8.7%	-	-1.6+E12	5.5+E12	2.4+E12
	contractual =1	0.33	10.9%	-			
	contractual =0	0.23	5.7%	-			

Table 4 . Results of exponential relationship between retention rate, activity level, and CLV

Equation	Condition	R	R^2	c	b_0	b_1	b_2	b_3
Model 5: CLV=c + exp(b_0+b_1*RetentionRate +b_2*ActivityLevel)	-	0.81	65.64%	-1.6+ E 11	22.63	2.88	9.26	
	contractual =1	0.82	67.93%	-3.1+ E 11	22.8	2.39	9.47	
	contractual =0	0.9	81.3%	-1.05+ E 11	17.49	3.36	18.13	
Model 6: CLV= c + exp(b_0+ b_1* RetentionRate + b_2*ActivityLevel +b_3*contractual)	-	0.77	59.9%	-3.99+E10	12.8	2.2	10.1	9.6



A B

Fig. 2. A. Scatter plot of retention rate vs. customer lifetime value; B. Scatter plot of activity level vs. customer lifetime value

Discussion and Conclusion

This study investigated the impact of activity level in conjunction with the retention rate on the customer lifetime value. In fact, this research attempted to improve a theory of marketing that discusses the effect of customer retention on profitability. Attempts to uncover the relationship between retention rate and customer profitability have yielded various results. Reichheld (1996) and Xevelonakis (2005) determined that customer retention leads to higher profitability. Reinartz and Kumar (2000) found no relationship between customer retention and profitability. Steffers, Murthi and Rao (2008) and Dubihlela and Molise–Khosa(2014), finding a middle ground, revealed customer retention has a weak influence on customers' profitability. In 2005, Reinartz, Thomas & Kumar showed that trading off between allocation resources to customer acquisition and retention is necessary to maximize profitability. In defining active and passive customers, as well as focusing on online and offline banking, Campbell and Frei

(2009) asserted that active customers have higher retention rates.

This study also investigated the relationship between retention rate and CLV for non-contractual products, and mixed (contractual and non-contractual) products. This research is empirically investigated and compared in the field of retail banking in Iran. The bank in this case study has a contractual setting for long-term deposits and several kinds of loans, and a non-contractual setting for checking, free interest savings and short-term deposits, and two kinds of loans. However, all contractual settings require the customer purchases a non-contractual product. For example, in order to have a contract for a long-term deposit, the customer must open a non-contractual deposit. Therefore, in this research, we have investigated the relationship in both a non-contractual setting for customers who have not purchased a contractual product, and a mixed situation of contractual and non-contractual purchase. The results confirm that there is no significant linear relationship between retention rate and CLV.

Based on the concept of customer activity, this research proposed a second model, which investigates the influence of the combination of activity level and retention rate on CLV for non-contractual products, and mixed (contractual and non-contractual) products. Results indicate a non-linear relationship between a combination of retention rate and activity level, and CLV. However, the comparison of two models reveals that the combination of retention rate and activity level results in a stronger relationship (higher correlation coefficient) with a higher confidence interval. Moreover, the contract variable does not show significant differences in the relationship.

The results of this study acknowledge the relationship between retention and CLV. However, they also reveal that more factors can affect this relationship. Moreover, the results can be used to improve the three perspectives of value (presented by Ulaga, 2001), which is based on S-D logic. Based on this model, three perspectives of customer value are the buyer's perspective (value creation through product and service), the seller's perspective (value creation through CLV/customer equity), and the buyer-seller perspective (value creation through networks). Based on the results of this research, the

buyer's perspective according to S-D logic shifts to customer-dominant logic and should be interpreted based on customer activity.

This research also confirms that marketing managers and directors should not focus highly on customer retention, and balance between customer activity and customer retention is necessary to maximize lifetime value of customers.

This research could be extended to other industries, including those that offer just contractual or non-contractual products. However, it should be considered an introductory revelation of the importance of customer activity in both physical and cyber worlds. Future research on customer activity level should focus more on how to measure the activity level. More research for studying customer activity in the physical world is necessary; especially, into the relationship between customer activity and customer purchase behavior.

Implication for managers

It is still debatable whether enterprises should invest in retaining the customers or not. This paper tried to bridge this gap in the literature by introducing a new variable, "activity level." Indeed, the results of this research imply that enterprises should start to measure the activity level of their customers as well as customer retention and value. Moreover, this new variable should be involved in marketing decision making. It could change the rule: invest in retaining those customers who have a higher activity level to gain more customer value. It means that there is no reason for enterprises to invest in retaining customers with low activity. In the banking context, less active customers could be due to, first, customer occupation or conditions. This kind of customer potentially returns no higher value; second, the customer may be active with competitors. If the enterprise strategy is to change them to loyal and active customers, various other marketing strategies should be employed. Indeed, measuring activity levels enhances the managers' ability to comprehend the behavior of their customers.

This study used a parametric way to calculate the activity level in the banking context. However, activity level can be measured using

various methods. For example, in the telecommunication sector, activity level depends on the number of receiving calls, the number of dialed calls, the duration of received/dialed calls, and so on. Nevertheless, activity level should be calculated based on the information of the customer's transactions. Frequency and duration of transactions indicate the activity level, but it is necessary to consider adding controlling variables to recognize fake transactions.

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