



# Cost-to-serve measurement and customer profitability analysis

Cost-to-serve  
measurement

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## Abstract

**Purpose** – This paper aims to assess the usefulness of cost-to-serve for customer profitability management through literature review and a case study in a food-industry company.

**Design/methodology/approach** – The research is based on a case study. The study presents the state-of-the-art of the literature review related to cost-to-serve measurement and customer profitability analysis and a case study of a Brazilian food-industry company with high operational complexity and an extensive customer product and commercial service line.

**Findings** – The literature review demonstrates that few empirical studies have actually addressed the problem of cost-to-serve measurement and customer profitability analysis. The findings of the study show that the measurement of cost-to-serve provides specific and detailed customer information that enables a more comprehensive customer profitability analysis than the classical paradigm.

**Research limitations/implications** – A single case study does not allow the results to be generalized to other organizations.

**Originality/value** – The paper includes a comprehensive review of literature and the empirical case study in a Brazilian food company offers additional insights in cost-to-serve measurement and customer profitability analysis.

**Keywords** Food industry, Profit, Activity-based costs, Brazil

**Paper type** Case study

## 1. Introduction

Management routinely seeks detailed information about the manufacturing costs of their company's products, but often have little idea about how much it costs to serve customers (Braithwaite and Samakh, 1998; Norek and Pohlen, 2001). This is somewhat incongruous, given that a company's profit 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 managers 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 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. Blattberg and Deighton (1996) observed that, in this customer-focused age, executives should focus on building and managing relationships as equity, rather than concentrating only on their company's 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". Therefore, useful measure of marketing productivity must 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.

In a subsequent paper, Sheth and Sisodia (1995b) emphasised the importance of information technology in pursuing what they called "effective efficiency" in the commercial function. According to these authors, the low productivity of marketing is largely due to companies treating marketing as a revenue earner, rather than a profit generator. As a result, commercial managers are under little pressure to produce higher contribution margins. In response to this common scenario, Sheth and Sisodia (1995b) advocated the use of an activity-based costing (ABC) system as an effective tool for achieving "effective efficiency" in this commercial function.

Lambert (2008, p. 41-52) emphasize that joint fixed costs should not be included in the customer profitability analysis, considering that the correct profitability analysis of products, customers and segments, should be carried out through deducting from net sales the avoidable costs, that is, variable costs and non-variable costs directly identified to the object of analysis. "The goal is to deduct from revenue all costs that would disappear if the revenue disappeared." According to this author, customer profitability reports should be presented in three levels of analysis:

- (1) manufacturing contribution (net sales less variable manufacturing costs);
- (2) contribution margin (manufacturing contribution less variable marketing and logistics costs); and
- (3) segment controllable margin (contribution margin less assignable non-variable costs).

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. A fundamental aspect of such a customer-driven marketing approach is an assessment of profitability at the customer level with a view to formulating more effective marketing strategies. In this regard, the importance of measuring customer-service costs cannot be overemphasized; without such measurement, customer profitability analysis cannot be credibly undertaken.

Few empirical studies have actually addressed this problem. The present study bridges 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 five parts. Following this introduction, the second section of the paper is a literature review of the theoretical foundations of cost-to-serve measurement and customer-profitability analysis. The third section of the paper contains the empirical case study of the food company. The results of this case study are then described. Finally, the main conclusions and implications are presented.

## 2. Theoretical framework

An accurate customer-profitability analysis is required if management is to formulate appropriate marketing strategies and optimize company 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:

- (1) cost-to-serve (CTS); and
- (2) customer-profitability analysis (CPA).

### 2.1 Measurement of cost-to-serve

Most academics, with the notable exception of Johnson (1992), have advocated the ABC system as the most appropriate costing method for measuring customer-service costs. 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. 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 (Lambert and Lewis, 1983; 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” (CTS) 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 they are not actually fixed costs but they could not be considered variable costs – because they are not directly influenced by sales volumes. Therefore, Kaplan and Cooper (1998) created a distinctive categorization to be applied to SMDA expenses – super-variable” expenses.

In an effort to identify 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.

For this reason, in this research we aim 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 manufacturing contribution of the products sold, less the costs to serve the customer(s). Most studies about CTS are thus associated with analysis of customer profitability. Guilding and McManus (2002) studied so-called “customer accounting” (CA) practices with three objectives:

- (1) to appraise the incidence of CA;
- (2) to assess practitioners’ perceptions of CA’s merit as a managerial tool; and
- (3) 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) provides an example of how information about customer-service costs can modify a firm’s relationship with customers who are not profitable. In this case, the two

largest-volume customers of Kanthal (a Swedish manufacturer of heating systems) were found to be the least profitable for 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”, presented in Figure 1. The analysis of accumulated profitability per customer demonstrated that 20 percent of the customers generated 225 percent of total profits, whereas 70 percent of customers were on the balance point and 10 percent generated a loss of 125 percent 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.

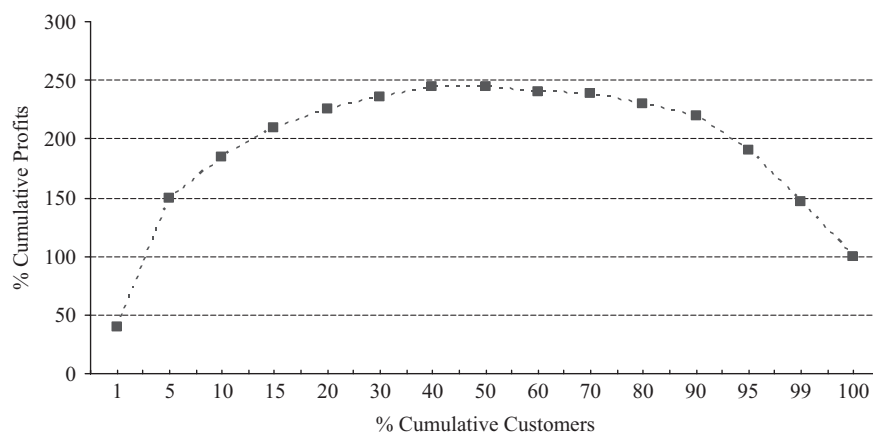
According to Braithwaite and Samakh (1998), traditional cost-determination systems do not permit accurate analysis of individual customer performance in companies with a wide range of products – because the contribution margin, in itself, does not enable the identification of relevant differentiating factors that determine the profitability of particular distribution channels. They suggested that adoption of the CTS 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 proposed a CTS measurement model, which was based on their experience with a high-tech electronics firm. This model was founded on the following concepts:

- (1) activities;
- (2) distribution channels; and
- (3) product families.

Customers were classified in four channels:

- (1) distributors;
- (2) large accounts;



Source: Kaplan (1989)

Figure 1.  
Customer profitability  
at Kanthal

- (3) retailers; and
- (4) 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 (1998) profitability analysis is so-called “margin erosion” per distribution channel and product family.

CTS 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:

- (1) service to small customers with a high CTS to be carried out through distributors;
- (2) simplifications and reductions in sales team’s administrative duties; and
- (3) 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 CTS are not always the most profitable proposition for a supplier, especially when such customers are aware of their low CTS condition. These authors gave the example of retailer, Wal-Mart, which demands large discounts in exchange for the reduced service costs that they believe their suppliers obtain. It is not enough to know whether a given customer’s CTS is high or low; the final analysis depends on the commercial policy adopted in each case.

Once each customer’s CTS has been measured, Kaplan and Cooper (1998) recommended the use of a matrix to categorize customers and facilitate the identification of appropriate strategies (Figure 2). The vertical axis shows the net margin that results

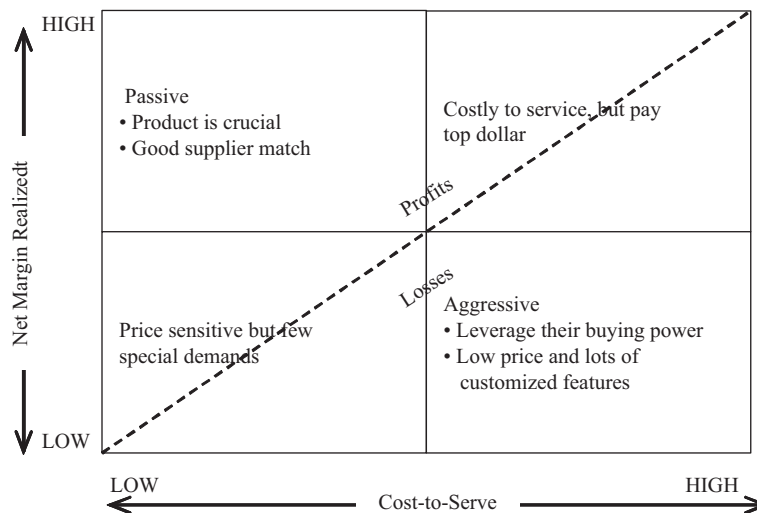


Figure 2.  
Customer Profitability

Source: Kaplan and Cooper (1998, p.193)

from the net sales price after sales promotions, deducting production costs. The horizontal axis presents customers' CTSs, including order-related costs, together with marketing, technical, sales and administrative expenses that are specific for customer support, calculated through the ABC method. Customers above the diagonal line can be profitable for the supplier in various ways, as their margins compensate for the incurred CTS; these customers should be protected and developed. In contrast, customers in the bottom-right rectangle (high CTS and low margin) represent greater challenges. According to the authors, a customer such as Wal-Mart would be located below the diagonal on the left side – because it requires large discounts and low CTS. High CTS can also represent high profitability to a supplier. Customers demanding a higher level of service may be willing to pay higher prices.

According to Kaplan and Cooper (1998, p. 193), understanding customer profitability as a function of CTS is an alternative to Porter's admonition not to attempt to be simultaneous low-cost and differentiated". By using a CTS 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 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. Strategic decisions can range from changes in the way customer deliveries are carried out to terminating relationships with non-profitable customers. These authors established four factors that affect the profitability obtained from individual customers:

- (1) purchase behavior;
- (2) delivery policy;
- (3) accounting procedures; and
- (4) inventory levels.

Within each factor, the main expense items are specified and their characteristics are analyzed for profitable and non-profitable customers.

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 the specific case of a distributor with a large heterogeneous customer base used 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, and a large customer with large 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:

- costs and revenues;
- risk; and
- 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 that 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.

In innovative companies managers 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 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. In many companies, executives 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 adjusting the levels of service quality and the allocation of resources.

The literature on this subject has addressed the well-known “80/20 rule” – that is, the notion that 80 percent of a company’s profits come from 20 percent of its customers,



while the remaining 20 percent of profits are provided by 80 percent of customers (Zeithaml *et al.*, 2001; Horngren *et al.*, 2003). In a similar vein, the Kanthal case (Kaplan, 1989) demonstrated that 20 percent of customers were responsible for 225 percent of profits, and the Blue Ridge case (Foster *et al.*, 1996) demonstrated that 0.8 percent of the customer base contributed 67 percent of the company's operational income and 38 percent of total revenues. Similarly, Triest (2005) noted an unpublished empirical study carried out by Storbacka in 1997, which demonstrated that 5 percent of customers in two banks were responsible for 90 percent of profits and 25 percent 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 described three types of potentially non-profitable customers who should be retained:

- (1) new and growing customers who promise more profitable business in the future;
- (2) those who provide qualitative learning benefits (rather than financial benefits); and
- (3) 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.

In this research, we used sales and costs in São Paulo state between January and June 2005. The sample represented 14 per cent 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:

- chocolate drinks;
- milk;
- yogurt; and
- 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:

- wholesalers;
- large shops;
- supermarkets; and
- medium retailers.

The following analyses were conducted from the collected data:

- product sales and manufacturing contribution;
- CTS per activity and per customer; and
- product and customer profitability.

Differentiating factors in the CTS measurement of various channels included:

- delivery frequency;
- deliveries that required specific planning;
- promotions at the stores;
- product variety;
- negotiation complexity;
- actions at the sales point;
- differentiated discounts; and
- varying commercial conditions.

### *3.2 Analysis of net sales and manufacturing contribution*

*3.2.1 Net sales.* Table I shows the net sales and manufacturing contributions of various sales channels. Large shops were responsible for 70 percent of sales and 72 percent of the manufacturing contribution. There was a high concentration of sales to a limited number of customers, with 21 percent of customers representing 80 percent of sales volume during the period of the study and 29 percent of customers representing 80 percent of net sales during the study period.

In terms of sales of specific product types, the study revealed that only 20 percent of products represented 90 percent of gross sales volume and 84 percent of net sales. It was thus apparent that only 16 percent 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.

(BRL)	Whole-salers	Large shops	Super-markets	Medium retail	Total	Cost-to-serve measurement
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	
Manufacturing contribution	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	

**Table I.**  
Net sales and  
manufacturing  
contribution per channel

*3.2.2 Manufacturing contribution.* Table II shows the manufacturing contributions expressed as percentages of net sales per channel. It is apparent that the channels had similar manufacturing contributions, ranging from 40.2 percent (medium retail) to 45.6 percent (large shops). The variable manufacturing costs (raw-material, packing material and other variable costs) were deducted from net sales to obtain the manufacturing contribution.

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

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

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*

CTS was measured according to the methodology proposed by Braithwaite and Samakh (1998), with small adjustments. Customer profitability in the Braithwaite and Samakh (1998) case study, in the electronics industry, was measured deducting the

Percent net sales	Whole- salers (percent)	Large shops (percent)	Super-markets (percent)	Medium retail (percent)	Total (percent)
Manufacturing contribution	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

**Table II.**  
Manufacturing  
contribution as  
percentage of net sales

costs to serve customers from gross margin, while in this study, in the food industry those costs were deducted of the manufacturing contribution.

The methodology based on the following concepts:

- activity;
- customer group (channels); and
- product group.

The main activities required to serve customers were first identified, and the most relevant costs of these activities were measured. The avoidable costs of the activities were then allocated to customers group 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 III presents the activities and the cost drivers.

The main restrictions of the CTS measurement process were:

- inventory carrying costs were not included; and
- commercial discounts were included as an element of cost-to-serve based on net sales and were not identified by specific customer.

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

- The wholesalers group had the lowest unit values for CTS. 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 CTS 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 CTS 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 V shows the margins after CTS by channel and product group. This margin was calculated by deducting the CTS from the manufacturing contribution of the products and customers in each channel.

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

**Table III.**  
Activities and cost drivers

	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 (percent total CTS)	100.0	100.0	100.0	100.0	100.0
Distribution freight (percent)	53.0	22.5	23.2	24.2	23.4
Warehousing (percent)	23.5	5.1	5.2	5.2	5.4
Billing (percent)	4.2	1.0	1.8	1.8	1.2
Collecting (percent)	1.8	0.4	0.8	0.8	0.5
Sales promotion (percent)	0.0	14.9	11.2	9.0	13.4
Sales (percent)	17.5	6.2	10.4	8.9	7.1
Merchandising (percent)	0.0	50.0	47.4	50.2	48.9
Cost-to-serve (percent net sales)	8.5	38.8	39.8	38.7	36.4
Distribution freight (percent)	4.5	8.7	9.2	9.4	8.5
Warehousing (percent)	2.0	2.0	2.1	2.0	2.0
Billing (percent)	0.4	0.4	0.7	0.7	0.4
Collecting (percent)	0.2	0.2	0.3	0.3	0.2
Sales promotion (percent)	0.0	5.8	4.5	3.5	4.9
Sales (percent)	1.5	2.4	4.2	3.4	2.6
Merchandising (percent)	0.0	19.4	18.9	19.4	17.8
Cost-to-serve (BRL/ton)	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

Cost-to-serve composition  
**Table IV.**

**Table V.**  
Margin after cost-to-serve  
in composition

(BRL)	Whole- salers	Large shops	Super-markets	Medium retail	Total
Manufacturing contribution	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

The concept of margin after “CTS” is similar to the segment controllable “margin” of Lambert (2008) model. Joint fixed costs were not included in the analysis of product and customer profitability; only avoidable costs and the revenues of customer groups were considered.

Table VI shows the composition of the margin after CTS expressed as a percentage of net sales.

It can be observed that all channels presented similar profitability according to the manufacturing contribution as a percentage of net sales. The CTS expressed as a percentage of net sales per channel was also similar among the studied channels (at approximately 39 percent), with the exception of the wholesalers channel, which had a percentage of only 8.5 percent). As a result, the wholesalers channel was the most profitable channel for the company, with a margin after CTS of 35.7 percent.

**Table VI.**  
Margin after cost-to-serve  
as a percentage of net  
sales

Percent net sales	Whole-salers (percent)	Large shops (percent)	Super-markets (percent)	Medium retail (percent)	Total (percent)
Manufacturing contribution	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

The medium retail channel (1.5 percent) and the supermarkets channel (2.6 percent) were less profitable for the company. Large shops had a margin after CTS of 6.9 percent.

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

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

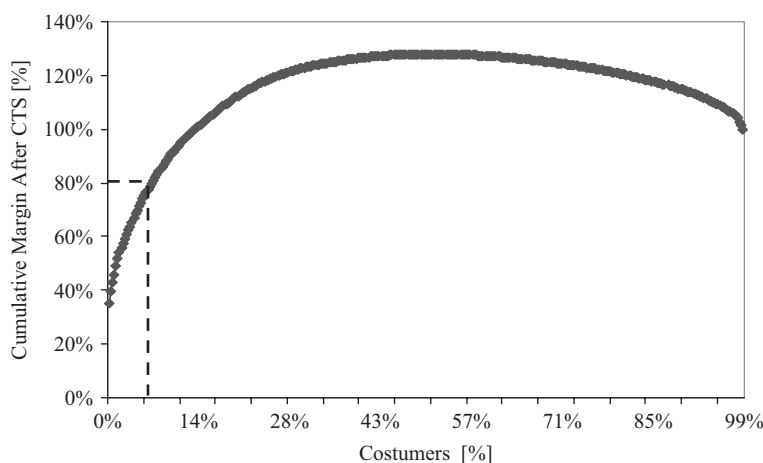
*Customer analysis.* The analysis of customer profitability was made on the basis of margin after CTS, in accordance with the curve shown in Figure 3. This curve behaves similarly to the so-called “whale curve” (Kaplan, 1989).

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

#### 4. Results

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 CTS has demonstrated that the classical profitability analysis paradigm, based on the manufacturing contribution, provides



**Figure 3.**  
Customer profitability  
curve

only limited information on which to base management actions to optimize results. The manufacturing contribution analysis demonstrated that 31 percent of customers represented 80 percent of the manufacturing contribution during the study period, whereas profitability analysis after CTS has demonstrated that 6 percent of customers (21 customers) provided 80 percent 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 CTS (Table VII).

Final reports of the study were presented and discussed with company management to validate the study results, to discuss the new approaches for clients profitability analysis and to stimulate business decisions. Discussions of service levels or price increases were considered very difficult to implement in the segment of large clients (represented by giant retailers), which represented the most relevant portion of the business. Consequently, priority was assigned to improve efficiency of marketing and logistics processes related to these customers. Studies for actions, such as sales promotion outsourcing and shared distribution were initiated.

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 that these customers provide, without necessarily eliminating the corresponding fixed cost.

In relation to clients with negative margins, company management classified them in strategic clients (representative in sales and important in company portfolio) and carried out specific detailed plans to identify inefficiencies, incentive plans and improvements, such as, forecasting and inventory information sharing and automation of order processing. The second group was the medium and small clients and for this group specific commercial and services policies, were revisited covering issues such as frequency of deliveries, number of visits, promotion efforts, and delegation to distributors.

One important aspect identified by company management was the fundamental need to align different company sectors to improve processes and profitability based on cost-to-serve. In this regard, management was considering redefining goals for sales force compensation and sales promotions, logistics processes and service levels.

### 5. Conclusions

In this research, we establish whether the CTS concept provides more pertinent information for customer management than that provided by traditional measures (such as manufacturing contribution). The findings of the study show that the measurement of CTS provides specific and detailed customer information that enables

**Table VII.**  
Customer participation  
in profits

Study	Accumulated customers (percent)	Accumulated profits (percent)
This study	6	80
Kanthal (Kaplan, 1989)	20	225
Blue ridge (Foster <i>et al.</i> , 1996)	0.8	67
Storbacka (Triest, 2005)	5	90



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a more comprehensive customer profitability analysis that is similar to that proposed by Lambert (2008).

The case study of a food company with a wide range of products and services demonstrated that CTS 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 prior studies and empirical data presented in this study provides a strong indication that CTS measurement and customer profitability analysis are useful.

## 6. Future research

In accordance with the findings of this study, new opportunities for research are presented. The first opportunity for research deals with the reconfiguration of marketing and logistics business processes based on cost-to-serve information. Future research could address, among other aspects, the impact of this type of information on the design of processes and activities adopted by companies to attend customers (considering the level of logistics services), policies of sales force incentives, choices of distribution channels and strategies of relationship and collaboration with clients.

A second opportunity for research is the question of how to deal with loss-making customers, considering that eliminating these customers will result in the loss of the contribution margin they provide, without necessarily reducing the fixed cost of the company.

A third opportunity for research could address the interaction between the cost-to-serve and the benefit to serve customers. In various situations customer margins are under targets or expectations but other benefits are being considered. These benefits can be considered relevant to maintain those clients, such as: future profitability potential, prestige of the client in the industry, access to other opportunities, technology/knowledge development and importance of the client in terms of testimony in its sector, region or country.

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