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Setting customer service levels: an overall cost-approach

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Abstract

Customer service level decisions are usually based on qualitative market information and internal costs only. In this text we suggest an approach of using quantified costs information of both customer and supplier in setting service levels. After a brief introduction on how customer service can be defined we describe its typical cost-structure. Due to the characteristics of this cost-structure the use of unquantified and ambiguous market information in setting service levels can easily lead to under-servicing or over-servicing. The overall cost-approach in which both supplier and customer costs are considered better supports service level decisions. This approach must be used in combination with other service level considerations. Some conditions for using the approach are identified. The applicability of the approach is described in relation to typical customer-supplier relationships.

1. Introduction

In the last couple of years many writers have advocated the integration of marketing and logistics or “customer service” as a new approach towards customers [1–3]. Some writers have called it the most important strategy for the nineties [4]. The reason for that lies in several market trends like shorter product life cycles, broader product ranges, market fragmentation (mass-customization) and increasing competition through service differentiation [5]. These trends are increasing the importance of logistics performance in marketing products. Because of this, providing the right customer service level through integration of marketing and logistics is a condition to gain and maintain a competitive edge in many markets.

Having said that customer service is increasingly important, writers also pay attention to the design of a customer service system. For example, Christopher [6] identifies six stages in designing a service system (see Fig. 1). In these stages major attention is directed at finding out the service requirements of customers. Stages I, II and III concern market research to identify key elements of customer service and their relative

importance of different customer groups in order to be able to segment the market on service criteria. Typical research techniques during these first stages would be expert opinion methods and customer surveys asking the customer to name and/or rank service elements. As suppliers can probably not fulfil all customer wishes they will have to make trade-offs. The service levels must be set based on the relative importance of the key service elements.

However, in designing customer service systems in practical situations two problem areas can be identified:

–Unclear market information. Information gathered during the first three stages is often ambiguous and unquantified. For example, much depends on who answers the survey questions within the customer organisation, the buyer or the production manager or someone else.

–Internal trade-offs. Service level decisions are made to optimise local costs only, both at suppliers and customers.

The consequences of these problems are that in many situations, customers are offered either too much or too little service. Overall cost-efficiency is low.

In this paper the above stated problems will be

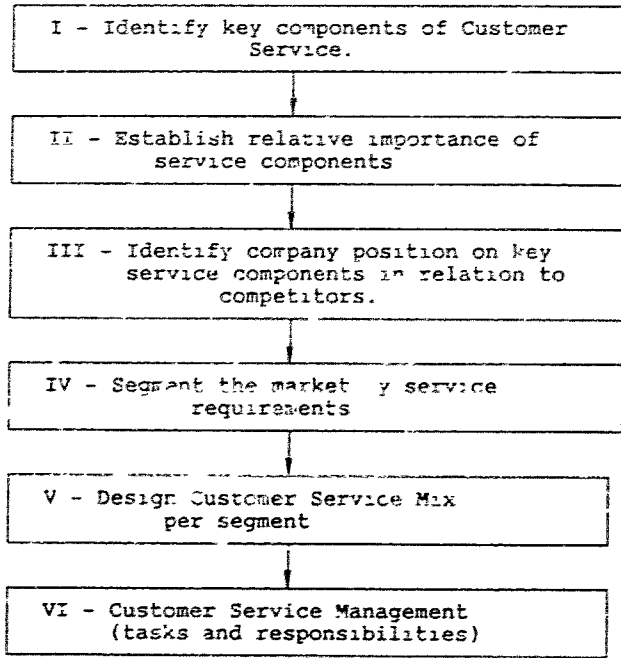


Fig. 1 Stages in designing a customer service system

further discussed. We will describe the general cost structure of customer service. To improve service level decisions, an overall cost approach will be introduced. Also, the use and applicability of this overall cost approach will be discussed.

2. The costs of customer service

Customer service should aim at customer satisfaction through fulfillment of customer demand. Without adding another definition to an already long list [7], this text will follow Christopher and consider customer service as: "the output of the logistics system towards customers." Customer service levels determine the amount of service provided to the customer. For individual service items these levels can be quantified or measured, for example 24 hour deliveries or 95% reliability of deliveries. The general service level can be described as the total "amount of service" on the individual items.

In this text we suggest an approach of making service level decisions considering overall costs, thereby providing the designer of the service sys-

tem better insight in the added value of the service to the customer. To use an overall cost-approach in service level decisions one must know the relation between service and costs for both supplier and customer. First we will discuss these relations for supplier and customer individually. The cost-curves are depicted in Fig. 2.

Supplier costs. At short or medium long term, every supplier is capable of offering a certain service level which fits its organisation. This service level depends on the kind of logistic facilities and management systems the supplier has

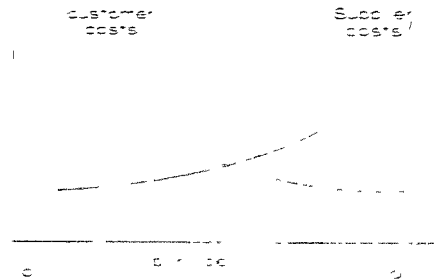


Fig. 2. Cost-curves

invested in. Offering service below this level will result in only a small decrease in costs, because investments are already made and people and systems are adapted to a higher service level. Also, offering service above this level will more than proportionally increase the costs due to diminishing economies of scale. Therefore, in many situations overall cost-curves will be similar to the curve in Fig. 2.

Customer costs The service offered to the customer should result in (perceived) added value to the customer. For the customer, the service offered has a diminishing marginal value. The customer organisation requires a certain level of service. Being supplied below that level will induce far higher costs, while being supplied above that service level will only lead to small benefits. Also here we consider only short or medium term consequences.

The structure of the service cost-curves is illustrated in box 1 by a quantified example on order-size.

It must be remarked that both customer and supplier cost-curves are not always smoothly shaped like in Fig. 2. Cost-curves of individual service elements can have break-points, increase to a certain maximum or be strictly proportional to the level of service. For example, increasing service through shortening delivery lead-times will for the supplier lead to increasing cost changes with breakpoints at the lead-times when an extra warehouse closer to the customers is needed. In many situations however, general cost-curves will be similar to the curves in Fig. 2.

This cost-structure of service, with high customer cost at low service levels and high supplier cost at high service levels, means that cost-efficient service levels can only be obtained when an overall cost-approach is used. To set the service levels, quantified information on both supplier and customer costs must be available. With this cost-framework the earlier mentioned problem areas can be discussed.

3. Problems in setting service levels

3.1 Unclear market information

In setting customer service levels in practical situations the two problems of unclear market

information and internal trade-offs have been identified. The problem area of not knowing what customers really want can be divided in two parts.

Unquantified information From the cost-curves it can be seen that setting the customer service levels requires information not only on what service the customers want but also how much they want of it. The results of customer surveys are often not very clear about that. An example of that can be seen in Fig. 3. The customers of a company have ranked importance of service elements on a scale from 1 to 4. The average rankings are presented as the results of the survey. These results do not tell much about the level of, for example, delivery reliability. Another example is that both 24 hour and 48 hour may be considered short lead-times while 24 hour delivery will result in much higher costs for the supplier.

Ambiguity of information The information from market research may not always be clear. Customers may seem to want short delivery lead-times while what they really want are reliable delivery lead-times. Trying to get products earlier can be a way of making sure you have them on time. Another issue in this is the interchangeability of service aspects and price. Many buyers are prepared to adapt their service requirements if this results in price reduction. The importance of service requirements very much depends on the kind of products bought [8].

One reason for the above problems is that many customers (buyers) do not have detailed cost information on the results of their buying decisions. The value of the service offered cannot easily be quantified. This leads to prices being a very important factor in buying decisions, which in its turn leads to low service. This can have had influence on overall cost-efficiency (see example, order-size 22 pallets).

An example of avoiding the above problems by using overall cost information can be found in food-retailing situations where buyers and sellers are using Direct Product Cost/Profitability systems (DPC/DPP). These kind of (software) systems consist of a model of the logistic and selling cost-structure of food retailing organisations. The DPC/DPP-system calculates the direct cost and resulting profits of buying products of differ-

Box 1. Example

Consider two companies Metcom, a production company of metal components (supplier) and the Machine Manufacturing Factory MMF (customer). Components are delivered from stock to MMF once a month in full truck-loads of 22 pallets (2500 times per pallet), free of charge. The delivery lead-time is one day.

In the customer costs the following variables involved with the present way of ordering can be described.

co = ordering cost per order = \$50

i = costs of holding inventory in percentage of inventory value (interest + space costs).

TCc = Total yearly costs of the customer (ordering + inventory costs)

X = order-size in pallets (22 in the present situation).

P = price per item = \$7.50 (\$18750 per pallet).

Inv = Average Inventory value

TCc depends on the number of days between placing two orders. Total production days per year is 250. The delivery lead-time will not change, therefore safety stock is not considered

$$TCc = \frac{250}{X} \cdot CO + Inv \cdot i$$

$$= \frac{250}{X} \cdot 50 + (0.5 \cdot 18750 \cdot X) \cdot 0.16$$

$$= \frac{12500}{X} + 1400 \cdot X$$

Minimal costs:

$$\frac{d(TCc)}{d(X)} = 0 \Rightarrow X = \frac{12500}{1400} \approx 9$$

$$TCc(3) = 8370$$

$$TCc(22) = 31370$$

Ordering every three days would mean a 75% costs reduction for MMF.

The resulting costs at the supplier Metcom can be calculated as follows

sc = sales costs per order = \$25

tc = transport costs per delivery depending on order-size

tc = 200√X for X < 22 (full load) For X > 22 transport costs are full load + 200√(X - 22).

TSc = total yearly supplier costs (sales + transport costs)

$$TSc = \frac{250}{X} \cdot tc + \frac{250}{X} \cdot sc$$

$$= \frac{250}{X} \cdot 200\sqrt{X} + \frac{250}{X} \cdot 25$$

$$= \frac{50000}{\sqrt{X}} + \frac{6250}{X}$$

for X = 22

From this costs function it is clear that to minimise supplier costs X should be 22 (= full load).

Metcom and MMF decide to look at the total chain costs (CHc) and try to minimise these.

CHc = TCc + TSc

$$= \frac{12500}{X} + 1400 \cdot X + \frac{50000}{\sqrt{X}} + \frac{6250}{X}$$

Optimal costs.

$$\frac{d(CHc)}{d(X)} = 0 \Rightarrow X = 8$$

$$CHc(3) = 8,370 + 30,950 = \$39,320$$

$$CHc(8) = 12,760 + 18,460 = \$31,220$$

$$CHc(16) = 15,250 + 16,436 = \$31,686$$

$$CHc(22) = 31,870 + 10,940 = \$42,810$$

From the results listed above the two companies could see what would be the best way to deliver the components. It was decided to deliver the components in 2-week quantities for that would make easier planning than delivering every 8 days without much extra cost.

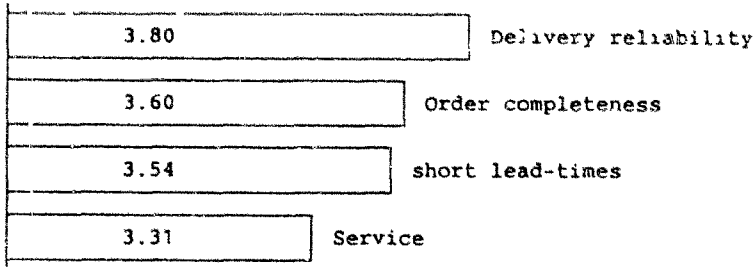


Fig. 3 Importance of service elements (example)

tain quality at a certain service level based on logistics product characteristics and prices [9]. This can change buyers from using gross margin in buying decisions to using information on direct profit and costs. It must be remarked that presently these DPC/DPP-systems are mainly used by food vendors and retailers. DPC/DPP-systems have been developed for these situations only. But also in other commercial relationships this approach can be useful. This requires a cost-framework, adapted to the characteristics of industrial customer service elements.

3.2 Local cost optimisation

The earlier signalled trend of market fragmentation requires suppliers to adapt their service to each individual customer. In general every customer wants its suppliers to offer the highest service and quality at the lowest price. As this is impossible, trade-offs have to be made. In most situations trade-offs are made to local costs. If overall cost information is not available the service levels will be set either to a supplier or customer local cost optimum. Either situation does

not often lead to an overall cost optimum as can be seen from Fig. 2 and the example. The supplier cost optimum is at a very low service level where the overall costs can be lowered by increasing service levels. This situation can be described as "under-servicing" (see Fig. 4). The customer cost optimum is reached at a high level of service which leads to "over-servicing". In that situation, lowering the service levels will lead to lower overall costs (see Fig. 4).

4. The overall cost-approach and other service level aspects

The overall cost optimum is not the only aspect in the process of setting the service levels. There can be other aspects which also have influence on the service level decision. Still, when suppliers are over-servicing their customers, it should be known what the extra costs are to monitor the success of the strategy. In this section the important aspects of the marketing strategy and price will shortly be discussed.

4.1 Marketing strategy

The service level decision is considered a tactical decision which must be taken in accordance with the overall marketing strategy [2,10]. The marketing strategy determines for example to compete on price or service and quality. This strategy can be the reason for a supplier to position his customer service at a cost inefficient level. An example of such a strategy would be a situation where higher service is used to penetrate a market or increase the market-share to get a better strategic position on a market. The extra costs

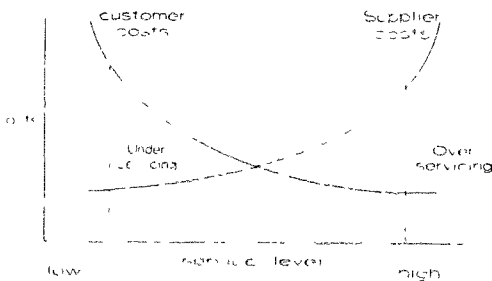


Fig. 4 Under-servicing and over-servicing

of "over-servicing" should then be considered as marketing costs

4.2 Price

In the setting of service levels price plays an important role. A price reduction can be an incentive for the customers to loosen their service demands and thereby letting the supplier set customer service at a more cost-efficient level. Also, customers which allow higher prices for extra service may lead to a supplier increasing the service level.

In Fig. 5 we give an example of the relation between costs of service and price. The supplier has been pushed into a situation of over-servicing at level *H*. When service requirements are decreased to level *M* the supplier can save *C* on his costs. Due to the structure of service costs, the supplier's savings are higher than the increase of costs *c'* at the customer. The savings of the supplier determine the possible price reduction. If all savings are put into the price reduction, the shift is financially neutral to the supplier. However, the price reduction may lead to a growing market-share and thereby increased revenue for the supplier.

An important factor in this is the price elasticity of the market. In general price elasticity depends on the homogeneity of the product (and service). On a homogeneous market, demand will have a high price elasticity. Increasing the price will lead to lower sales. In this case, only if customer service can move a supplier away from the homogeneity, the increased costs of higher service can be compensated for by a higher price without losing market share. In heterogeneous

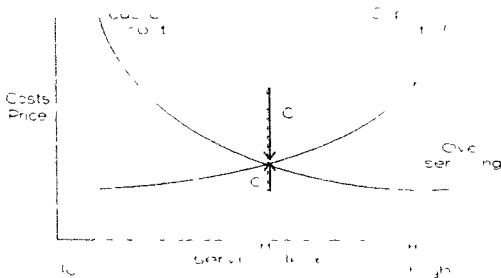


Fig. 5 Prices and service costs

markets price plays a less important role as customers can't really compare products of different suppliers. These markets provide more possibilities for increasing a price based on extra service.

5. Using the overall cost approach

However important, we do not want to suggest that using the overall cost-approach will easily solve all service level problems. In this section we will discuss some of the problems and conditions of using the approach.

5.1 Conditions

Obtaining an overall cost optimum is not always an achievable strategy in every supplier-customer relationship. Two important conditions can be identified:

-Mutual interests

A first important aspect is the mutual interest companies must have in maintaining a good relationship. Obtaining the overall cost optimum will often require some changes in the supplier-customer relationship. When there is no mutual interest in the relationship, the companies will not be willing to make any adaptations.

-Availability of cost information

If companies do not have an open relationship in which service matters can be discussed, the right service levels cannot be obtained. In many situations both customers and suppliers are not at all willing to provide each other with cost information. Companies are afraid of jeopardising their commercial interests by giving away too much information. This protection of information from a commercial point of view, is a major barrier in many situations of tuning service requirements.

Still, even if the above conditions are not fulfilled, the overall cost-approach can be valuable in setting the service level.

5.2 Supplier-customer relationship

To get an idea of how the cost approach can be used in different situations we identify three customer-supplier relations:

- Incidental;
- Repeated buying;

-Co-makship

Each of these relations requires another way of obtaining and using (overall) cost information

Incidental

An incidental relationship between two companies is the situation in which customers buy only once or twice from the same supplier. The supplier has a continuously changing group of customers, or customers buy at a very low frequency, for example suppliers of investment goods (production machinery or large office equipment) to industrial customers. Customer cost curves cannot be identified. Setting the level of service is an internal matter of suppliers as they cannot adapt their service levels to an ever changing group of customers. The level of service in this situation depends mainly on the marketing strategy and the competitive situation. Logistic management must try to minimise costs at the service level set. Adapting the service level for individual customers will result in significantly higher costs.

In this situation the (overall) cost-approach is used for internal costs only to indicate the level of service appropriate to the organisation's facilities. If this level is significantly different from the service level determined by the marketing strategy, either the company should invest in new facilities and equipment or change its strategy.

Repeated buying situation

The situation of repeated buying occurs when a large group of customers frequently buys products from the same supplier. Typical products for this situation would be purchase parts and raw materials. Relations between customer and supplier last for a longer period. In this situation it is very well possible to obtain information on both supplier and customer costs. Customer surveys should result in quantified customer service information. Segmentation of customers will be necessary. This requires a good marketing research program as customers are not always willing to make this information available to suppliers. A more analytical way to obtain insight in customer cost curves is to design and/or use a DPP/DPC-system. The system can be filled with

customer logistic characteristics and used to calculate the cost consequences of the customer service offered. If customers are unable to quantify costs themselves, DPP/DPC-systems can also be used to convince customers of the value added through service [9]. As both customer(segment) and supplier costs are quantified, service levels can be set as close as possible to the overall cost minimum in each segment. The overall cost-approach becomes an integrated part of the customer service design system.

Co-makship relation

A co-makship relation is where supplier and customer are working towards a common goal, fully using each others potential while keeping separated financial ownership structures. This relation occurs in a situation with a high mutual dependence of supplier and customer. The customer can be dependent because alternative suppliers are hard to find. Suppliers may experience dependence because the customer is responsible for a large part of total sales volume. In co-makship, openness is the very nature of the relation. Detailed cost information is passed on through the channel in both directions. Cost-curves are clear for both sides. In this situation the overall cost-approach must be used to obtain the right service level.

When costs of both customer and supplier are quantified, it may be possible to adapt facilities or procedures to lower the cost curves. (In a case situation we studied, it turned out to be possible to lower the supplier cost-curve through a very small adaption in order procedures. The result was higher service at lower overall costs.) The overall cost-approach is a major tool in building a co-makship relation.

6. Conclusions

Although an overall cost optimum cannot be achieved in every situation, the cost-approach does provide a better view on the results of service level decisions. Not using quantified information or not discussing service levels at all can easily lead to over-servicing or under-servicing. As has been stated, the availability of cost information can be a big problem. Commercial inter-

ests seem to be more important than overall cost minimisation. Using the overall cost-approach requires a new way of customers and suppliers dealing with each-other. Salespeople should be able to bring up the matter of service levels, even in situations where customers only seem to be interested in low prices. More research will be directed at how to overcome the commercial barriers in obtaining cost information. When this kind of information is available, the service level can be set to minimise chain costs. Minimal chain costs provide both customer and supplier with better opportunities to compete on their markets.

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