

Customer Lifetime Value: Literature Scoping Map, and an Agenda for Future Research

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Abstract

Customer Lifetime Value (CLV) is the core concept of relationship marketing and is increasingly addressed in scholarly and business articles. However, there is a big gap in the literature to make CLV thoroughly applicable in business. This paper aims to illuminate the trend of CLV by critical analysis of the literature. For this purpose, after revealing the scoping map of the research area, CLV concepts, the proposed mathematical models besides its techniques and mentioned categorization, its application, and its limitations are investigated. The research exposes the need to a comprehensive model for increasing the applicability of CLV. In addition, the scoping map illuminates the need for more research in the area of implementation and validation.

Keywords: Customer Lifetime Value; CRM; Valuation; Customer retention; Relationship marketing.

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1. Introduction

Based on relationship marketing, identifying more profitable customers for the purpose of improving marketing strategies and investment will lead to more profitable firms. Choosing such a strategy would be possible, if there were the capability of accurately measuring and predicting profitability of customers [40]. In addition, long-term relationship is emphasized, which in turn leads to increase in Customer Lifetime Value (CLV) [30, 33].

Using CLV, firms are capable of differentiating profitable customers from non-profitable customers, which in turn leads to effective decision making. Most of both researchers and practitioners have well accepted the notion of “Customer lifetime value” from the middle of 1980s. They believe customers who stayed longer with the firm, are more profitable. Customers are valuable assets and businesses should be able to measure and manage their value. In fact, CLV fundamentally measures the financial return of the customer and the firm relationship [23, 33].

As the availability of customers' transaction data are increased, CLV will be receiving more attention, and will play a major role in managerial decision making, including marketing and corporation strategies [23].

This paper aims to investigate the literature of CLV in order to explore what has been done in this area, and how the next research should be directed. For this purpose, more than 100 papers in this area have been investigated (see Appendix A. for the number of investigated papers), and the scoping map of the literature has been extracted, as illustrated in Figure 1.

This Figure explicates the CLV concept, models, applications and limitations, which are described, respectively, in the paper. Moreover, a deep understanding of the CLV literature can explore future direction, and trends in the literature, which will be finally explained in this paper.

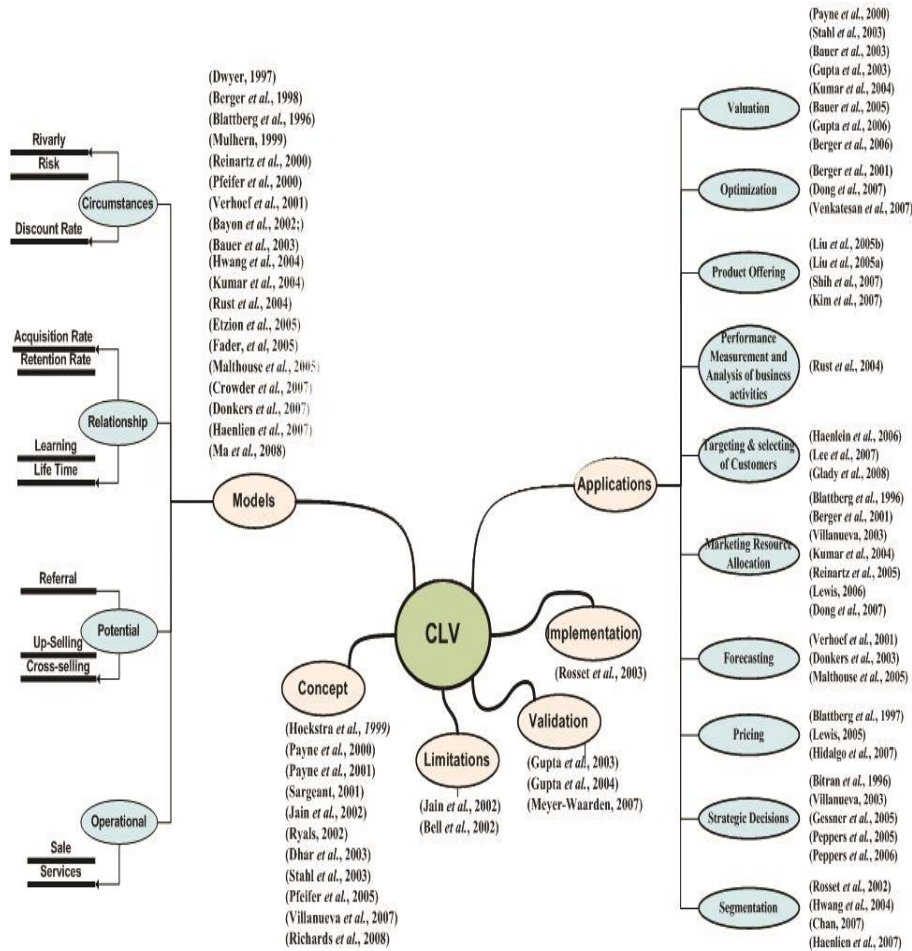


Figure 1. The scoping map of CLV research area

2. Literature Review

Customer Lifetime Value is abbreviated as CV, CLV, CLTV, and LTV¹. Like the various abbreviations used for Customer Lifetime Value, various concepts are mentioned for its definition, conceptual and computational models. In this section, its concepts will be reviewed and criticized.

1. However, we accept and use CLV in this paper.

Table 1. CLV definitions

Author	Definition
(Blattberg&Deighton, 1996)	Expected profits from customers except cost of customer management
(Jain & Singh, 2002)	The net profit or loss to the firm from a customer over the entire life of transactions of that customer with the firm
(Bauer <i>et al.</i> , 2003)	The profit streams of a customer across the entire customer life cycle. P.333
(Berger & Nasr Bechwati, 2001)	The excess of a customer's revenues over time over the company costs of attracting, selling, and servicing that customer P.49
(Sargeant, 2001)	The total net contribution that a customer generates during his/her lifetime on a house-list P.28
(Hoekstra & Huizingh, 1999)	LTV is the total value of direct contributions and indirect contributions to overhead and profit of an individual customer during the entire customer life cycle that is from the start of the relationship until its projected ending. P.266
(Kumar <i>et al.</i> , 2004)	The sum of cumulated cash flows—discounted using the weighted average cost of capital—of a customer over his or her entire lifetime with the firm P.61
(Chen <i>et al.</i> , 2006; Hwang <i>et al.</i> , 2004; Kim <i>et al.</i> , 2006)	The sum of the revenues gained from company's customers over the lifetime of transactions after The deduction of the total cost of attracting, selling, and servicing customers, taking into account The time value of money P.182, P.102, P.1353
(Villanueva & Hanssens, 2007)	The discounted sum of cash flows generated over the lifetime of an individual customer, or of a segment of customers within the firm P.5
(Dwyer, 1997)	The customer's present value of the expected benefits less the burdens
(Berger & Nasr, 1998)	Value of projected the net cash flow that the firm expects to receive from the customer over time.
(Gloy <i>et al.</i> , 1997)	The net present value of cash flows a customer is expected to generate for a firm over the length of The customer's relationship with the firm P.336
(Payne & Holt, 2001)	The net present value of the future profit flow over a customer's lifetime P.167
(Lenskold, 2002)	The net present value of profit from the stream of customer transaction resulting from the investment
(Peppers & Rogers, 2005)	The net present value of the future stream of cash flows a company expects to generate from the customer
(Venkatesan <i>et al.</i> , 2007)	The net present value of long-term cash flows from a customer
(Stahl <i>et al.</i> , 2003)	The net present value of future cash flows generated by the firm's assets, discounted at an appropriate interest rate and adjusted for inflation and risk P.267
(Ryals, 2002)	The present value of a customer's future purchases P. 245
(Gupta & Lehman, 2003)	The presentvalue of all future profits generated from a customer P. 10
(Pfeifer <i>et al.</i> , 2005)	The present value of the future cash flows attributed to the customer relationship P.17
(Haenlien <i>et al.</i> , 2007)	The present value of the future profit stream expected over a given time horizon oftransacting with the customer P.222
(Hidalgo <i>et al.</i> , 2007)	The present value of all future earnings a firm may generate from a customer P.695

As Table 1 shows, CLV often is defined as net present value of customer contribution to a firm. However, there are some discrepancies among CLV definitions. Several definitions indicate “Value”, that is, according to Pfeifer *et al.* (2005) “What something is worth (the cash-equivalent price today that a buyer would be willing to pay to own the future cash-flow benefits springing from that asset), P.14”. Several definitions indicate that “Profit” is financial gain or revenues

earned after expenses are subtracted. Moreover, two expressions are brought in the definitions: “Cash flow” and “Customer profit”, which are not exactly the same, though they are not significantly different. Cash flow is the change in the cash balance over a specific period of time [1].

According to [29] there are several differences between cash flow and profit. However, the primary difference between them is the time period between payments made for investments which will generate future income, and the actual receipt of that income [42].

In order to obtain the value of customers, annual profit pattern is essential. However, if cash flow differs substantially from profit, then cash flow pattern should be used [11, 31, 48, 49].

Based on the differences, definitions are categorized in three-colored groups in Table 1 and discussed as follows. Researchers of the first group emphasized on “Profit” without denoting the time value of money. In this group, all the researchers except Hoekstra (1999) mentioned “Profit”, which is a monetary value. This thereby ignores the non-monetary values of customers which is critical in CLV.

The second group regarded the concept of “Net present value”, as the total value of all cash inflows and outflows-discounted- from an investment. In these definitions, present and future cash flows are taken into account. The third group defined profit as “Present value”, meaning the current value of future (and not present) cash flow, discounted to reflect the time value of money. As the reader knows, present value is the value on a given date of a future payment or series of future payments, discounted to reflect the time value of money and other factors such as investment risk. One can yield net present value by subtracting the required initial expenditure from present value of projected cash flows [38]. Furthermore, several researches consider CLV and customer equity (CE) as being equal: Jain and Singh (2002), Berger & Nasr (1998), Hwang *et al.* (2004), and Villanueva & Hanssens (2007) included this in the last part of their definition (segment of customers). However, most of researchers consider CE as total summation of CLVs of individual customers [2, 4, 14, 36, 51, 62].

The mentioned definitions are a basis for proposing the CLV models. However, various researchers state that there is no single definition of a comprehensive model [3, 4, 5, 22].

CLV Models. Since the late 1980s, various models have been proposed to calculate value of customers in their lifetime. A few researchers make an effort to provide a model, and examine it in an enterprise. More researchers conducted studies to develop a general model without considering a particular industry. On the other hand, the interest in CLV is increasing because of its great potential in improving marketing decision-making, and even business strategies [33, 45, 50].

In the following, discussion authors try to investigate the components and variables of various models. At first, the components of models, as illustrated in Figure 1, are described and then, the CLV techniques and approaches are reviewed.

Components of CLV Models. A CLV model aims to calculate the value of the customer based on customer transactions with the firm across customer lifetime. For this, the researchers proposed various models with different combinations of variables. In this paper, variables of the models are extracted (see Appendix A. for

more details), and then they are aggregated in four components: operational, potential, relationship and circumstance (see Figure 1).

Operational component refers to direct transaction with the customer for selling the product or service. Proposed models just consider the selling product, and only Hwang *et al.* suggested considering services. For selling, two variables are involved: cost of transaction, which is the money spent by the firm, and the revenue of the firm, which is money paid by the customer. This is observed in the proposed models in two forms: cost, and revenue or profit. In fact, it is necessary to measure total cost spent for servicing and adding value to the customer, and total revenue gained from the customer's transactions during her/his life-time, for the purpose of determining the net profit of the individual customer.

The cost factor includes acquisition cost, selling and service delivering cost, and retention cost. However, there are two viewpoints on whether to consider acquisition cost in the CLV model or not. Jain and Singh (2002) stated that researchers, who do not agree to include acquisition cost even for new customers, interpret CLV as the maximum profitable acquisition cost. Researchers, who included acquisition cost, are implicitly considering the lifetime value of an as-yet-to-be-acquired customer. It is suggested to exclude acquisition cost, if CLV is calculated for various years [3, 9, 22].

In addition, Bauer & Hammerschmidt (2005) suggested that it depends on the acquisition practice used (direct marketing vs. mass marketing). Acquisition cost is included in proposed models [2, 4, 21, 58].

Moreover, the calculation and estimation of acquisition cost is difficult, and it depends on accounting and management practices in the enterprise [24]. Other models just indicated to total or marketing cost, without mentioning its sub-components [17, 24, 26, 32, 35, 39, 47].

Revenue includes all money obtained from the customer. Several researchers separated the revenue of direct sale from cross-selling and up-selling revenue. The latter is considered a potential benefit, which is discussed later.

3. Problem Description

Various researchers consider profit a variable [6, 9, 12, 15, 18, 23, 30, 41, 47, 50, 52, 53, 56]. In calculating customer profit, researchers described various variables such as net contribution, past profit contribution, future cash flow, gross contribution, margin contribution, etc.

Potential value addresses a customer who may return more value to the firm by cross-selling, up-selling and referrals. In cross-selling, the firm would offer new products (not bought before by the same customer) to an existing customer. In up-selling, the firm would offer the same kind of products (bought before by the same customer) to an existing customer (Schiffman, 2005).

Many researchers and practitioners believe that cross-selling and up-selling leads to an increase in cash flow [2, 4, 15, 22, 32, 57, 58].

Indeed, Bayon *et al.* (2002) and Bauer and Hammerschmidt (2003, 2005) considered variables for cross-selling and up-selling and Hwang *et al.* (2004) mentioned that those should be included in calculating the revenue (See Table 2). Referral refers to how customers spread positive/negative words of mouth, which affects purchase behavior of their people network such as relatives and friends. Satisfied customers may decrease the cost of acquisition for the firm, while

dissatisfied customers may impose extra cost. The cash flow being produced by word of mouth is considered in [2, 4] as illustrated in Table 2.

Table 2. The relationship and potential components in proposed models

	Relationship						Potential		
	Lifetime						Up-Selling	Cross-Selling	Referral
	Continuous	Discrete	Future	From Present	Acquisition Rate	Retention Rate			
(Blattberg & Deighton, 1996)		✓		✓	✓	✓			
(Berger & Nasr, 1998)	✓	✓		✓		✓			
(Mulhern, 1999)		✓	✓						
(Pfeifer & Carraway, 2000)		✓		✓		✓			
(Reinartz & Kumar, 2000)		✓		✓*		✓			
(Sargeant, 2001)		✓	✓						
(Bayon <i>et al.</i> , 2002)		✓		✓			✓	✓	✓
(Gupta & Lehman, 2003)		✓	✓			✓			
(Rosset <i>et al.</i> , 2003)	✓			✓		✓			
(Gupta <i>et al.</i> , 2004)	✓	✓		✓		✓			
(Hwang <i>et al.</i> , 2004)		✓		✓*		✓	✓	✓	
(Kumar <i>et al.</i> , 2004)		✓		✓		✓			
(Rust <i>et al.</i> , 2004)		✓		✓					
(Bauer & Hammerschmidt, 2005)		✓		✓		✓	✓	✓	✓
(Etzion <i>et al.</i> , 2005)		✓		✓					
(Fader <i>et al.</i> , 2005a)		✓		✓					
(Berger <i>et al.</i> , 2006)		✓	✓						
(Haenlein <i>et al.</i> , 2006)		✓		✓		✓			
(Crowder <i>et al.</i> , 2007)	✓			✓		✓			
(Donkers <i>et al.</i> , 2007)		✓		✓		✓			
(Hidalgo <i>et al.</i> , 2007)		✓		✓		✓			
(Venkatesan <i>et al.</i> , 2007)		✓	✓						
(Ma <i>et al.</i> , 2008)		✓		✓		✓			

* These researchers has considered customers' transactions from past to future

Relationship benefits are known as hidden values, which can significantly increase the values of the customer for the firm. For valuing relationship, it is necessary to collect data about customers' behavior, and use financial tools to analyze that data [54]. However, relationship value of each customer is unique and may vary over time. Indeed, it is hard to measure. In the CLV models, four variables are addressed for calculating the value of relationship: acquisition rate, retention rate, lifetime, and learning. The first three are described in the following. The last one, learning, refers to the knowledge that firm gains through the relationship with the customer. This is only addressed by the Stahl (2003) in a conceptual model. In this research, discrete time with unequal interval has been considered. The similar discussion as acquisition cost is explained for acquisition rate. Villanueva and Hanssens (2007) argued whether acquisition rate influences future retention rate or not. In the reviewed models, acquisition rate is considered by Blattberg *et al.* (1996) and Gloy *et al.* (2002). Gupta *et al.* (2003) showed that reducing acquisition cost has a small impact on the customer value, while customer retention has a significant impact. Many researches emphasize the benefits of retaining customers. Indeed, customer retention is known as a critical variable in lifetime profit of customers. In

fact, retention rate is the chance that a customer remains with the supplier for the next period and for the next purchase, provided that the customer has bought from that supplier at each previous purchase (Bauer & Hammerschmidt, 2005; Berger & Nasr, 1998). However, since the retention rate has little meaning in a contractual situation, calculating a retention rate particularly for non-contractual businesses is complicated. Customer loyalty, customer satisfaction, switching barriers, and even churn rate is used for estimating customer retention (Bauer *et al.*, 2003). In the CLV models, retention rate is an essential variable, which has been calculated through different factors in different models [2, 12, 18, 21, 23, 24, 26, 30, 32, 35, 39, 50, 52, 53].

Obviously, time period is a main component in the CLV models. Most of the models regard discrete time periods with equal intervals. However, Fader *et al.* (2005) provided a model in which customer transaction has a poisson distribution. It means discrete time period has unequal intervals. Pfeiffer *et al.* (2000) and Etzion *et al.* (2005) considered infinite time for calculating value of customers. Previously, Blattberg and Deighton (1996) has addressed infinite time horizon in calculating customer equity [10].

There is another difference point in these models: considering the present period or future. In several models, time horizon does not include current time and it is based on future transactions. Finally, there are models, which regard continuous time instead of discrete periods [12, 24].

Circumstances are the conditions, which influence the value of customers for the firm. Circumstances can be categorized in three groups. First, risk is a concept that refers to a potential negative impact to some characteristics of lifetime value of customers. It may arise from a future event and may be caused by competitors, internal events, or the customer himself/herself. Dhar and Glazer (2003) introduced the concept of Risk-Adjusted Life Time Value (RALTV). Secondly, rivalry and competition directly threat companies for losing their customers. It means losing customer value and decreasing cash flow. Some may say that risk includes the rivalry factor. However, because of significant impact of rivalry in customer retention, it is highlighted as a single sub-component. The CLV model that considers the rivalry variable is very rare, and is an exception, Rust *et al.* (2000, 2004).

Finally, discount rate is described in several cases. Most researchers introduce the discount rate. Several researchers, Bayon *et al.* (2002), Hwang *et al.* (2004), and Kumar *et al.* (2004) indicated only the interest rate. In two models, Etzion *et al.* (2005), and Crowder *et al.* (2007), interest rate and inflation rate are defined for calculating the discount rate. Additionally, the time value of money is not just included in the model presented by Fader *et al.* (2005).

4. Methodology

Techniques and Approaches for CLV Calculation. Various techniques and approaches are used in the CLV models. Most of the models follow the simple mathematical model. One of the essential techniques in measuring value of customers, albeit with other approaches, is data mining. Data mining is used for calculating the probability of retention/churn rate, to obtain a view of risk, predicting customer behavior, and so on (Hwang *et al.*, 2004; Ryals, 2002).

Several researchers use regression for predicting customer behavior [24, 40, 59]. Discrete regression, Probit and Logit have been used in models developed in

{Donkers, 2007 #337; Rust, 2004 #295; Vibhu, 2002 #254; Kalyan, 2002 #254}. Several researchers proposed their models based on probability models such as Pareto/NBD, which is originated from Schmittlein *et al.* research in 1987 and is extended by Reinartz and Kumar (2000), Fader *et al.* (2005) and Glady *et al.* (2008). These researchers introduced Pareto/NBD as a powerful technique for predicting future activity of a customer in a non-contractual business. The technique predicts only the probability of activity, and the number of transactions of a customer [18, 50].

Hence, it is necessary to make an adaptation to incorporate the profit of the transactions, and to estimate the CLV. In addition, the number and timing of customers' previous transactions is required as input, which causes a main limitation in using this method: a need to very long history of customers' transactions [33]. Another technique used in the CLV models is Markov Chain Model (MCM), which enables authors to model the manner of customer transition (both migration and retention) over a given time horizon. Pfeifer and Carraway (2000) proposed a general model based on MCM. They believe that MCM has several main advantages in modeling customer relationship, which are: being flexible, supporting probability, and having a well-developed theory to be used in decision making [33, 47].

Besides, Etzion *et al.* (2005) and Ma *et al.* (2008) proposed the CLV models based on MCM. RFM (Recency, Frequency, Monetary) analysis is one of the marketing techniques, and is particularly popular in customer segmentation. Using RFM, it is possible to predict the customers' short-term future behavior. This describes the probability of customer purchase during the next period, being produced in practice using data mining techniques. The analysis is based on three attributes. These are recency, frequency, and monetary. Recency refers to the time passed since the last purchase/use of product/service by the customer. Frequency is related to the number of times that a customer purchases/uses a product/service. Monetary would be the total money that a customer spends on purchase from the company [17, 25, 36].

RFM technique is used in linking with other approaches such as Pareto/NBD and Markov Chain Model. Pfeifer and Carraway (2000) are the first researchers who introduced the idea of combining two techniques to overcome limitations of each method. They presented a model based on MCM and RFM. In addition, Fader *et al.* (2005b) use Pareto/NBD at the heart of their model [19] and RFM for measuring individual customers purchasing history.

5. Results and Discussion

Because of the CLV potential, various applications for the CLV concept are reported as illustrated in Figure 1. As stated in the literature, making a distinction between good and bad customers is one of the earliest applications of the CLV models [61].

CLV may be used for segmentation and targeting of customers in numerous researches. Optimization of channels, supported by the CLV concept, can lead to an increase in profitability of the organization [35].

CLV is in fact a strategic tool for segmentation and customer targeting. According to [5], managers should implement marketing initiatives that maximize the value of the customers. CLV can be used in determining an optimum price for a customer, or a customer cohort. In fact, Dynamic pricing is one of the suggested

applications of CLV [61]. Moreover, [20] suggested using CLV in Business Intelligence (BI). They proposed a model based on remaining CLV of customers. It is possible to assess and improve organizational performance through CLV and CE concepts. Villanueva & Hanssens, 2007, mentioned that CLV and CE could help to provide a connection between marketing spending, marketing metrics, and financial performance. Moreover, they believe CLV can be used to develop frameworks, tools, and metrics for enhancing the productivity of CRM platforms. CLV and CE models are also useful for assessment of return on investment of marketing campaigns. Rust *et al.*, 2004 have provided a brief review on papers, which have developed the models for assessing *return on marketing*. CLV also is applicable in calculating Return on Customer (ROC) as an efficient metric in decision making [45]. ROC measures the rate at which a business is able to create value from any given customer [46].

Payne *et al.*, 2000 examined concepts of employee value, customer value and shareholder value as well as linkages between these three value domains. Stahl *et al.*, 2003 studied the linkages between CLV and shareholder value and suggested a framework to link these concepts. Bauer & Hammerschmidt, 2005 developed a method based on shareholder value and CLV. Finally, (Berger *et al.*, 2006) examined the relationship between CLV and shareholder value and effects of company actions on them.

CLV has been used as an approach in increasing value for the firm. For this purpose, it is tried to optimize CLV in several researches. For example, Berger and Nasr Bechwati (2001), Dong *et al.* (2007), and Venkatesan *et al.* (2007) tried to maximize the CLV after measuring it, subject to some constraints.

However, there is a big gap in the literature between suggested applications and empirical evidence of CLV in the businesses. The following section deals with this subject in more detail as a part of CLV limitations.

CLV Models. For non-monetary variable, the relationship with customer and its implication should be expanded to define variables such as referral value, reactivation possibility, cause of customer defection and learning potential. Determining cash flow from relationships such as referrals and word-of-mouth is a challenging task because of its difficulty in obtaining the data needed [32, 33, 57]. Calculating referral value of customers would be an interest area of research, which could be embedded in the CLV models [8, 61].

Learning potential is defined as the cash flow from knowledge created during the relationship between seller and buyer [57].

The assessment of learning potential is also challenging because it is very difficult to predict and measure the relationship, and the knowledge created [57]. As the effects of learning potential on cash flow is undeniable, it is essential to do more research in this area to improve the CLV models.

In addition, developing models for particular applications such as marketing spending, and pricing can be studied. These models would have a potential to evaluate the different strategies aimed at improve customer retention and profitability. For example, the CLV models have a capability to measure the direct impact of marketing. Besides, an interesting future study could be the developing of models for measuring market response of customers who have already defected [33, 61].

Moreover, most of the proposed models have deterministic nature, which is a main cause of difficulty in providing required input. There are more consistency between stochastic models and non-linear pattern of customer lifetime [61]. Furthermore, using real options to reflect the flexibility of management in uncertain situations, which is yet under research, have a potential to bring more accuracy in CLV estimation, and decrease the risk of investment on customers [6, 26].

Finally, in the CLV approach, customers are considered as the main asset of an organization [28]. However, this main asset is a risky one [13].

Unfortunately, current CLV models focus on the expected value of a customer and ignore the potential risks. So a CLV model may predict that a high-risk customer is more valuable than a low-risk one [22].

Therefore, it is necessary to pay more attention, and take into account the risk of customers. Dhar & Glazer, 2003 had a seminal research on this topic.

CLV Proofing and Validation. As it is said in the limitations of CLV, lack of empirical implementation is one of the main issues in the CLV models. Implementing proposed models particularly in various industries can reveal the weaknesses and strengths of the conducted researches. Besides, it may bring a potential in removing limitations and extending use of CLV. In addition, businesses need more proof of the relationship between customer retention and profitability. In other words, managers want to know, what is the effect of improving CLV of a selected group of customers on other groups [40, 61].

An area of research could extend the study of Gupta *et al* (2006) to analyze the sensitivity of CLV to each of its variable. For example, what happens, if a company increases or decreases the acquisition/retention of investments [22, 33].

6. Conclusions and Future Works

Current limitations of CLV are the main obstacle in increasing its applicability and utilizing its potential in improving business strategies. These are limitations of the models, limitations of predicting customer behavior, accuracy, the lack of empirical implementations, implementation challenges, the lack of integration between customer data, and marketing efforts [9, 17, 32, 32, 33, 40, 55].

According to Jain & Singh (2002), all proposed models for calculating CLV have some limitations, which originate from restrictions on cash flow from a customer, timing of cash flow, business restrictions, restriction on source of data, and/or so on. On the other hand, except for the Haenlein *et al.*, 2006; Hidalgo *et al.*, 2007 models, all other models are based on NPV analysis, which leads to more limitations on the CLV models; (for NPV limitations, refer to (Haenlein *et al.*, 2006)). Moreover, most of the models consider the monetary value of the customer. There are some conceptual models for non-monetary value, but there is a big gap in empirical experiences. More variables including demographics and product usage should also be considered. In addition, in calculating CLV, it is necessary to analyze and predict customer behavior, which in turn, still requires more researches to propose flexible and accurate models. This leads to a lack of accuracy in the CLV models, which is one of the main obstacles in using them in business. Lack of empirical experience of many CLV models is a main limitation. Estimation methods can help develop more valid models. Calculating CLV requires a rich database of customers' transactions and business activities that leads to several difficulties in implementing CLV. First,

many of businesses do not have a rich database of customers' transaction with required fields. Secondly, in the case of an implemented CRM system, there is lack of integration between customers' data and business strategies, particularly marketing efforts, most of the time. Finally, the more accurate models are more complicated, and more difficult to implement. One of the main topics in CRM research is developing a model to show "Profitable customers" [32, 54]. Customer lifetime value (CLV) is an accountable metric that helps businesses in assessing their return on investment (ROI), return on customers (ROC), and increasing shareholder value. However, the CLV literature shows somehow a diversification in concept, and non-comprehensiveness in the proposed model. Further research is required to fill the gap in literature while focusing on removing the mentioned limitations, and extending CLV efficiency, effectiveness, and applicability. In the following, further research (Figure 2) for CLV is classified and described.

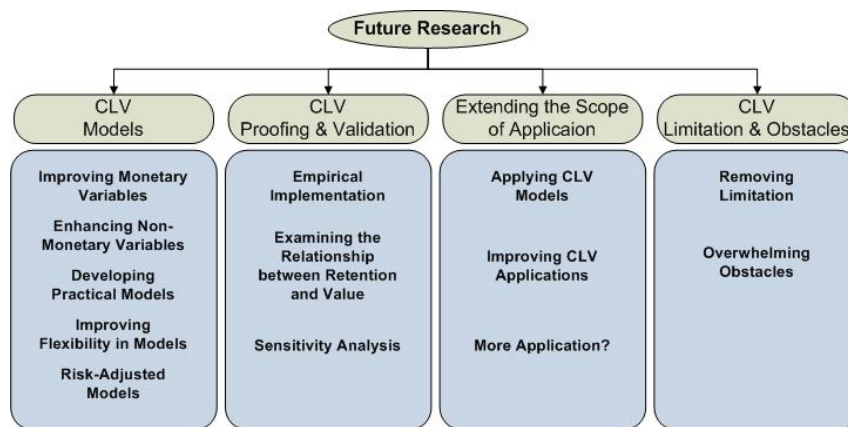


Figure 2- Future trends of CLV research

Extending the Scope of Application. As it is mentioned in the "CLV application" section, various applications are known for the CLV. Some of them, such as segmentation, and pricing have been implemented successfully. Bauer & Hammerschmidt, 2005; Berger *et al.*, 2006; Payne *et al.*, 2000; Stahl *et al.*, 2003 discussed the integration between CLV and shareholder value. In fact, some applications such as valuation and making strategy are at the theory level. It could be an interesting and critical area of research [22]. Moreover, Peppers & Rogers (2005) suggested using CLV for calculating ROC. It is necessary to study, empirically, how increasing CLV could tend to increase the in shareholder value. Can CLV have more potential in improving strategies? Can we assess business processes based on analyzing CLV components?

CLV Limitations and Obstacles. Several limitations of the CLV's concepts and models have been described. However, are there more obstacles in implementing CLV? What does limit the applicability of CLV? How can the limitations be removed and obstacles overwhelmed? These questions can be an area of further research, which should have an effective impact on extending CLV [33, 61].

Appendix A. CLV researches in the literature (based on the search of "customer lifetime/lifetime/life time value" in the abstract in Scopus database)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	total
Data Mining and Knowledge Discovery							1				1		2
European Journal of Marketing								1					1
European Journal of Operational Research											1	1	2
European Management Journal	1					2					1		4
Expert Systems With Applications								1	1			4	6
Harvard Business Review						1		1			3		5
Industrial Marketing Management							1	1		1	2		5
International Journal of Bank Marketing											1		1
International Journal of Research in Marketing											1		1
Journal of Business Research										1	1	1	3
Journal of Interactive Marketing		1	1			1	2	2	2			1	10
Journal of Marketing								1		1		1	3
Journal of Marketing Research									2		2	1	5
Journal of Relationship Marketing										10	2		12
Journal of Retailing					1			1		1			3
Journal of Service Research									1	3			4
Journal of Services Marketing										1	1		2
Journal of the Academy of Marketing Science									1				1
Management Science										2		1	3
Marketing Science		1	1						1	3	2		8
Omega					1								1
Quantitative Marketing and Economics											2		2
other								2	11	2	2		17
Total	1	2	2	0	2	4	4	9	19	26	23	9	101

Appendix B. Variables and Techniques of CLV Models in the Literature.

Paper	Variables	Technique
(Blattberg & Deighton, 1996)	Profit Contribution, Retention Rate, Acquisition Rate, Acquisition Cost, Retention Cost, Lifetime (Equal Interval Discrete), Discount Rate	Simple Math. Model
(Mulhern, 1999)	Profit Contribution, Lifetime (Equal Interval Discrete), Discount Rate	Simple Math. Model
(Pfeifer & Carraway, 2000)	Profit Contribution, Retention Rate, Marketing Cost, Lifetime (Equal Interval Discrete, Infinite), Discount rate	RFM & Markov Chain Model
(Reinartz & Kumar, 2000)	Profit Contribution, Lifetime (Equal Interval Discrete), Retention Rate, Discount Rate	Pareto/NB D
(Sargeant, 2001)	Profit Contribution, Lifetime (Equal Interval Discrete), Discount Rate,	
(Bayon <i>et al.</i> , 2002)	Profit Contribution, Potential Benefit, Acquisition Cost, Retention Cost, Lifetime (Equal Interval Discrete), Interest Rate,	Simple Math. Model
(Berger & Nasr, 1998)	Profit Contribution, Lifetime (Equal Interval Discrete), Discount Rate	
(Gupta & Lehman, 2003)	Profit Contribution, Retention Rate, Time Lifetime (Equal Interval Discrete), Discount Rate	Simple Math. Model
(Rosset <i>et al.</i> , 2003)	Profit Contribution, Retention Rate (Churn), Lifetime (Continuous), Discount Rate	Simple Math. Model
(Gupta <i>et al.</i> , 2004)	Profit Contribution, Retention Rate, Acquisition Cost, Lifetime (Equal Interval Discrete & Continuous), Discount Rate	Simple Math. Model
(Hwang <i>et al.</i> , 2004)	Profit Contribution, Potential Benefit (Cross and Up Selling), Retention Rate (Churn), Lifetime (Equal Interval Discrete), Interest Rate	Data Mining & Regression
(Kumar <i>et al.</i> , 2004)	Profit Contribution, Transaction Rate, Retention Rate, Marketing Cost (Channel), Lifetime (Equal Interval Discrete), Interest Rate	Simple Math. Model
(Rust <i>et al.</i> , 2004)	Profit Contribution, Retention Rate, Lifetime (Equal Interval Discrete), Discount Rate	Simple Math. Model
(Bauer & Hammerschmidt, 2005)	Profit Contribution, Potential Benefit, Retention Rate, Acquisition Cost, Retention Cost, Termination Cost, Lifetime (Equal Interval Discrete), Discount Rate	Simple Math. Model
(Etzion <i>et al.</i> , 2005)	Profit Contribution, Marketing Cost, Lifetime (Equal Interval Discrete, Infinite), Discount Rate (Interest & Inflation)	RFM & Markov Chain Model
(Fader <i>et al.</i> , 2005a)	Transaction Rate, Retention Rate (Churn), Lifetime (Unequal Interval Discrete)	RFM & Pareto/NB D
(Berger <i>et al.</i> , 2006)	Future only: Profit Contribution, Lifetime (Equal Interval Discrete) , Discount Rate	Simple Math. Model

Paper	Variables	Technique
(Haenlein <i>et al.</i> , 2006)	Profit Contribution, Retention Rate, Marketing Cost, Lifetime (Equal Interval Discrete), Discount Rate	RFM & Option Value
(Crowder <i>et al.</i> , 2007)	Profit Contribution, Lifetime (Continuous), Retention Rate (Churn), Discount Rate (Interest, Inflation)	Simple Math. Model
(Donkers <i>et al.</i> , 2007)	Profit Contribution, Retention Rate, Lifetime (Equal Interval Discrete), Discount Rate	Probit/Logit
(Hidalgo <i>et al.</i> , 2007)	Profit Contribution, Retention Rate, Lifetime (Equal Interval Discrete), Discount Rate	Option Value
(Venkatesan <i>et al.</i> , 2007)	Profit Contribution, Acquisition Cost (channel), Lifetime (Equal Interval Discrete), Discount Rate	RFM
(Ma <i>et al.</i> , 2008)	Profit Contribution, Retention Rate, Marketing Cost, Lifetime (Equal Interval Discrete), Discount Rate	Markov Chain Model

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