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Customer Stratification: Understanding Customer Profitability

Abstract:

Classification of customers into groups based on profitability and volume is an essential step in developing a customer-centric operations strategy. Our technique stratifies customers into four different groups such as Core, Opportunistic, Marginal, and Service-drain. Core customers are profitable customers who transact in high volume on a regular basis. Opportunistic customers are also profitable customers who buy infrequently when their regular supplier stocks out. Marginal customers buy infrequently in low sales volumes and require either low prices or high service levels. Service-drain customers are high volume customers who consistently require higher levels of service while demanding low prices. In addition to developing the stratification technique, we also recommend strategies to handle each of those customer segments in terms of pricing, negotiation, and resource allocation. We will demonstrate this technique and its application using data from an industrial distributor.

Keywords : Customer stratification; Customer classification; Pricing; Customer service strategy

1 Introduction

Traditionally, distributors have acted as middle-men in their supply chains, but lately they have taken the role of marketing and information managers. The authors have been working with industrial distributors in United States for over a decade and have helped several key players with their inventory management. Over the years, pricing has become a key area of focus. Distributors are being pressured to reduce prices for the

customers, but they still have to maintain their profit margins to stay in business.

Customers expect reduced lead times and better services, but at the same time, refuse to pay for the additional services. As a result, distributors are seeing a compression of their margins (Lawrence, 2006). This prompted the researchers at Texas A&M University to start a consortium of distributors, manufacturers, and service providers to study the distributor's pricing problem. In spring 2006, nine key players in the industrial distributor supply chain with collective revenue of over \$4 billion joined the consortium. They provided both funding and data to conduct the research.

Weinberg (1975), Stephenson et al. (1979), Joseph (2001), Lal (1986) and Bhardwaj (2001) have all raised the popular question in pricing: should pricing decisions be made by the company or should significant leeway be provided to the sales force? Mishra and Prasad (2004) also address the same question under imperfect information (i.e., when the salesperson's knowledge of the customers differs from the company's knowledge). The researchers at Texas A&M University also encountered the same dilemma at the focus sessions with consortium partners. After initial sessions, the consortium members identified some key issues in pricing. These were customer types, product status, and services. The question of pricing at company or sales force level was identified as a secondary factor when compared to the above-mentioned key issues. As a result, there was a need to identify the types of customers.

Campbell and Cunningham (1983) categorize customers into four groups: yesterday's customers, today's regular customers, today's special customers, and tomorrow's customers. They base this classification on multiple criteria including sales volume, age of relationship, and profitability. This classification however did not fit the

objectives of the pricing consortium. The authors are unaware of any other literature that addresses multi-criteria customer stratification. Therefore, the first step for the consortium was to develop a methodology to stratify customers in the industrial distribution sector.

1.1 Inventory and Customer Stratification

Companies typically use stratification techniques for inventory management. These techniques are commonly known as ABC inventory analysis. According to a recent study conducted by Aberdeen Group (2004) of firms generating over \$1 billion in revenue, 60% still use ABC classification or similar strategies to set their inventory policies. This technique is based on Vilfredo Pareto's observation (Pareto, 1906), which is widely known as the 80-20 rule or the law of the vital few. Pareto observed that about 20% of the population of a country has about 80% of its wealth. This rule holds true for items sold by a firm: about 20% of items account for about 80% of a firm's revenue.

Inventory stratification determines which items need to be stocked and which items need to be carefully monitored using effective forecasting methods. It also helps establish appropriate service levels for items in each class. Inventory stratification typically identifies fast moving, slow moving, profitable, and unprofitable items. The technique classifies items as A, B, or C based on certain threshold conditions. The most popular criterion used in inventory stratification is the sales volume. Combinations of multiple criteria have also been used for inventory stratification. These include combining item criticality with dollar usage (Flores and Whybark, 1989), and combining cost of goods sold, number of transactions, and profitability (Schreibfeder, 2005).

Various other criteria could be included in the stratification process based on the business environment, data availability, and management strategies.

In this paper we extend the idea of stratification to customers. It is well known that revenue and profits from customers follow Pareto's rule – about 20% of a firm's customers account for about 80% of its revenue and profits (Curry and Curry, 2000). Customer segmentation approaches are used in revenue management models of airlines, hotels and retail chains (Bitran and Caldentey, 2003). In 2004, Best Buy, the leading electronics retailer, began identifying high spenders in its stores as “angels” - based on its sales records. Best Buy further classified the angels as Barrys (high income men), Jills (suburban moms) and Buzzes (people interested in latest gadgets) based on demographic and buying patterns. This classification helped Best buy to customize its local stores and train its sales force to assist the right customers. Best Buy also identified unprofitable customers and formulated strategies to avoid them (McWilliams, 2004).

Stephenson, Cron, and Frazier (1979) grouped customers based on market strategies such as single market, dominant market, and related market in order to analyze profit performance differences resulting from different market segmentation strategies adopted by firms. Bilal (1989) describes customer types and pricing in a monopolist environment. Revenue management models have different sets of customers based on attributes such as needs, budget, and quality. Lazear (1986) classified potential customers as shoppers and buyers. Shoppers are customers who search for a product but do not buy them because of the price or quality, while buyers are customers who are willing to make the purchase. Customers can also be classified on the amount of after-sales support and their apparent price sensitivity (Zablah et al, 2004). The authors stress on the immediate

need for understanding the types of customers, the perceived value, and how the customer types differ from each other. It is equally important to understand the customer groups who are not part of the target market.

1.2 Benefits of Customer Stratification

We expect that customer stratification will be beneficial for various reasons such as:

- (i.) Pricing decisions: Different customers require different levels of service. Some customers purchase high quantities while some purchase low quantities. These factors contribute to varied costs for different customers. The Robinson-Patman act (1936) prohibits price discrimination between customers if it causes injury to competition. However, “a price differential is exonerated if it does not exceed the difference to the seller in the comparative costs of doing business with the customers receiving the higher and lower prices” (Rowe, 1959). Therefore, price discrimination based on cost to serve and quantities are justifiable. Customer stratification would help the distributor understand where each customer stands with respect to service cost. The stratification can also help in contract bidding processes.
- (ii) Negotiations: If a salesperson has information about the characteristics of the customer with respect to other customers, he/she will be better positioned to make judicious decisions.
- (iii) Resource allocation: Sales force and logistics deployment decisions can be made based on customer stratification. For example, a distributor could assign the top sales person to the most promising customer. A great deal of research is currently being conducted in lean sales processes. Eliminating non-value added activities from the sales

process is critical for a lean activity and the customer stratification process is the starting point.

(iv) Identification of future opportunities: There could be areas of potential growth in both customer and product market share. Customer stratification would guide a distributor in developing strategies for identifying and capturing these opportunities.

This paper is organized as follows. Section 2 describes the methodology. In section 3, we present an example of customer stratification as applied to an industrial distributor. In section 4, we discuss customer development strategies. Section 5 provides the conclusion and implications of this research.

2 Methodology – Performing customer stratification

Our stratification identifies customers who

i) are very important to the distributor's sales volume and profitability (Core customers),

ii) buy only occasionally from the distributor, but are very profitable to the distributor (Opportunistic customers),

iii) buy in large volumes, but provide low margins and require high service levels (Service-drain customers), and

iv) buy low volumes and are low on profitability for the distributor (Marginal customers).

To identify these customer groups, we propose a 4-dimensional classification based on (a) sales volume, (b) gross margin, (c) cost to serve, and (d) loyalty. Some of these dimensions are similar to those in Campbell and Cunningham (1983), but our research contribution lies in the methodology we use to classify the customers.

In Section 2.1, we explain the rationale behind each dimension. The data requirements and data availability issues for each dimension are discussed in section 2.2. Section 2.3 shows how we stratify the customers using these four dimensions.

2.1 Dimensions

Sales volume: A distributor needs high sales volumes to cover his fixed costs and to take advantage of economies of scale. A customer with very high sales volume will typically be a very important customer even if he provides lower margins and is not very loyal.

Gross margin (GM): High sales volume by itself will not make a profitable customer. Apart from its direct effect on profitability, GM also indicates whether a customer is a tough negotiator on pricing.

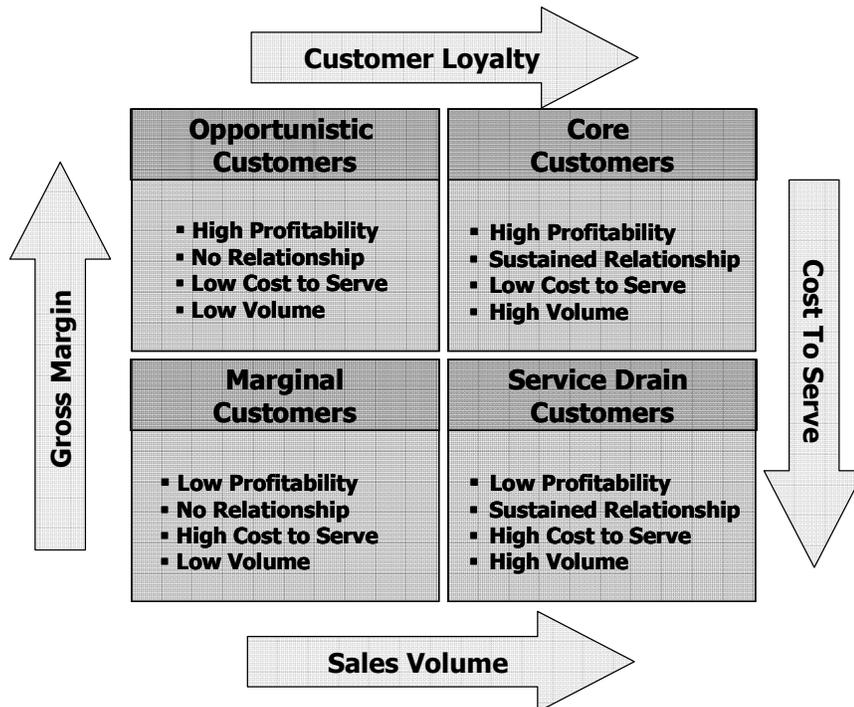


Figure 1: Customer Stratification

Cost to serve (CTS): GM is not a complete indicator of a customer's profitability since CTS is never factored into it. For example, some customers demand higher levels of services and this keeps the distributor's net profits (NP) down.

Loyalty: A customer could be very profitable with high sales volumes, but he might switch suppliers based on just the prices. It is extremely difficult to come up with a good measure for loyalty. We will discuss a few surrogate measures for loyalty in section 2.2.

Figure 1 illustrates our customer stratification and the interaction of these dimensions.

2.2 Data

We now describe how we identify each of these dimensions, and their corresponding data requirements.

2.2.1. Sales volume and GM: The data for these dimensions can be easily extracted from most ERP systems.

2.2.2. Cost to serve (CTS): The cost of each transaction beyond the cost of goods sold is known as cost to serve (CTS) (e.g., service calls, site visits, special delivery requirements, etc.). Most distributors find this very difficult to estimate. The distributors in the pricing consortium identified the following as the primary drivers of CTS.

Order sizes and frequency of orders: These impact inventory and handling costs which inherently contribute to additional CTS. Frequent small orders would incur higher handling costs than less frequent and bigger orders. Order sizes and order times that vary greatly between orders would also impact forecast accuracy, and hence, the inventory carrying cost. While the handling cost component of this driver would be relatively easy to measure, it would be more difficult to measure the carrying cost component.

Delivery requirements: Same-day deliveries incur higher transportation and inventory costs than next day deliveries. Some customers may require a forklift to unload materials from a delivery truck – this would decrease the effective truck volume as well as increase the delivery times. These costs must be factored into the CTS.

Days Sales Outstanding (DSO): The longer a customer takes to pay for a purchase, higher the opportunity cost (of capital). Distributors typically are not strict about DSO because they fear customer dissatisfaction.

Cost of sales and service calls: Customers who require multiple visits by salespeople cost more than customers who just call in their orders regularly.

Fast movers Vs Slow movers: Customers whose product mix includes a high proportion of fast moving items would have lower inventory carrying costs than customers whose product mix includes a high proportion of slow moving items.

Returns / Exchanges: Customers who frequently return or exchange the items cost more because of the additional handling and processing charges.

While the costs of some of the above drivers may be relatively easy to measure (for example: DSO, delivery requirements, order sizes), most distributors are not equipped with information systems that can accurately measure the others (for example: cost of sales calls, fast movers Vs slow movers, returns).

2.2.3. Loyalty: This is the most subjective dimension of the four considered in this methodology. As mentioned in section 2.1, it is extremely difficult to obtain a good measure for loyalty. Some of the primary indicators of customer loyalty include:

- i. Number of years of relationship
- ii. Annual sales volume and its trend

- iii. Annual number of orders and its trend
- iv. Share of customer (revenue generated by a customer for a distributor as a percentage of the total amount the customer spent on items similar to the ones stocked by the distributor)
- v. Customer lifetime value (CLV) (see Jain and Singh, 2002)

However, some ERP systems only contain last two years of data. Distributors with such systems can estimate ranks based on loyalty using the following three secondary measures:

Number of orders: A customer who has placed 100 orders in a year is likely to be more loyal than a similar customer who has placed just 20 orders in the same year.

Average order size: This counteracts the effect of number of orders. A customer who placed 100 small orders in a year is less likely to be more loyal than a similar customer who places 50 large orders. The reasoning for this premise lies in the possibility that the former customer buys only a certain portion of its inventory from this distributor, rest from its competitor.

Coefficient of Variation (COV) of the monthly number of orders: A customer who has placed 100 orders in one month and less than 10 in the other months is probably not as loyal as a customer who placed between 30-70 orders each month. The former probably bought most of his requirements from a competitor and placed orders with the distributor only because the competitor stocked out.

2.3 Ranking Criteria and Combination

We perform a Pareto-type stratification for the first two dimensions (sales volume and GM). For the other dimensions, we use customized ranges based on their distributions to obtain the customer rankings.

We can compute CTS as a percentage of sales volume. If an accurate number for CTS is available, we can combine GM and CTS into one dimension – net profit (NP). However, we have CTS as a separate dimension in this analysis because if a distributor cannot estimate CTS accurately, he can rank the customers on the individual drivers of CTS (described in section 2.2) and combine the ranks using appropriate weights to obtain a single CTS rank for each customer. Similarly, for customer loyalty, we will determine each customer's rank with respect to each of the primary measures. We will assign weights to each measure appropriately and combine the corresponding ranks to obtain a single rank for loyalty. If primary measures are unavailable, we will use the secondary measures to determine the ranks.

Figure 1 illustrates the methodology we use for customer stratification. It has sales volume and loyalty on the X-axis, and GM and CTS on the Y-axis. A highly ranked customer with respect to sales volume and loyalty would be either a core or service-drain customer. If he is also highly ranked with respect to both GM and CTS, he would be a core customer. However, Figure 1 does not adequately explain how to classify a customer with high sales volume and low loyalty. To facilitate the process for such customers, we combine the rankings with respect to sales volume and loyalty into a single set of rankings. Likewise, we combine the rankings with respect to GM and CTS into another set. An example of how we could combine GM and CTS rankings is

illustrated in Figure 2. (It should be noted that the parameters in Figure 2 should be set or verified by personnel in the company with knowledge of their sales processes).

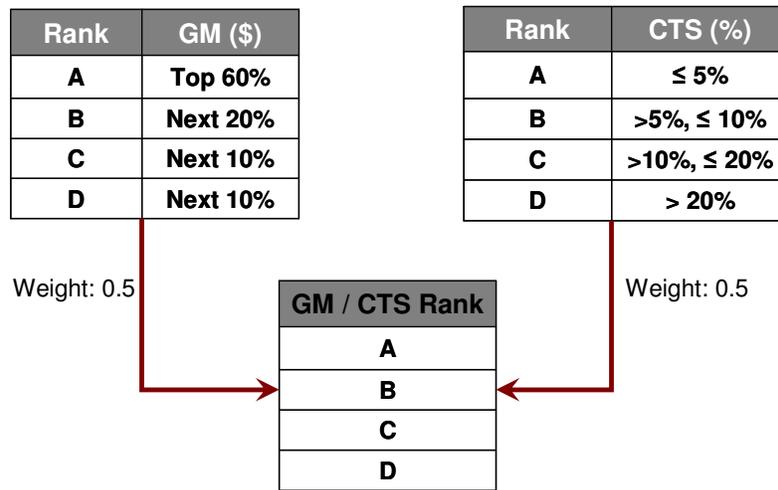


Figure 2: Combining rankings from GM (\$) and CTS (%)

3 illustrates how the combined rankings will be used to determine the customer types.

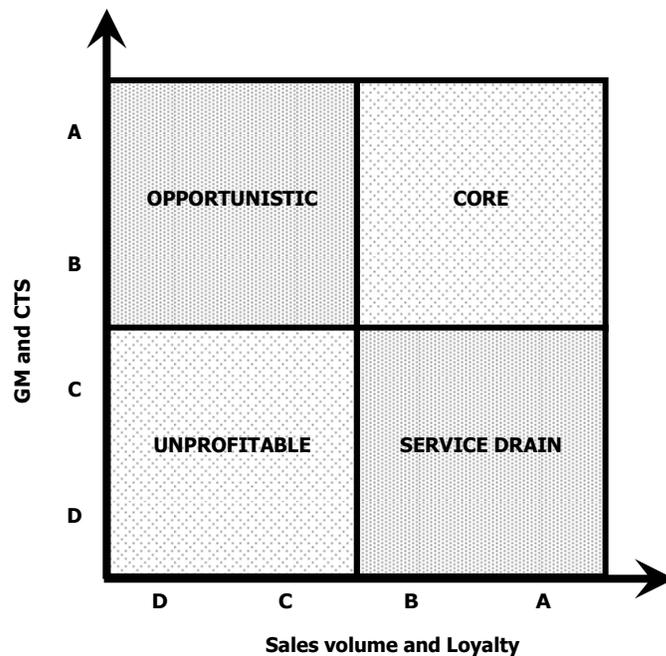


Figure 3: Combining rankings to determine customer types

3 Case study: Customer stratification for an industrial distributor

As a part of the pricing consortium, the participating members provided some of their transactional data for the research. The following analysis is based on the data provided by one of the participants. The participant is a leading industrial distributor with annual revenue of over \$1 billion. We will demonstrate the methodology and its application using one of this distributor's branches. The branch under consideration has annual revenue of over \$10 million, with gross margin of \$3 million. The company provided the authors with one year worth of transactional information (November 2005 to October 2006). During the year, 231 customers transacted at this branch. Figure 4 shows the relationship between sales volume and the number of customers.

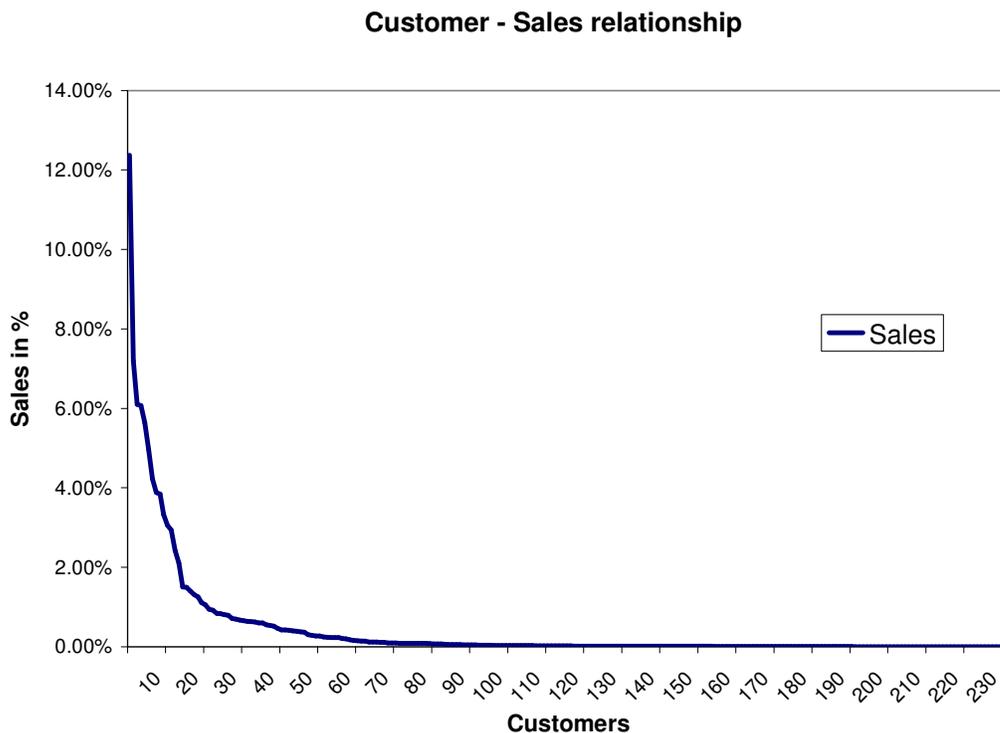


Figure 4: Customer-Sales relationship

The top 25 (approximately 10%) customers contributed to 80% of the sales and 75% of the net profit at this branch. We see a long-tail of low-revenue customers. But contrary to Anderson’s (2006) definition of long-tail, the last 90% of the customers contributed just 20% of sales volume, which in turn accounted for 24% of net profit.

We used the revenue (\$) for the sales volume dimension and gross margin (\$) for the GM dimension. The data provided corresponded to just one year – not enough to determine customer loyalty using the primary measures. We opted to use the secondary measures described in section 2.2.3, namely, number of orders in a year, the average order size and coefficient of variation of orders per month, to estimate customer loyalty. The result was verified with the company for its correctness. We computed cost to serve (CTS) as a percentage of revenue and ranked the customers based on them. This ranking was also verified with the company as it based on our parameter settings. The stratification was then performed using these four dimensions as described in section 2.3. Figure 5 illustrates the outcome of this methodology.

Opportunistic Customers	Core Customers
5	13
Marginal Customers	Service Drain Customers
203	10

Figure 5: Results of Customer Stratification – number of customers

Even though the top 25 customers contributed to 80% of the sales, our methodology identified only 13 as core customers. Of the 231 customers, 203 were identified as marginal customers. These are part of the long-tail and they contribute to about 20% of the net profits.

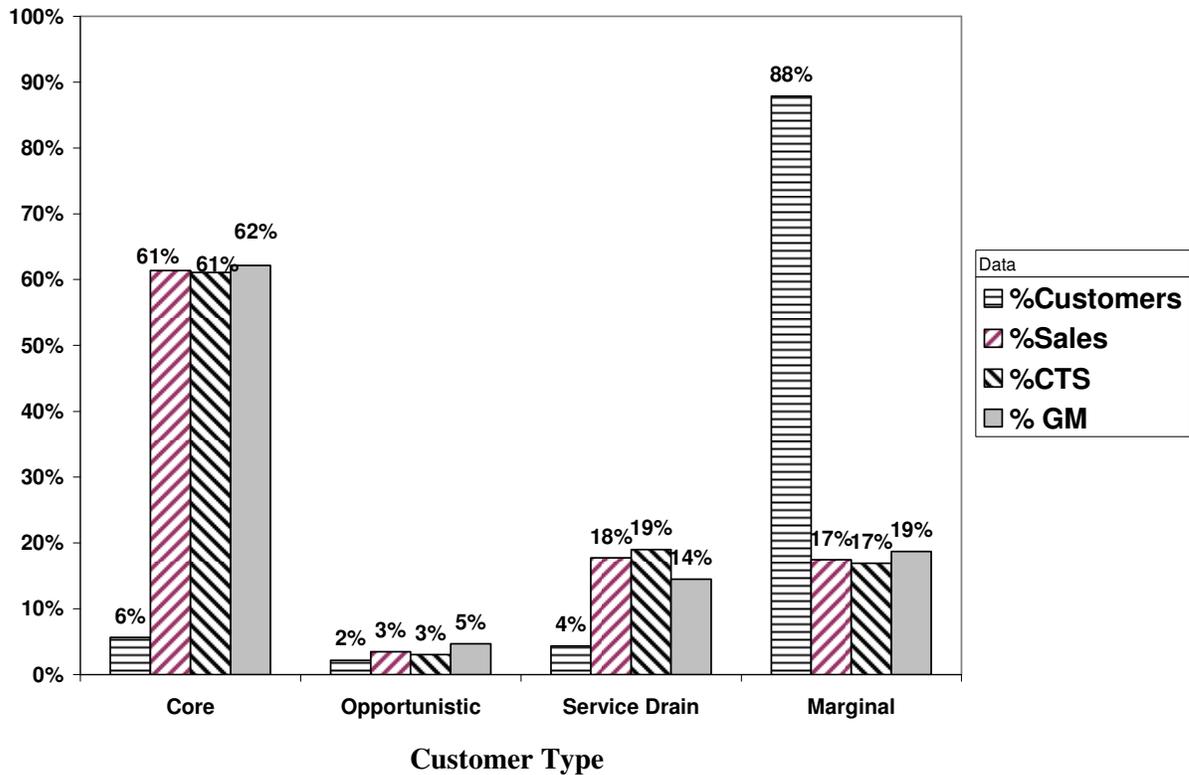


Figure 6: Characteristics of Customer Types

Figure 6 shows the characteristics of each customer type for this case. The thirteen core customers contribute to 61% of the total sales, 62% of the gross margins, and about 61% of CTS. The five opportunist customers contribute to only 3% of the total sales, but they generate 5% of the gross margins and contribute to only 3% of CTS. As expected, the opportunists are low volume, high margin customers. They generate more profit per sale than any other customer category. The ten service-drain customers

contribute to 18% of the sales, but only 14% of the gross margins – this shows that they are tough negotiators. They also contribute to 19% of CTS – indicating (as expected) that they use more services than the other customer types. The 203 marginal customers contribute to just 17% of the total sales – this shows that each of these 203 customers is really marginal. However, as a whole, this group of marginal customers contributes to 19% of the branch’s gross margins.

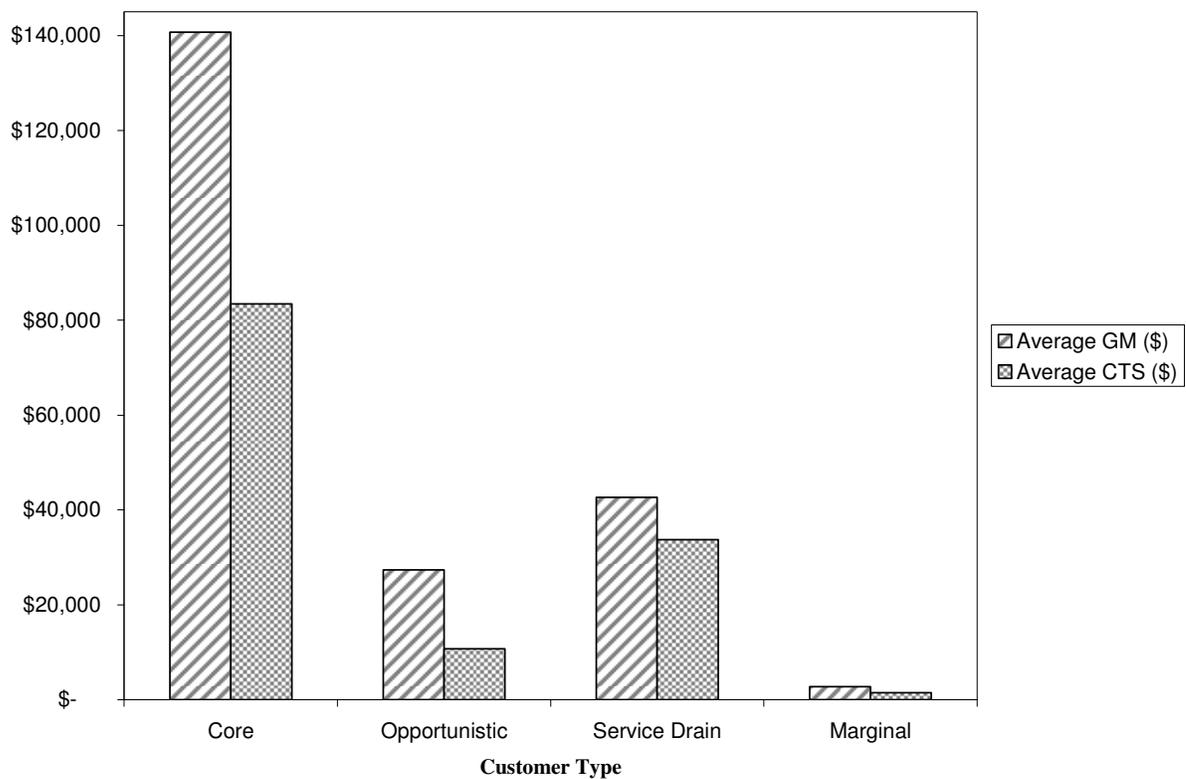


Figure 7: Characteristics of the Average Customer in Each Type

Figure 7 shows the characteristics of an average customer in each type. The average core customer contributed about \$140,000 in GM that year and cost about \$80,000 to serve. The average opportunistic customer contributed about \$27,000, but cost only \$10,000 to serve, thus generating a high profit margin for the distributor. The

service-drain customers, on average, contributed about \$43,000 in GM, but cost almost \$34,000 to serve – this high CTS justifies their grouping. The average marginal customer contributed just \$2,700 in GM and cost about \$1,500 to serve. This shows that while the marginal customers as a group are important to sales and profitability, adding or losing a marginal customer does not affect the balance sheet significantly.

The 13 core customers placed an average of 3800 orders each for the year and generated 65% of the net profit for the company; whereas, the 10 service-drain customers placed an average of 1280 orders each and generated just 7% of the net profit for the company. The five opportunistic customers placed an average of 530 orders each and generated about 8% of the net profit for the company by themselves. Finally, the 203 marginal customers placed an average of only 75 orders each for the year and generated 20% of the net profit. However, the average net profit generated by the marginal customers is at least 10 times less than that of opportunistic customers. It should be noted that 35 marginal customers had a higher net profit percentage (as a percentage of sales) than the opportunistic customers, but the cumulative net profit (\$) for these 35 marginal customers was less than the net profit (\$) of the least profitable opportunistic customer. These customers were categorized as marginal because of the low dollar value of their gross margins.

We also studied the effect of each dimension on this branch's customer stratification. When the CTS dimension is removed, we had just two (as compared to 10) service-drain customers. This shows the importance of CTS, without which we cannot identify the customers who cost more to serve and in some cases they may even be unprofitable. When the CTS and loyalty dimensions are removed from the analysis, we

had less than 2 customers in both opportunistic and service-drain quadrants. This essentially demonstrates the significance of the two dimensions: they help in identifying the areas of potential growth (opportunistic) and decline (service-drain) in the distributor's business. We could also classify the customers just based on sales volume by performing a Pareto-type analysis, but again this analysis will differentiate the core customer from a service-drain customer, and an opportunistic customer from a marginal customer.

4 Customer Development Strategies

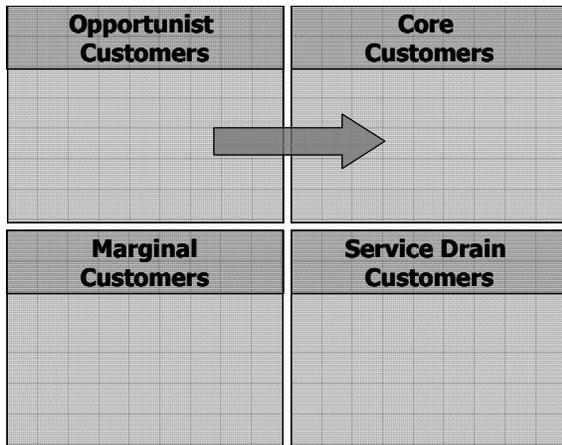
The customer stratification not only distinguishes between good and bad customers but also provides a blue print for conducting future business. Figure 8 shows how we can use the stratification tool to outline different customer development strategies.

Strategy for Opportunistic customer: Resources should be allocated to the sales force to attract the opportunistic customer to the core category. The high-margin opportunistic customers usually buy from the distributor only when the competitors are high priced or out of stock. The distributor should therefore devise a strategy to attract their profitable businesses on a consistent basis.

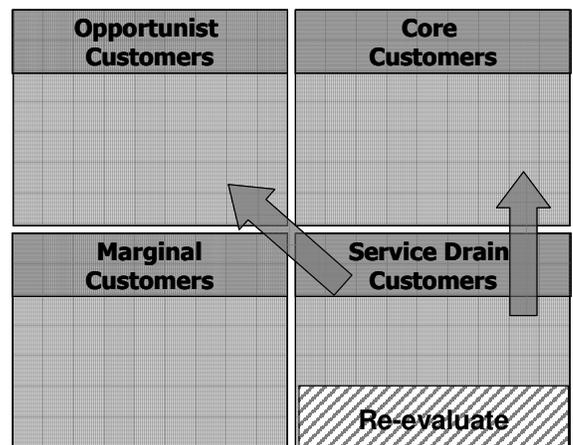
Strategy for Service-drain customers: The high-volume service-drain customers could be moved to core category by increasing prices, thereby essentially increasing the gross margins. Any price increase should be cautiously applied, as it may backfire and cause the service-drain customer to buy from the competitors, making them an opportunistic customer. In either case we avoid making a sale at a loss or a lower profit. Some service-drain customers could be unprofitable for the company. For example in the company

described in section 3, one of their service-drain customers had a high negative profit margin. The business with such a customer should be re-evaluated; at times losing such customers would help the bottom line of the balance sheet.

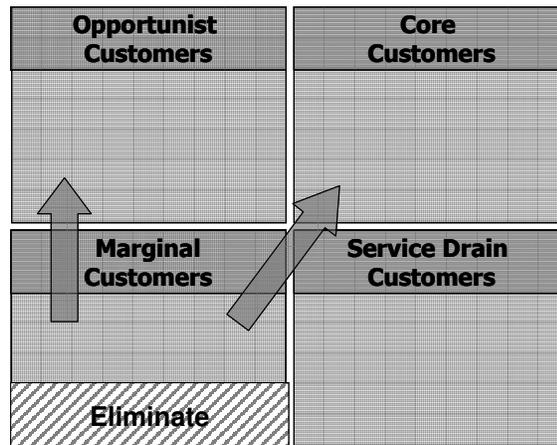
Figure 8: Customer Development Strategies



(a) For Opportunistic customer



(b) For Service-drain customer



(c) For Marginal customer

Strategy for Marginal customers: These long-tail low-volume customers are essential for a company since they bring in at least 15-20% of the total profit. At the same time, not all of them are important to the company. In our example described in section 3, we had at least 15 customers with negative profit margin. The business with these marginal customers should be avoided (eliminated). Losing these low-volume loss making customers would help the distributor to improve their overall profit. The resources spent on these transactions could be used in other profit making ventures. Some of these marginal customers could be moved to opportunistic category by increasing the gross margin. In rare cases, the distributor can develop a relationship with a marginal customer, eventually convincing him to buy more products at the right price, thereby moving him to the core category. The distributor should be careful when increasing the business with such customers; they may turn out to be a service-drain and could significantly affect the profit of the firm.

5 Conclusions and Future Research

Much of the previous work done on customer stratification has focused on single dimensional analysis using sales volume, gross margins, or net profit. We have presented a stratification model that combines several dimensions. The resulting customer types provide critical information about each customer to the marketing and sales departments. This information should help them in their pricing and resource allocation decisions. We have also presented business strategies for each customer type, especially for unprofitable service-drain and marginal customers.

This approach highlights the importance of the cost to serve (CTS) measure. One of the well known methods for estimating cost to serve is activity based costing (Cooper

and Kaplan 1987). Based on our interviews with industrial distributors and software providers, we find that most distributors do not use activity-based costing to track their service costs - even though when such a facility is available in their ERP systems. Hence, we have provided a technique to approximate the effect of CTS by ranking the major drivers of CTS. However the authors acknowledge that the full potential of the customer stratification model would be realized only when all dimensions are accurately measured by the company.

Another important advantage of our customer stratification model is its ease of implementation in a spreadsheet package. We are currently exploring opportunities to incorporate this methodology in distribution software packages.

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