COST-TO-SERVE MEASUREMENT AND CUSTOMER PROFITABILITY ANALYSIS: A CASE STUDY AT A FOOD INDUSTRY IN BRAZIL

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ABSTRACT
Nowadays, companies operate in complex and very competitive markets. This has brought about a decrease in the margins of the products they trade. The innovations in management accounting developed in recent decades was directed at getting better measurement of products' manufacturing cost, while little has been done to measure how much it costs to attend the customers needs. This study aims to assess the information quality for customer profitability management produced by measuring the cost-to-serve (CTS) at a food industry. The research methodology was based on a single case study, whose results demonstrate that cost-to-serve information can be very useful in the customer profitability management process.

KEYWORDS: customer profitability, cost-to-serve, marketing cost, activity based costing.

1. INTRODUCTION

Companies routinely seek detailed information about the manufacturing costs of their products, but often have little idea about how much it costs to serve their customers (Braithwaite and Samakh, 1998). This is somewhat incongruous, given that a company's profit generation is often as dependent on the costs of serving its customers as it is on the costs of producing its goods. In service companies in particular, profitability per customer is more important than profitability per product; however, the costs of services are often dependent on the customer's behaviour, rather than that of the provider (Kaplan and Narayanan, 2001). Given these circumstances, many companies report that they require a reliable tool to determine the effects of customers' cost on profitability (Norek and Pohlen, 2001).

As a way of measuring their profitability, many companies use either the contribution margin or the gross profit margin (Sharman, 1996). The former uses the variable-costing method (with the contribution margin generated during a certain period being enough to cover the fixed costs and expense structure of that period, and thus constituting the company's profit), whereas the latter uses the absorption-costing method (with all production costs being allocated to the products, and the gross margin covering all organizational expenses). However, both of these costing methodologies focus on the measurement of the manufacturing costs of products, and do not therefore address the question of spending in relation to customer-service activities. It is thus apparent that cost-measurement models have not advanced in terms of identifying how customer-service costs affect the cost structures of companies and the measurement of customer profitability.

Various authors have emphasized the relevance of measuring customer-service costs. For example, Blattberg and Deighton (1996) observed that, in this customer-focused age, companies should focus on building and managing relationships as equity, rather than concentrating only on their own brand. To do this effectively, they need to be able to measure, select, and establish appropriate relationship policies for each type of customer. In this context, Anderson et al. (1997) contended that the verification of appropriate relationship policies is basically concerned with such factors as the changing needs of customers, variations in bargaining power, and the creation of alliances and collaborative relationships.

Sheth and Sisodia (1995a, p. 11) were in general accord with this view when they declared that "… ultimately, the desired output of marketing can be stated in simple terms: acquiring and retaining customers profitably". A useful measure of marketing productivity must therefore include the economics of both customer acquisition and customer retention. According to Sheth and Sisodia (1995a), many companies obtain negative returns in relation to their increased commercial spending; nevertheless, they argued that well-spent marketing resources can be highly productive.

Niraj et al. (2001) have noted that, in recent years, marketing professionals and academics have developed a series of new marketing concepts while emphasizing the importance of constructing relationships with customers. The basic premise behind these concepts is that a 'customer-driven' approach

enables a company to focus on individual customers and thus improve its profitability by serving these customers in a differentiated manner.

Few empirical studies have actually addressed this problem. The present study aims to bridge this gap by identifying relevant behavioral standards with respect to the use of service-cost information and customer-profitability analysis. It does this through a case study of a Brazilian food-industry company with high operational complexity and an extensive customer product and commercial service line. In this sector, profitability is low (Milone, 2003), and the management of resources related to customer service can thus have a significant impact on business results.

The study is divided into four parts. Following this introduction, the second section of the paper presents a literature review of the theoretical foundations of cost-to-serve measurement and customer-profitability analysis. The third section of the paper presents the empirical case study of the food company. The results of this case study are then discussed. Finally, the paper presents its main conclusions and implications.

2. THEORETICAL FRAMEWORK

An accurate customer-profitability analysis is required if companies are to formulate appropriate marketing strategies and optimize their profits. Such an analysis involves an accurate assessment of customer-service costs and profitability per customer. In this context, two themes are prominent in the marketing and management-accounting literature: (i) cost-to-serve (CTS); and (ii) customer-profitability analysis (CPA).

2.1 Measurement of cost-to-serve

Most academics have advocated the ABC system as the most appropriate costing method for measuring customer-service costs. For example, Kaplan and Cooper (1998) stated that the ABC system is, in theory, the most appropriate method for determining customer-service costs in companies with complex product, customer, and service requirements.

However, despite this endorsement, ABC accounting has traditionally been applied to the measurement of costs in industrial activities, and only a limited number of empirical studies have applied this system to customer-service activities. In this regard, Kaplan's (1989) case study of the Swedish company, Kanthal, was a pioneering work (as discussed in greater detail below). Other authors who have addressed this subject include Lewis (1991), who described a relatively simple ABC system for assessing marketing costs per product line and indicated how this might be used to structure a profitability statement. Turney and Stratton (1992) presented a more structured activity-based model that included two activity levels—micro-activities and macro-activities—in allocating costs to products and customers. Foster and Gupta (1994) emphasized that marketing costs represent a significant part of the cost structure of many companies; however, in comparison with industrial cost studies, they noted that marketing costs have received very little attention in the accounting literature. Stapleton et al. (2004) noted that the ABC system, after more than a decade of slow growth, had been achieving greater acceptance as a marketing and logistics cost-determination tool. In addition to these contributions, various conceptual studies have associated logistics activities and customer-service costs system in

the ABC system (Pohlen and La Londe, 1994; Lambert and Burduroglu, 2000; Cokins, 2003).

The term 'cost-to-serve' has been used to describe customer-service costs by several authors (Kaplan, 1989; Cooper and Kaplan, 1998; Braithwaite and Samakh, 1998; Kaplan and Narayanan, 2001); indeed, Braithwaite and Samakh (1998) even registered the 'Cost-to-Serve' brand. However, the term 'cost-to-serve' (CST) has not been universally adopted in the literature. Other terms with a similar meaning include 'customer service cost' (Hansen and Mowen, 2000), 'marketing costs' (Foster and Gupta, 1994), and 'marketing and logistics costs' (Stapleton et al., 2004).

In the costing process of different objects, such as customers and marketing channels, Kaplan and Cooper (1998) recommended the allocation of sales, marketing, distribution and administrative (SMDA) expenses to the costing objects, in accordance with the proposal of Christopher (1997). Kaplan and Cooper (1998) noted that such an allocation of expenses is not usually applied to customers—because it is generally considered that these expenses are fixed and that any allocation would be random and confusing. However, in view of the growth of these expenses in all companies, Kaplan and Cooper (1998) argued that that are not actually fixed costs.

In an effort to simplify the ABC method, Anderson and Kaplan (2004) proposed a so-called 'time-driven ABC'. The novelty of this approach is its emphasis on *time* as an activity-time driver and its determination of the unit times of services and non-used capacity time.

On the basis of the above discussion, the present study aims to facilitate CPA by positing 'cost-to-service' as the cost of the administrative, commercial, and logistic activities related to customer-service delivery, as measured through the ABC methodology.

2.2 Analysis of customer profitability

The few empirical studies of customer-service cost measurement almost invariably associate the measurement of such costs with analysis of customer profitability. Customer profitability can be assessed as the contribution margin (or gross margin) of the products sold, less the costs to serve the customer(s). Most studies about CST are thus associated with analysis of customer profitability. For example, Guilding and McManus (2002) studied so-called 'customer accounting' (CA) practices with three objectives: (i) to appraise the incidence of CA; (ii) to assess practitioners' perceptions of CA's merit as a managerial tool; and (iii) to develop and test hypotheses concerned with contingent factors that might affect the use and perceived merit of CA. One of these CA practices was analysis of customer profitability.

The 'Kanthal Case' (Kaplan, 1989; Kaplan and Cooper, 1998; Kaplan and Narayanan, 2001) is an illustrative example of how information about customer-service costs can modify a firm's relationship with customers who are not profitable propositions. In this case, the two largest-volume customers of Kanthal (a Swedish manufacturer of heating systems) were found to be the least profitable propositions to the company. In reviewing the case, Kaplan (1989) noted that only large-volume customers have the power to produce significant losses for a company; indeed, according to Kaplan (1989), large customers tend to be either the most profitable or the least profitable for the supplier, and rarely

return an ‘average’ customer profitability. One of the more significant findings of Kaplan’s study (1989) of Kanthal is the so-called ‘whale curve’. The analysis of accumulated profitability per customer demonstrated that 20% of the customers generated 225% of total profits, whereas 70% of customers were on the balance point and 10% generated a loss of 125% of total profits. This analysis enabled adjustments to be made to prices and supply volumes with the two least-profitable customers with a view to maintaining relationships on a commercial basis.

According to Braithwaite and Samakh (1998), traditional cost-determination systems do not permit accurate analysis of individual customer performance in companies with a wide range of products—because the contribution margin, in itself, does not enable the identification of relevant differentiating factors that determine the profitability of particular distribution channels. These authors suggested that adoption of the CST approach could enable identification of such drivers for change as variety cost, customer-channel management, customer-service objectives, company supply structure, commercial price policy, and functional costs and staff remuneration.

They therefore proposed a CST measurement model, which was based on their experience of a high-tech electronics firm. This model was founded on the following concepts: (i) activities, (ii) distribution channels; and (iii) product families. Customers were classified in four channels: (i) distributors; (ii) large accounts; (iii) retailers; and (iv) original equipment manufacturers. In summary, the model enabled the calculation of the main customer-service activity costs. The costs of these activities were then allocated to distribution channels on the basis of certain cost drivers. Finally, channel costs were allocated to products, based on sales volumes. An important concept to emerge from Braithwaite and Samakh’s (1998) profitability analysis is so-called ‘margin erosion’ per distribution channel and product family.

CST was also used to manage sales channels in a study by Gebert (1996) of the American company VLSI Technology Inc. The main changes proposed on the basis of the study findings were: (i) service to small customers with a high CST to be carried out through distributors; (ii) simplifications and reductions in sales team’s administrative duties; and (iii) the allocation of investments from small customers to large customers (which, according to the analysis, was a more profitable strategy).

According to Cooper and Kaplan (1998), customers with a low CST are not always the most profitable proposition for a supplier, especially when such customers are aware of their low CST condition. These authors gave the example of the retailing network, Wal-Mart, which demands large discounts in exchange for the reduced service costs they believe their suppliers obtain in the operation. It is therefore not enough to know whether a given customer’s CST is high or low; the final analysis depends on the commercial policy adopted in each case.

According to (Kaplan and Cooper, 1998, p. 211), understanding customer profitability as a function of CST is “an alternative to … trying to achieve low cost and product differentiation simultaneously”. By using a CST analysis, a company can seek to be profitable on all customer types, irrespective of cost or product differentiation. The most important consideration in CPA is that

management is provided with information about customers who are not a profitable proposition, and can thus focus on developing innovations and strategies to enhance the profit generated from a given customer, without reducing that customer's satisfaction. Alternatively, management can focus on restructuring processes with a view to enhancing general profitability from customers.

Smith and Dikolli (1995) noted that the impact of ABC on CPA has attracted relatively little attention in the management accounting literature. According to these authors, CPA is justified if the cost/benefit of compiling information is favorable and if the result of any subsequent strategic decision leads to increased profits.

A study by Niraj et al. (2001) integrated relevant studies from the marketing literature and the CPA literature to develop a conceptual model to assess profitability from individual customers. The model, which was applied in a specific case study of a distributor with a large heterogeneous customer base, analyzed the firm's supply chain using ABC analysis. The same study demonstrated that many purchase characteristics of customers exert opposing effects in terms of gross margins and service costs—leading to the conclusion that a focus on customer revenues alone as a profitability driver can produce misleading results. In the final analysis, the study by Niraj et al. (2001) came to similar conclusions to those of earlier studies (Kaplan, 1992; Braithwaite and Samakh, 1998) in finding that a small proportion of customers is responsible for a large proportion of profitability, whereas a large customer volume can be unprofitable.

A study by Raaij (2005) placed greater emphasis on the strategic use of information from CPA than on the measurement methodology itself. According to this author, CPA provides two types of insights. The first refers to the level of profitability obtained from each customer, whereas the second refers to the distribution of profitability across the whole customer base. These two insights can facilitate analyses of: (i) costs and revenues; (ii) risk; and (iii) strategic positioning.

A study by Triest (2005), involving customers from a hygiene company in a business-to-business environment, focused on the customer profitability margin and attempted to identify the variables that provoked higher profitability margins from large-volume customers. According to this author, an accurate analysis of profitability obtained from an individual customer requires an assessment of profitability at the customer level, and not only at the product level. In the relationship between a company and its customers, the cost of the products or services the firm offers are only one part of the total costs incurred in the relationship. Activities such as order management, logistics, sales, marketing, and customer support are performed at different levels, according to individual requirements, and this generates significant differences in the profitability levels of individual customer relationships, which go deeper than the differences in profitability margins among various products.

Innovative companies now acknowledge that they can achieve higher profits by recognizing that different customer groups have quite distinct responses to marketing efforts. In this regard, Zeithaml et al. (2001) noted the case of the Federal Express Corporation, which has revolutionized its marketing

philosophy by ranking its customers as ‘good’, ‘bad’, and ‘ugly’ on the basis of the criterion of customer profitability. Rather than expending equal marketing efforts on all customers, the company concentrates its efforts on ‘good’ customers, while simultaneously attempting to move the ‘bad’ ones into the ‘good’ category and discouraging the ‘ugly’ ones. Companies have thus discovered that they do not need to serve all customers in the same way—because many customers cost significantly more to be served and have a low potential to become a profitable proposition for the supplier, even in the long term. Many companies are becoming aware that it is neither practical nor profitable to deliver high-quality services with a view to complying with all customers’ expectations.

It is this becoming increasingly apparent that an examination of the key elements of costs and revenues in the customer-profit equation enables a firm to increase current and future profitability in its customer portfolio. In this regard, Zeithaml et al., (2001) proposed a profitability-based customer-segmentation model (the so-called ‘customer pyramid’ model), which consists of four levels of profitability from customers. The first level (the ‘platinum’ level) consists of a small group of the customers who represent the most profitable return for the supplier. The second, third, and fourth levels (‘gold’, ‘iron’, and ‘lead’) include larger groups of less profitable customers. The rationale for this pyramid is that a company can use its knowledge of different levels of profitability from various customers to maintain or enhance profitability from individual customers by appropriate levels of service quality and optimal allocation of resources.

The literature on this subject has addressed the well-known ‘80/20 rule’—that is, the notion that 80% of a company’s profits come from 20% of its customers, while the remaining 20% of profits are provided by 80% of customers (Zeithaml et al., 2001; Horngren et al., 2003). In a similar vein, the Kanthal case (Kaplan, 1989) demonstrated that 20% of customers were responsible for 225% of profits, and the Blue Ridge case (Foster et al., 1996) demonstrated that 0.8% of the customer base contributed 67% of the company’s operational income and 38% of total revenues. Similarly, Triest (2005) noted an unpublished empirical study carried out by Storbacka in 1997, which demonstrated that 5% of customers in two banks were responsible for 90% of profits and 25% of the banks’ total revenues. These results indicated that profitability results not only from the high volume of revenues obtained from large customers, but also from their higher profitability margins.

With regard to the application of ABC in CPA, Johnson (1992) suggested that activity-based concepts are over-rated and that what really matters is a focus on the customer’s total satisfaction. According to this author, if a customer really wants frequent deliveries in small parcels, and an alternative supplier can attend to these needs, then the activity analysis can be confusing for the supplier. However, Smith and Dikolli (1995) noted that Johnson’s (1992) reasoning presupposes that the supplier will be induced to give up the customer and allow another supplier to serve his or her needs. According to these authors, a supplier using ABC for CPA could perceive that the customer is not a profitable proposition, but nevertheless want to comply with established service levels. In support of this contention, Smith and Dikolli (1995) referred to Kaplan’s (1992) study, which discussed three types of potentially non-profitable customers who

should be retained: (i) new and growing customers who promise more profitable business in the future; (ii) those who provide qualitative learning benefits (rather than financial benefits); and (iii) those who are acknowledged as leaders in their market or specialty area. According to Kaplan (1992), the fact that a customer is not a profitable proposition does not mean that he or she should be eliminated or necessarily persuaded to accept negotiation terms that reduce the customer's satisfaction level.

3. CASE STUDY

3.1 Methodology

This case study was conducted at a Brazilian food business over a period of six months using non-structured interviews with key persons and documentary analysis. The company authorized the study on the condition that its name and customers remain confidential for commercial reasons.

The study company was founded in the early twentieth century. By 2004, its gross sales amounted to more than BRL500 million (about US$200 million). Its brand is a leader in some states of Brazil, with the majority of company sales being concentrated in the south and south-east of the country. Sales and promotions are managed through nine regional sales departments, each of which controls its own team. Their function is to place all of the company's product lines on the retailers' shelves, to provide information to the company about the competition's actions at the sales point, and to organize promotional packages at the retailers' stores.

The present case study used data on sales and costs in São Paulo state between January and June 2005. The sample represented 14% of the company's total national sales in this period. A total of 313 stock-keeping units (SKUs) were considered, which were grouped in the following product lines of varying size and complexity: (i) chocolate drinks; (ii) milk; (iii) yogurt; and (iv) desserts. The company had two basic forms of transport and storage—cold (for yogurt and desserts) and dry (for milk and chocolate drinks). The study sample involved 355 customers who were distributed in the following channels: (i) wholesalers; (ii) large shops; (iii) supermarkets; and (iv) medium retailers.

The following analyses were conducted from the collected data: (i) product sales and contribution margin; (ii) CST per activity and per customer; and (iii) product and customer profitability. Differentiating factors in the CST measurement of various channels included: (i) delivery frequency; (ii) deliveries that required specific planning; (iii) promotions at the stores; (iv) product variety; (v) negotiation complexity; (vi) actions at the sales point; (vii) differentiated discounts; and (viii) varying commercial conditions.

3.2 Analysis of net sales and contribution margin

3.2.1 Net sales

Table 1 shows the net sales and contribution margins of various sales channels. Large shops were responsible for 70% of sales and 72% of the contribution margin. There was a high concentration of sales to a limited number of customers, with 21% of customers representing 80% of sales volume during the period of the study and 29% of customers representing 80% of net sales during the study period.

In terms of sales of specific product types, the study revealed that only 20% of products represented 90% of gross sales volume and 84% of net sales. It was thus apparent that only 16% of the company's sales were derived from its efforts to offer 250 products, each of which has only a small individual share of sales.

Table 1: Net sales and contribution margin per channel

BRL	Whole-salers	Large Shops	Super-markets	Medium Retail	Total
Net Sales	401,911	3,553,279	339,978	762,257	5,057,423
Chocolates	10,693	88,355	6,597	16,351	121,995
Yogurts	143,168	1,432,018	211,029	411,178	2,197,392
Milk	213,712	1,881,889	86,047	261,643	2,443,291
Desserts	34,336	151,018	36,306	73,085	294,745
Contribution Margin	177,871	1,621,624	144,197	306,597	2,250,289
Chocolates	5,057	42,169	3,171	7,158	57,556
Yogurts	67,648	718,729	89,183	166,161	1,041,719
Milk	89,704	776,547	34,891	101,161	1,002,302
Desserts	15,462	84,177	16,953	32,118	148,711

3.2.2 Contribution margin

Table 2 shows the contribution margins expressed as percentages of net sales per channel. It is apparent that the channels had similar contribution margins, ranging from 40.2% (medium retail) to 45.6% (large shops).

With regard to the importance of each product unit to the total contribution margin, 20% of the SKUs represented 81% of the total margin. In other words, the company's efforts to sell 80% of the SKUs produced a benefit of only 19% of additional contribution margin.

The customer analysis shows that 31% of customers represented 80% of the contribution margin. The largest customer represented 19%, whereas 82 customers (23% of the total) represented less than 0.05% of the total contribution margin. Only one customer showed a negative contribution margin.

Table 2: Contribution margin as percentage of net sales

% Net Sales	Whole-salers	Large Shops	Super-markets	Medium Retail	Total
Contribution Margin	44.3%	45.6%	42.4%	40.2%	44.5%
Chocolates	47.3%	47.7%	48.1%	43.8%	47.2%
Yogurts	47.3%	50.2%	42.3%	40.4%	47.4%
Milk	42.0%	41.3%	40.5%	38.7%	41.0%
Desserts	45.0%	55.7%	46.7%	43.9%	50.5%

The results show the company's operational complexity in terms of number of products and customers, and that these were asymmetrically distributed in relation to their business volume and profitability.

3.3 Measurement of cost-to-serve

CST was measured according to the methodology proposed by Braithwaite and Samakh (1998), with small adjustments. This methodology based on the following concepts: (i) activity; (ii) customer group (channels); and (iii) product group. The main activities required to serve customers were first identified, and the most relevant costs of these activities were measured. The activity costs were then allocated to customers through the defined cost drivers. The costs accumulated in terms of customers were then identified with the products, based on sales volumes by customer. Table 1 presents the activities and the cost drivers.

Table 3: Activities and cost drivers

Activity	Cost Drivers
Distribution	Quantity and weight of SKU transported
Warehousing	Quantity and weight of pallets handled
Billing	Quantity of bills issued
Sales	Time and type of salesman visit
Sales Promotion	Time and type of promoter visit
Merchandising	Commercial contracts
Collecting	Quantity of bills collected

The main restrictions of the CST measurement process were: (i) non-consideration of the financial cost of inventories; and (ii) non-segregation of commercial discounts (with calculations being made on the basis of net sales).

Table 4: Cost-to-serve composition

	Whole-salers	Large Shops	Super-markets	Medium Retail	Total
Cost-to-Serve (BRL)	**34,197**	**1,378,065**	**135,342**	**295,146**	**1,842,750**
Distribution Freight	18,122	310,231	31,404	71,384	431,141
Warehousing	8,041	69,971	7,044	15,351	100,406
Billing	1,435	13,442	2,428	5,175	22,481
Collecting	620	5,804	1,048	2,235	9,706
Sales Promotion	0	204,789	15,131	26,446	246,365
Sales	5,979	84,953	14,143	26,298	131,372
Merchandising	0	688,877	64,145	148,257	901,281
Cost-to-Serve (% Total CTS)	**100.0%**	**100.0%**	**100.0%**	**100,0%**	**100.0%**
Distribution Freight	53.0%	22.5%	23.2%	24.2%	23.4%
Warehousing	23.5%	5.1%	5.2%	5.2%	5.4%
Billing	4.2%	1.0%	1.8%	1.8%	1.2%
Collecting	1.8%	0.4%	0.8%	0.8%	0.5%

Sales Promotion	0.0%	14.9%	11.2%	9.0%	13.4%
Sales	17.5%	6.2%	10.4%	8.9%	7.1%
Merchandising	0.0%	50.0%	47.4%	50.2%	48.9%
Cost-to-Serve (% Net Sales)	**8.5%**	**38.8%**	**39.8%**	**38.7%**	**36.4%**
Distribution Freight	4.5%	8.7%	9.2%	9.4%	8.5%
Warehousing	2.0%	2.0%	2.1%	2.0%	2.0%
Billing	0.4%	0.4%	0.7%	0.7%	0.4%
Collecting	0.2%	0.2%	0.3%	0.3%	0.2%
Sales Promotion	0.0%	5.8%	4.5%	3.5%	4.9%
Sales	1.5%	2.4%	4.2%	3.4%	2.6%
Merchandising	0.0%	19.4%	18.9%	19.4%	17.8%
Cost-to-Serve (BRL)	**145**	**670**	**812**	**756**	**647**
Distribution Freight	77	151	188	183	151
Warehousing	34	34	42	39	35
Billing	6	7	15	13	8
Collecting	3	3	6	6	3
Sales Promotion	0	100	91	68	86
Sales	25	41	85	67	46
Merchandising	0	335	385	380	316

Table 4 shows the CST per customer group (expressed in BRL). The following differences in each group's CST composition were apparent.

- The wholesalers group had the lowest unit values for CST. Costs in this channel were due to distribution, warehousing, and sales requirements. There were no promotion and merchandising costs in this channel.
- In the large shops channel, the largest CST item was the cost of management of merchandising resources. Large shops are complex channels with variable customer demands, especially during special promotions. Although the company faced difficulties in negotiating annual contracts with these customers, it had not been able to find alternative channels to reduce its significant dependence on this channel.
- Supermarkets and medium retail outlets had similar CST compositions, including a large percentage of merchandising costs due to promotion services and high freight costs.

3.4 Customer profitability analysis using cost-to-serve

3.4.1 Channel analysis

Table 5 shows the margins after CST by channel and product group. This margin was calculated by deducting the CST from the contribution margin of the products and customers in each channel.

Table 5: Margin after cost-to-serve in composition

BRL	Whole-salers	Large Shops	Super-markets	Medium Retail	Total
Contribution Margin	177,871	1,621,624	144,197	306,597	2,250,289
Chocolates	5,057	42,169	3,171	7,158	57,556
Yogurts	67,648	718,729	89,183	166,161	1,041,719
Milk	89,704	776,547	34,891	101,161	1,002,302
Desserts	15,462	84,177	16,953	32,118	148,711
Cost-to-Serve (CTS)	34,197	1,378,065	135,342	295,146	1,842,749
Chocolates	764	27,198	2,721	5,921	36,604
Yogurts	12,521	645,003	89,085	167,493	914,102
Milk	18,195	642,328	30,195	92,821	783,539
Desserts	2,717	63,536	13,341	28,911	108,505
Margin after CTS	143,674	243,559	8,855	11,451	407,539
Chocolates	4,294	14,971	450	1,237	20,952
Yogurts	55,127	73,726	98	-1,333	127,618
Milk	71,509	134,219	4,695	8,339	218,763
Desserts	12,744	20,642	3,612	3,208	40,206

Table 6 shows the composition of the margin after CST expressed as a percentage of net sales.

Table 6: Margin after cost-to-serve as a percentage of net sales

% Net Sales	Whole-salers	Large Shops	Super-markets	Medium Retail	Total
Contribution Margin	44.3%	45.6%	42.4%	40.2%	44.5%
Chocolates	47.3%	47.7%	48.1%	43.8%	47.2%
Yogurts	47.3%	50.2%	42.3%	40.4%	47.4%
Milk	42.0%	41.3%	40.5%	38.7%	41.0%
Desserts	45.0%	55.7%	46.7%	43.9%	50.5%
Cost-to-Serve (CTS)	8.5%	38.8%	39.8%	38.7%	36.4%
Chocolates	7.1%	30.8%	41.2%	36.2%	30.0%
Yogurts	8.7%	45.0%	42.2%	40.7%	41.6%
Milk	8.5%	34.1%	35.1%	35.5%	32.1%
Desserts	7.9%	42.1%	36.7%	39.6%	36.8%
Margin after CTS	35.7%	6.9%	2.6%	1.5%	8.1%
Chocolates	40.2%	16.9%	6.8%	7.6%	17.2%
Yogurts	38.5%	5.1%	0.0%	(0.3)	5.8%
Milk	33.5%	7.1%	5.5%	3.2%	9.0%
Desserts	37.1%	13.7%	9.9%	4.4%	13.6%

It can be observed that all channels presented similar profitability according to the contribution margin as a percentage of net sales. The CST

expressed as a percentage of net sales per channel was also similar among the studied channels (at approximately 39%), with the exception of the wholesalers channel, which had a percentage of only 8.5%). As a result, the wholesalers channel was the most profitable channel for the company, with a margin after CST of 35.7%. The medium retail channel (1.5%) and the supermarkets channel (2.6%) were less profitable for the company. Large shops had a margin after CST of 6.9%.

The study demonstrated that the high concentration (70.2%) of net sales in the large shops channel provided 59.7% of the total margin after CST. The data (Table 4 and Table 5) also show that the wholesalers channel was highly profitable; although this channel provided only 7.9% of the net sales of the company, it provided 35.2% of the margin after CST.

Supermarkets and the medium retail channel did not provide large net sales; moreover, they represented a low contribution margin after CST. In particular, yogurts provided no contribution after CST in these two channels.

3.4.2 Customer analysis

The analysis of customer profitability was made on the basis of margin after CST, in accordance with the curve shown in Figure 1. This curve behaves similarly to the so-called 'whale curve' (Kaplan, 1989; Gebert, 1996; Kaplan and Cooper, 1998; Kaplan and Narayanan, 2001).

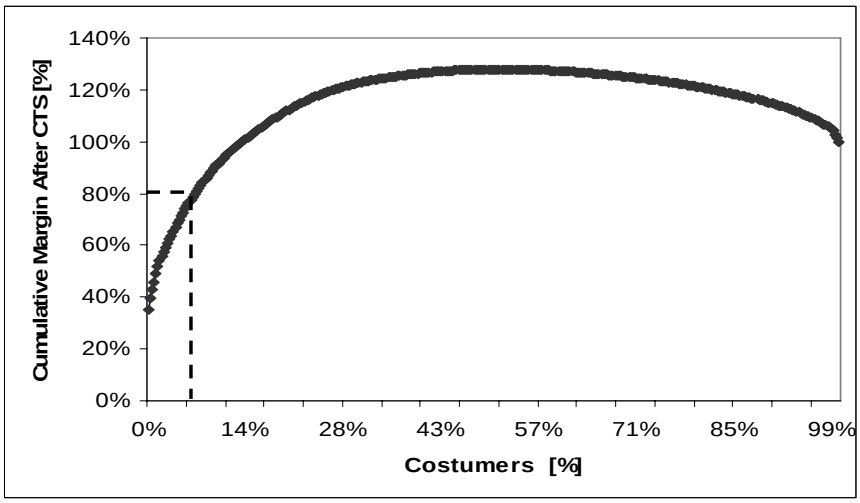

Figure 1: Customer profitability curve

The data show that 80% of margin after CST came from only 6% of customers (21 customers).

4. DISCUSSION

The above analysis of customer profitability is significant for commercial activity management, commercial policy reviews, and negotiations with loss-making customers. It is apparent that the activity-based management perspectives noted by Kaplan and Cooper (1998) can be applied to this

company. One alternative is to restructure the current activities to serve the customer, aiming to obtain the same results at lower costs. This can be achieved by improving the levels of efficiency—for example, by reducing the resources needed to perform activities by sharing sales promoters with other companies. Other alternatives include a reassessment of the demand for activities that result in unsatisfactorily remunerated services (such as higher delivery frequencies) or measures to improve general collaboration with customers.

The customer analysis on the basis of CST has demonstrated that the classical profitability analysis paradigm, based on the contribution margin or gross margin, provides only limited information on which to base management actions to optimize results. The contribution margin analysis demonstrated that 31% of customers represented 80% of the contribution margin during the study period, whereas profitability analysis after CST has demonstrated that 6% of customers (21 customers) provided 80% of the service margin. These results are in accordance with previous empirical studies in that a limited number of customers generated almost all profitability after CST (see Table 7).

Table 7: Customer participation in profits

Study	Accumulated Customers	Accumulated Profits
This study	6%	80%
Kanthal (Kaplan, 1989)	20%	225%
Blue Ridge (Foster, Gupta and Sjoblom, 1996)	0.8%	67%
Storbacka (Triest, 2005)	5%	90%

The case study has revealed quite a large proportion of loss-making customers for the company, which is worthy of a further specific and in-depth study. The conventional wisdom in the cost accounting literature recommends elimination of such loss-making customers. In this context, it should be noted that a significant proportion of service-activity costs are fixed costs. Eliminating loss-making customers thus eliminates the amount of the contribution margin that these customers provide, without necessarily eliminating the corresponding fixed cost.

5. CONCLUSIONS

The present study aimed to establish whether the CST concept provides more pertinent information for customer management than that provided by traditional measures (such as contribution margin). The findings of the study show that the measurement of CST provides specific and detailed customer information that enables a more comprehensive customer profitability analysis than the classical paradigm.

The case study of a food company with a wide range of products and services demonstrated that CST information in terms of sales channel is important for profitability management. Differences among the profitability levels of various channels and the varying characteristics of the required activities in each channel justify the use of this kind of information in making appropriate adjustments to policies and service levels. Although a single case study does not allow the results to be generalized to other settings, the

combination of conceptual analysis and empirical data presented in this study provides a strong indication that CST measurement and customer profitability analysis would be useful in similar business contexts.

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