MANAGERIAL ACCOUNTING: MODELING CUSTOMER LIFETIME VALUE - AN APPLICATION IN THE TELECOMMUNICATION INDUSTRY.

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ABSTRACT

C ustomer lifetime value (CLV) is both a concept and a measure. At its core, CLV is about optimizing each interaction and conversation in order to create an engaged customer relationship which drives customer retention, repeat purchases, customer referrals, reduced support costs, and possibly even price premiums. The aim of this article is to help the management team to cope with the use of customer lifetime value as a decent framework that bridges the gap between the various organizational functions (particularly marketing and finance), offers a common language, so the functions collectively can align on strategy and make more effective decisions regarding investment and customer treatment. Therefore, how to measure and manage customer lifetime value for determining the likely future profit from the customer is very important because the customer is always looking for better and cheaper products and services. Hence, in a broader sense, the objective of this article is to develop a concept of customer lifetime value in the telecommunication industry, in particular in cellular telephony and to demonstrate business uses of CLV for decision making process.

JEL classification: M2, G34

Key words: *Subscriber Acquisition Cost, Average Margin per User, Customer Lifetime Value, Activity-Based Costing*

Introduction

The top managers across all industries continue to face the most disruptive market conditions in decades. Increased competition has only accelerated; large rivals remain to compete by intensively buying market share, new entrants are more agile and substitute products seem to pop up almost at every corner. These market conditions particularly apply to the telecommunication industry. Faced by eroding pricing power telecom executives find themselves in a downward spiral of price deflation and profit pressure. [1] The fierce competition makes operators heavily invest in acquiring new customers. This is most often done with marketing campaigns and subsidies of handsets. But, to be really profitable, it is essential not only to attract new customers, but also to make sure they retain with the company for as long time as possible. Given the fact that the telecommunication industry familiarities an average of 38% annual churn rate and it cost around 10 times more to recruit a new customer than to retain an existing one, customer retention become even more important than customer acquisition. [2] This turns the telecommunications operators' attention to customer lifetime value. The customer lifetime value refers to the total incomes generated by an individual customer over time from all consumptions of the company's products and services, discounted by the time value of money. [3] In its simplest form, customer lifetime value is the present value of a customer based on the future cash flows attributed to the relationship. CLV model allows companies to distinguish between customers that are profitable, nearly profitable, unprofitable, and have potential to be profitable. [4] Essentially, the figure represents how much a company can spend acquiring and keeping your customers. Financial theories such as the time value of money and return on investment have been applied mainly to fixed assets such as buildings, fixtures, equipment, land, etc. and have not been utilized toward the valuation of customers. Marketing concepts such as customer profitability and retention have focused on revenues generated from customers and have ignored financial functions such as the time value of money. Customer lifetime value is good framework that bridges the gap between the various organizational functions in the telecommunication sector (especially marketing and finance), provides a common language, so the functions collectively can align on strategy and make more effective decisions regarding investment and treatment. If the companies don't have a way to reconcile the notion of customer lifetime value with the internal financial yardsticks of the firm, it is not likely they will find a lot of support for managing based on customer value measurements. Hence, in a broader sense, the objective of this article is to develop a simple concept of customer lifetime value in the telecommunication industry, in particular in cellular telephony and to demonstrate business uses of CLV for decision support. The plan for the article is as follows. In section 2 we first present a conceptual framework that shows how CLV fits in the value chain and what are its key drivers. Afterwards, we discuss the need for transforming the customer lifetime value into a concept that managerial accounting theory can reconcile with the new management and controlling approaches. Finally, we conclude and debate contributions of our study.

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[1] Gulati, Ranjay. 2009. *Reorganize for Resilience: Putting Customers at the Center of Your Organization.* Harvard Business Press.

[2] Bobbier, T., 2013. *Keeping the Customer Satisfied: The Dynamics of Customer Defection, and the Changing Role of the Loss Adjuster.* CILA Report.

[3] Pfeifer, P., and Carraway, R., 2000. "Modeling Customer Relationships as Markov Chains," *Journal of Interactive Marketing* 14 (2), 43-55.

[4] Jain D., and Singh S., 2002. "Customer Lifetime Value Research in Marketing: A Review and Future Directions," *Journal of Interactive Marketing* 16, 34-46.

The customer lifetime value concept

Customer Relationship Management (CRM) is a managerial effort to achieve business interactions with customers by mixing business processes and technologies that pursue to understand a company's customers. [5] CRM is the process of watchfully managing detailed information about customers and all customer angles to maximize customer loyalty (Zikmund, 2003). Until recently, much of the discussion around CRM concentrated on how to make customer information available to the business, whatever the interaction channel. Current CRM thinking is focusing more on the value of the relationship between the customer and the business, and how businesses can provide products and services to their customers which develop this relationship value. Value for the business is usually monetary, that is revenue and profit, whilst value to the customer can include convenience, a good deal, even perhaps feelings of importance. However, to manage the value relationship to mutual advantage, the business needs to have an excellent understanding of the customer requirements and to be able to quantify the value that the customer is bringing to the business now, and ideally in future years. At the simplest level, business value can be quantified as the number of subscribers. This yardstick has been used as one of the main measures of the performance of the mobile phone operators. However, as the mobile market reaches saturation, the evaluation criteria are likely to move towards analyzing the value profile of the customer base. The consequence of this increasing emphasis on customer value is the inclusion of the financial dimension to CRM best practice. Customer Lifetime Value is one of the important topics in CRM, which was defined by Kotler many years ago as "The present value of the future profit stream expected given a time horizon of transacting with the customer" (Kotler, 1974). CLV can help companies to recognize the profitable users. Limitation of company's resources makes it necessary to identify profitable and non-profitable customers. Mainly, understanding customers' profitability and retaining profitable customers in knows as the main part of CRM. CLV has an important role for studies such as performance measurement or customer valuation, churn analysis, retention management, resource allocation, product portfolio management and customer segmentation. Therefore it is time to demystify the measurement of customer value - both the value today in terms of revenue and profit, but more importantly the customer lifetime value.

The CLV measures the profit streams of a customer across the entire customer life cycle. There were several motivating factors behind the need for CLV: different service levels to different customer segments, unique offers in the enterprise segment, we felt that in addition to the margin / customer loyalty played a central role in the profitability and how much we can spend on customer acquisition and retention. A comprehensive understanding of customer value should include all different aspects of a customer's contribution to the company's success (Cornelsen, 2000). The customer lifetime value signifies such a profound supplier-oriented understanding of customer value. The CLV represents an application of the principles of contemporary finance to the evaluation of customer relations. The model is aimed at the assignment of a profitability figure to the customer which is based on all prospective and directly attributable in payments and out payments. [6] There have been few different concepts of CLV developed through several research studies. Jain and Singh (2002) determined that customer acquisition costs should be included in CLV calculations and a contrary to the concept developed by Berger and Nasr (1998) that exclude customer acquisition costs (Pfeifer at al. 2005). We would argue that CLV concepts need to include customer acquisition cost. Also, we agree that CLV concept need to incorporate the time value of money and present value techniques that match the financial use of value consistent with the valuation of an

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[5] Kim, J., Suh, E., and Hwang, H. 2003. "A model for evaluating the effectiveness of CRM using the balanced scorecard". *Journal of Interactive Marketing* 17(2), 5–19.
[6] Doyle P., 2000. "Value-Based Marketing." *Journal of Strategic Marketing* Vol.8, pp. 299–311.

asset by determining its net present value. Our concept has four components: subscriber acquisition costs, customer's value over time, customer length of services and a discounting factor. Exhibit 1 depicts customer lifetime value concept in cellular telephony. The customer acquisition cost is the cost associated in convincing a customer to buy a product/service. The customer's value over time has to be estimated from current data, using business knowledge and analytical tools. A length of service model describing the customer's churn probability over time. A discounting factor describes how much each $1 gained in some future time is worth for us right now.

Exhibit 1. Customer lifetime value concept in cellular telephony

Subscriber Acquisition Costs (SAC) have to be affixed when contemplating the CLV of a future customer. With regard to existing customers, from managerial accounting perspective they have to be booked as a sunk cost. Since these costs arise only once, they may be characterized as a company's irreversible investment in the customer. Subscriber acquisition cost, or SAC, is an important but often overlooked metric when analyzing the profitability of companies in the wireless telecommunications industry. Activity-Based Costing (ABC) is often used to calculate the cost of acquiring customers through different sales channels. SAC comprises of the subsidized cost of the phone (handset subsidy) - the difference between what the manufacturer charges the carrier and what the carrier gets upfront from the client, marketing/sales costs such as advertising made for the new customer, material costs (sim cards, packages, bags etc.) and trade commissions. The SAC is defined as:

$$SAC =$$
$$Handset\ Subsidy\ + Marketing/Sales\ Costs\ +\ Material\ Costs\ +\ Trade\ Commissions$$

A high SAC figure can be significantly detrimental to a company's EBITDA growth and free cash flow as the cost of gaining a new customer is an upfront cash outflow Also, high SAC rate relative to peers can be indicative of cost overruns at the sales channel level or that the company is pricing its handsets too cheaply compared to its competitors in order to load more clients than it would normally achieve.

Average margin per user (AMPU) is one of several criteria for measuring the success of telephone companies which is calculated on the basis of net profit rather than total income, and which is the difference between the cost of serving a user and the revenue that user generates. Thus the greater the AMPU the greater the profit. In this regard, it is noted that some telecoms have started shifting their focus from ARPU to AMPU in order to maximize their returns as niche markets become saturated. It is an alternative to ARPU which focuses on revenue per user. Net AMPU equals net ARPU (Average Revenue per User) less ACPU (Average Cost per User).

To calculate the ARPU, a standard time period must be defined. Most telecommunications carriers operate by the month. The total revenue generated by all units (paying subscribers or communications devices) during that period is determined. Then that figure is divided by the number of units. Because the number of units can vary from day to day, the average number of units must be calculated or estimated for a given month to obtain the most accurate possible ARPU figure for that month. The ARPU can be broken down according to income-producing categories. For example, monthly or annual subscriber fees generate a steady revenue stream but do not take into account short-term changes in customer usage habits. The income generated by "excess minutes," roaming services or incoming calls can be highly variable. New, novel features may temporarily generate higher ARPU figures than established, proven functions. The ARPU can be calculated for each feature to identify sources of the greatest income per unit. The ARPU can also be calculated according to diverse factors such as geographic location, user age, user occupation, user income and the total time per month each user spends on the system. Within the mobile terminology, ARPU is calculated by dividing services revenues such as monthly subscription revenue, outgoing and incoming airtime revenue, inbound roaming revenue and enhanced services revenues by customer months (average number of subscribes).

ACPU is a term introduced in mobile telecom as an indicator to measure the costs incurred by the company to offer products and services to its users. It is usually calculated by dividing the total costs of a predefined period of time over the customer months. The calculation of ACPU is trickier than the ARPU calculation due to the variety and complexity of the expenses included. The variables included in the calculation of the ACPU are far more complicated than the ones used in determining the ARPU. Cost allocation and the methodology used to apply it needs to be clarified and agreed upon with the finance department before the commercial department ventures in the usage of ACPU. Cost allocation methods vary from one company to another and various types of costs (direct and indirect) need to be included. Direct costs were identified as follows: traffic costs (i.e. the costs telecom supports for using the telecommunications capacities of international operators and correspondents); leased capacities (costs of getting basic transport infrastructure to wholesale and retail services); transmission costs (costs that telecom supports for using its own systems of submarine cables, satellite, radio, and network); commutation costs (costs of managing the network); other costs of operation (including costs of activities such as engineering, maintenance, management and control, planning, computer systems, training services etc., when these are developed for specific products/services; commercial costs (marketing costs, and other costs related to the commercial function when concerned with specific products/services); and direct costs of capital (costs of capital of the specific fixed assets used to obtain products/services). Following the above mentioned,

simplifying in mobile industry we will get that direct cost comprises of the network costs (leased lines costs, BTS site costs, maintenance costs, and MSC costs), interconnection charges and roaming costs. Indirect costs comprised the following items: costs of capital not specific to any fixed asset used to obtain products/services; costs of activities not directly associated with cost objects; costs of transmission of systems whose capacity was not used; costs generated by staff departments and costs of macro-structure; and capital expenditures are usually accounted for in the ACPU by allocating their depreciation value for the period of time that the ACPU represents.

The AMPU is defined as:

(1) $AMPU \; = \; ARPU - ACPU$

(2) $ARPU = \dfrac{Service\ Revenue}{Customer\ Month}$

(3) $ACPU = \dfrac{Direct\ Costs + Indirect\ Costs}{Customer\ Month}$

Furthermore, discussing the AMPU, the central premise is that by attention to the margin produced per sold unit, not the amount of cash (revenue) earned from each customer, and one can afford low volumes and still have a healthy company. [7] High volumes can also bring a significant edge, but only until competition forces prices down. Telecom analysts are traditionally highly focused on ARPU because the typical telecommunication company has had huge infrastructure costs that needs to be serviced by a considerable ARPU.

Discount rate (WACC) handles the time value of money. The WACC comprises of six parameters. Three of these are independent of the product market under assessment (the risk-free rate, taxes and equity risk premium) and are estimated using available statistics and studies according to well-defined and transparent criteria. The remaining three parameters (debt-risk premium, financial gearing and beta) are determined by the market to be regulated. These are estimated using a group of companies that serve as reasonable proxies for an efficient operator for mobile voice call termination. The companies are also denoted "pure play", although it in practice can be difficult to find really 'pure' companies, i.e. companies solely focused on mobile telecommunication. These are referred to as the "peer group" of mobile operators.

The risk free rates are country specific and represented by 10 years government bond yields. [8] As debt risk premium an industry average of 200 basis points yield spread is used to represent a typical telecom operator. [9] The corporate tax rates are also country specific and the gearing of 35% is constant across the countries as an industry average. [10] Just as a cost of debt, the cost of equity is intended with a mixture of

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[7]   Daniel F. Spulber., Christopher S. Yoo., 2009. *"Networks in Telecommunications: Economics and Law,"* Edition: 1st.

[8]   Graham, J. R., and Campbell R. H. 2002. "The Theory and Practice of Corporate Finance: Evidence from the Field." *Journal of Financial Economics*, pp. 187-243.

[9] The Swedish Post and Telecom Authority, 2008. "Cost of Capital for Swedish Mobile Telecom Networks." Copenhagen Economics. Accessed November 11, 2015.
http://www.copenhageneconomics.com/dyn/resources/Publication/publicationPDF/9/49/0/Mobil_WACC_18marts_final.pdf

[10] KPMG, 2013. "Corporate and Indirect Tax Survey 2012," KPMG Tax. Accessed November 11,2015.https://www.kpmg.com/DE/de/Documents/Corporate_and_Indirect_Tax_Survey_2012.pdf

approximates and real figures. The WACC is a weighted average of the cost of borrowing capital and the costs of raising capital through equity. The two estimates are then weighted together in order to provide the lowest possible cost of capital for the investor. The parameters of these calculations are given by the WACC - formula which is derived from the capital asset pricing model (CAPM). The post-tax WACC is defined as:

$$(4) \quad WACC = g \times (1-T) \times (Rf + DRP) + (1-g) \times \underbrace{(R + \beta\, ERP)}$$

$$\qquad\qquad\qquad\qquad Cost\ of\ Equity \qquad\qquad\qquad Cost\ of\ Debt$$

where

$$(5) \quad g = \frac{Sum\ of\ Debt}{Sum\ of\ Debt + Sum\ of\ Equity} = \frac{D}{E-D}\, g$$

The parameters are defined as follows: T is the company tax rate; DRP is the Debt Risk Premium, i.e. the difference between the risk free rate of return and the interest of company debt; Rf is the risk free interest rate; ERP is the Equity Risk Premium (i.e. the required interest on a relevant market portfolio above the risk free rate), and; ßj is the asset beta, i.e. the sensitivity of the return on asset j relative to a market portfolio.

Retention rate is defined as the probability that a customer continues its relationship with the company through a given time period. Modeling retention involves explaining the retention level based on customer behavior and characteristics.[11] When it comes to modeling predictions, the procedures depend on what kind of date is available. Most recent theory apply to cases when the dataset constitutes of usage data and customer characteristics, i.e. call history, contact with customer service, amounts spent, age, gender, etc. Churn is closely related to the concept of average customer lifetime. **Customer churn** is the opposite of customer retention. In the telecommunication industry the broad definition is the action that a customer's telecommunications service is cancelled. Churn can be of several types: involuntary churn (this occurs when subscribers fail to pay for service and as a result the provider terminates services, voluntary churn (service termination on the part of the customer when leaving one operator for another) and unavoidable churn (when customer die or are otherwise permanently removed from the market). The factors that are considered to have most influence on the customers' likelihood to churn vary between markets and customer segment. In telecom, the most commonly mentioned in recent research studies include network quality, new competitors, handsets, tariffs, new technology / product introduced by competitors, fraud, customer service and brand image. When talking about individual subscribers or customers, sometimes the expression "retention rate" is used to mean 1 minus the churn rate. For example, for a group of subscribers, an annual churn rate of 20% is the same as an annual retention rate of 80%. Both imply a customer life time of 5 years.

$$(6) \quad Customer\ lifetime = \frac{1}{Churn\ rate}$$

$$(7) \quad Retention\ rate = 1 - Churn\ rate$$

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[11] De Pock, K. and Van den Poel, D. 2011. "An Empirical Evaluation of Rotation-Based Ensemble Classifiers for Customer Churn Prediction." *Expert Systems with Applications*, Belgium.

Churn rate has a simple definition for a wireless operator – it is the number of net deactivations (i.e. gross adds – net adds) divided by the average number of the subscribers during the year

$$(8) \quad Churn\ rate = \frac{Net\ deactivations}{Avg.number\ of\ subscriber}$$

$$(9) \quad Net\ deactivation\ =\ Gross\ adds - Net\ Adds$$

Managing customer churn is great concern to global telecommunications service companies and it is becoming a more serious problem as the market matures. The annual churn rate ranges from 20% to 40% in most of the global mobile telecommunications service companies. [12] Customer churn adversely affects these companies because they stand to lose a great deal of price premium, decreasing profit levels and a possible loss of referrals from continuing service customers (Reichheld & Sasser, 1990). Furthermore, the cost of acquiring a new customer can substantially exceed the cost of retaining an existing customer. In a highly competitive and maturing mobile telecommunications service market, a defensive marketing strategy is becoming more important. Instead of attempting to entice new customers or lure subscribers away from competitors, defensive marketing is concerned with reducing customer exit and brand switching (Fornell & Wernerfelt, 1987). In order to better manage customer churn, companies need to fully understand a customer's behavioral churn path and the factors pertaining to the customer churn; however, these problems have not been fully addressed in the literature. Having all needed parameters it's time to move forward. There are several ways to calculate CLV in a business context. The simplest way to model CLV can be expressed with the following formula:

$$(10) \quad CLV = -SAC + \frac{AMPU}{r+c}$$

Here is what a simple LTV table looks like:

ARPU - Average Revenue per User	€ 200.00
ACPU - Average Cost per User	€ 100.00
AMPU - Average Margin per User	**€ 100.00**
SAC - Subscriber Acquisition Costs	**€ 50.00**
c - Customer Churn Rate	25.00%
R - Customer Retention Rate	75.00%
t - Customer Lifetime in Years	4.00
r - Discount rate (WACC)	10.00%
Simple CLV	**€ 235.71**

In other words, the lifetime value is simply the average margin per user times lifetime in years discounted with appropriate discount rate less the initial cost of customer acquisition.

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[12] Berson, A., Smith, S., and Therling, K. (1999). *Building data mining applications for CRM*. New York: McGraw-Hil

	Acq. Year 1	Year 2	Year 3
Customers	200,000	178,640	159,990
Churn Rate (monthly)	0.89%	0.87%	0.85%
Retention Rate	89.32%	89.56%	89.80%
ARPU - Average Revenue per User	€ 41.00	€ 41.50	€ 42.00
ACPU - Average Cost per User	€ 26.00	€ 26.00	€ 26.00
AMPU - Average Margin per User	€ 15.00	€ 15.50	€ 16.00
Subscriber Acquisition Costs per Gross Adds	€ 150.00		
Service Revenue	**€ 98,400,000**	**€ 88,962,720**	**€ 80,634,952**
User Costs	€ 62,400,000	€ 55,735,680	€ 49,916,875
SAC - Subscriber Acquisition Costs	€ 30,000,000		
Total Cost	**€ 92,400,000**	**€ 55,735,680**	**€ 49,916,875**
Profit	**€ 6,000,000**	**€ 33,227,040**	**€ 30,718,077**
Discount rate (WACC) at 16%	1.000	1.160	1.346
Net Present Value Profit	€ 6,000,000	€ 28,644,000	€ 22,828,535
Cumulative NPV Profit	€ 6,000,000	€ 34,644,000	€ 57,472,535
CLV per Year	**€ 30.00**	**€ 143.22**	**€ 114.14**
Cumulativ CLV per Year	**€ 30.00**	**€ 173.22**	**€ 287.36**

In this table we are observing at a group of 200,000 newly acquired wireless customers. We will examine their performance over a three-year period using the full CLV calculation. There are many gross adds but we are not looking at them in this chart. Note that of the 200,000 customers who were acquired in year 1, only 178,640 of them were still connected in the second year. That means that that the retention rate in the first year was 89%. This annual retention rate is the result of a monthly churn rate of 0.89%. The retention rate is easily calculated from the monthly churn rate by a simple formula mentioned above:

RR = 1 − (Monthly churn rate x 12)

RR = 1 − (0.0089 x 12)

RR = 89.32%

In the table above ARPU (average revenue per unit) stands for average monthly revenue. The total revenue is computed by multiplying the ARPU times the number of customers, times 12. The profit, is simply the revenue minus the costs. Once you have decided on a WACC, you need to compute the discount rate that applies to amounts to be received in each year. In this case, discount rate is 16%. Further years are 1.16 x 1.16 = 1.346, and so on. When you have the discount rate, each of your expected profits must be discounted so as to arrive at the Net Present Value of these future profits. The process is a simple:

Net Present Value (NPV) Profits = Profits / Discount Rate

The Net Present Value of the 30,718,077 EUR profits expected in Year 3 is 22,828,535 EUR, which is the result of dividing 30,718,077 EUR by the discount rate of 1.346. Than, add together the net present value of all the profits in the present year, and each previous year. The net present value of profits realized by the third year, is equal to sum of the net present value of the profits in the Acquisition year + Year 2 +

Year 3. The lifetime value is the Cumulative NPV profit in each year, divided by the original group of customers (in this case 200,000). Mainly, the NPV lifetime value represents the average profits you can expect to receive, after a given number of years, from the average new customer that you can sign up today. The customer lifetime value of the average new customer in the third year is 287.36 EUR:

$$CLV \ = \ CUM - NPV/\,Acquired\ customers \ = \ 57{,}472{,}535\ EUR\ /\ 200{,}000 \ = \ 287.36\ EUR$$

This means that the 150 EUR SAC per gross add has generated good profits for the firm. As a 16% discount rate has been used, the ROI on the marketing investment is more than a 16% return.

Customer lifetime concept and managerial accounting theory

The marketing and sales functions have long understood that to generate maximum financial return for their company from their budgeted spending, they need to determine which customers they should spend the most money attracting, retaining, growing, and recovering. In contrast, the finance and accounting function which usually spearheads companywide performance management projects has traditionally focused on cost reduction as the sole road to higher profits in the marketing realm. The problem stems from managerial accounting systems' concentration of attention on product or service-line costs (which are often flawed by arbitrary, broad, average-based cost allocations). An analysis with an expanded scope would break down costs by customer. But financial accounting regulations require line expenses below the gross margin including costs related to distribution channels, sales, and marketing to be recognized during the period in which they were incurred. They cannot be capitalized and stored in the balance sheet the way product costs can be stored as inventories. However, just because expenses must be classified that way to comply with external financial reporting regulations doesn't mean that customer data can't be used differently in internal managerial accounting to support the analysis and decision-making of managers and employee teams. Accountants should begin applying the same costing principles they use for product costing including Activity-Based Costing principles to types of channels and types of customers so that there is visibility into all traceable and assignable costs. The finance department should also be involved in customer analytics activities in order to move customer relationship management to the next level. The day is coming when the CFO will need to turn his or her attention from the operations functions and cost controls to the support of decisions being made by the chief marketing officer and sales director about which kinds of customers and sales prospects they should focus on. Companies that fail to consider customer value from a rigorous finance and accounting perspective are losing an important opportunity to improve the company's economic value over the long term.

Telco business is no longer about just growing sales, but rather growing sales profitably. To be competitive, a telco company must know its sources of profit and understand its cost structure. A good customer relationship management (CRM) system includes end-to-end functionality from sales-lead management to order tracking, and ideally it's seamless. An Activity-Based Costing (ABC) system can enhance CRM by showing the cost to serve each telco customer, including expenses for interactions like customer-service phone calls, dropped calls, the proportion of services that take place through high-cost channels, or special delivery requirements. When the profit margin and cost to serve for a customer's product

mix are combined in a performance analytics setting, companies can more clearly see which customers are generating the most profits for them. The telecommunication companies that are the most advanced in customer analytics have become competent in measuring current-period customer profitability. ABC and its supporting technologies have provided the capability to trace and assign the unique consumption of the company's resources by subscribers, channels, services, and products.

From the time when it was introduced in 1980's (Kaplan, Bruns, 1987), the Activity-Based Costing model has been broadly recognized in theory as one of the most superior cost and profit measurement methods and tool for overhead costs assignment to products, services, customers or other cost objects. Over-all, ABC has in large extent made obsolete the traditional cost management systems based on arbitrary overhead costs allocation, and enabled much higher level of accuracy in determination of actual costs of production as it seeks to identify the real cause-effect relationships in the process of indirect costs assignment. Furthermore, it has become a base for development of new management and controlling approaches, such as Activity-Based Management and Activity-Based Budgeting.[13] Even though the geneses of ABC are in the production industry, the model has been proved to be even more valid and beneficial for the services industries, more implicitly in the banking, health institutions and education and telecommunication sector. Practically all the costs in these ranges are overheads and fix over period of time, in contrast to manufacturing where still, the major portion of costs are direct and variable to the volume of production and sales. ABC in service entities have to take, first of all, the customer behavior into account which is feature distinguishing these system from Activity-Based Costing as used in manufacturing enterprises. In manufacturing firms only the cost of marketing, selling, order handling, delivery and service of the products might be customer-specific. Used for service companies, in contrast, even the basic operating costs of standard service are determined by customer behavior (Kaplan and Cooper, 1998).

The above statements are also valid for the telecommunication industry, which faces huge market and technological changes in terms of services diversification and convergence, and increased competition by the new alternative providers, on the other side. In addition, the telecommunication carriers experience have significantly increased requirements by the state regulators in the area of interconnect charging between operators, followed by the continuous pressure on optimization of costs that are subject to calculation of interconnect prices. The saturation of telecommunication markets and pressure on prices, customer lifetime, profitability / profit margin per customer becomes much more important than traditionally one of the key parameters, average revenue per user. In addition, the service combinations, offered on the market as bundled products, have considerably increased the need of sophisticated profitability tools and models in order to understand and control the real profit drivers in the telecommunication business. Traditional cost methodologies cannot provide required level of accuracy to cope with the complex service and product combinations that have recently become typical and commonly offered on the market. The development of telecommunication technologies, which was the main precondition for bundling the products, also put the analysts and business experts in position where the key factor of success is determination of true costs of services / customers and finding the optimal and most profitable product / technology combinations which are to be offered to the increasingly demanding customers. Mainly, not all the customers have equal usage behavior, so employment of simple cost allocation methods will not provide clear picture of each customer or customer segment profitability. Applying the fixed pricing models per period, where customers receive high-end handsets and bundled minutes included in monthly subscription, it becomes of crucial importance to understand customer profitability, as not all of the customers use the same

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[13] Cokins, G. 2001. "Activity-Based Cost Management: An executive's guide*." New York, NY: John Wiley & Sons, Inc.*

volume of service and resources provided by the operator. Finally, operators are interested in identifying the true costs and profitability of the technical network they employ, which becomes increasingly difficult in recent times where various logical networks and protocols share the same transmission network, thus turning the traditionally directly attributable costs into indirect, which will have to be additionally allocated to specific services and customers.

Potential enhancements of customer lifetime value over the profitability are among the crucial advantages assisted by the activity-based methodologies. ABC logics basically does not recognize fixed costs and these specific objectives of ABC model to convert the traditionally fixed costs into variable aims to provide a different view on the changes in profitability with changes in operations and sales. In that way the activities represent a link between the resources costs and cost pools to the costs and profits of the cost objects, i.e. customers. Traditional costing methodologies, on the other hand, do not offer visibility on the true customer profitability, simply because of the fact that the allocation of costs to final cost objects is done by using allocation keys that are determined on the basis of subjective assumptions by the controlling officers or management of the company. Total customer profits comprise of each unit profit and it is a common case that it is a combination of profitable, less-profitable and loss-making customers. The real challenge is to accurately identify the true profit margins of each customer segments or even of the unique services provided and customers served. Our focus on customer lifetime value is due to the fact that for service providers, such as mobile operator, it is much more crucial to manage and control the customer and customer segments profitability than product or service profitability. This experience is a result of specifics in the service industries, where usually, the sales include also post-acquisition activities, such as customer service or support, which is not often the case with the manufacturing businesses. In other words, the customer lifetime value for service companies depends heavily on the behavior of each specific customer. Although many of the customers have bought the very same service package, the profit generated by every single customer is not the same, as a result of their different behavior and demands for support by the service provider. Therefore, the telecommunication service providers need to identify the difference in CLV of individual subscribers, even those using standard service packages. [14]

The possible problems in implementing ABC in telecommunication sector are mainly related to complexity and continuous technological and market changes. However, there are also some subjective reasons, such as: inadequate communication among employees, lack of management commitment and vision accompanied by the employees' resistance on implementing system of detailed tracking of their day-by-day activities. Some of those issues could be solved by applying of the less complex Time-Driven Activity-Based Costing method. The time-driven approach avoids the costly, time-consuming and subjective activity-surveying task of conventional ABC. It uses time equations that directly and automatically assign resource costs to the activities performed and transactions processed. Only two parameters need to be estimated: the capacity cost rate for the department and the capacity usage by each transaction processed in the department. It is evident that the TDABC model solves the issues of complexity and expensiveness of the conventional ABC, yet there might be certain concerns related to simplified process of activity mapping and threats for losing some quality and opportunities in the area of Activity-Based Management. However, TDABC could be seriously considered as an option in all cases where there are constraints regarding the implementation and maintenance costs and processes' complexity. [15] In regards to the benefits, it is obvious that successful

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[14] Damjanovski, S., 2013. "Applicability of Activity-Based Costing and Related Management Tools: The case of Ipko Telecommunications LLC." Master's thesis, University of Ljubljana Faculty of Economics.
[15] Kaplan, R., and Anderson, S. 2007. "Time-Driven Activity-Based Costing: A simpler and more powerful path to higher profits." *Boston Massachusetts: Harvard Business School Press.*

implementation of ABC/M in telecom providers could result in much better understanding of profit drivers throughout the technical and commercial processes, but certainly the most important is that the company can gain significant long-run competitive advantage in the area of pricing and cost controlling, which are considered to be the key success factors in this continuously changing industry segment. Carrying out of ABC/M requires engagement of sophisticated software application that will support tracking and analyzing of massive volume of data throughout the period. Globally, there are several software tools already established as a 'top of class' systems in this area: SAP, Oracle, Acorn Systems, QPR Cost Control and SAS. As an ultimate purpose of ABC implementation is to support and improve the decision making process, it is of crucial importance that ABC/M system has to be in some way integrated in the overall performance management and measurement system of the company. The clients are more interested in employing integrated solutions with the rest of their systems, i.e. prefer the built-in ABC functionalities in the ERP and EPM systems in use.

Conclusion

Customer lifetime value is a practical concept that should not be considered a marketing concept but a cooperative financial / marketing concept that identifies customers as vital assets whose return needs to be calculated using various financial methods based upon the time value of money. The literature on customer lifetime value has reached a junction where numerous models have been proposed to estimate CLV in different context. In this paper we have argued that CLV concepts in telecoms need to include customer acquisition cost. Also, we have agreed that CLV concept need to incorporate the time value of money and present value techniques that match the financial use of value consistent with the valuation of an asset by determining its net present value. Customer lifetime value is an influential and straightforward measure that fuses customer profitability and churn risk at individual customer level. For existing customers, customer lifetime value can help companies develop customer loyalty and treatment strategies to maximize customer value. For newly acquired customers, customer lifetime value can help companies develop strategies to grow the right customers. It is relatively obvious that telecommunication operators, like most of providers doing business in the service industries, can gain substantial advantages by adopting the ABC concept. Potential enhancements of customer lifetime value over the profitability are among the crucial advantages assisted by the activity-based methodologies. Also we have debated that ABC logics basically does not recognize fixed costs and these specific objectives of ABC model to convert the traditionally fixed costs into variable aims to provide a different view on the changes in profitability with changes in operations and sales. Finally, we think that customer lifetime value models are a powerful tool to help telco businesses demonstrate the future value they can generate from marketing and sales activities.

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