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## MEASURING AND MANAGING THE AFTER-SALES SERVICE: APRILIA'S EXPERIENCE

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### ABSTRACT

The fundamental role played by after-sales services, in increasing the competitive advantage, is the reason why several manufacturing firms are giving greater attention to its measurement. Following an in-depth analysis of the literature concerning the characteristics and dimensions of service in manufacturing, a model for measuring and managing the after-sales service is proposed, and applied to a leading European company involved in technical assistance and repairing activities. The presented model permits an analysis of the origin of customer satisfaction with after-sales services starting from both the determinants of the customers' expectations and the customer understanding by the firm; from this latter, service specifications and the delivery of the service are derived. Eleven dimensions of service, both objective and subjective, have been individuated. The difference between the expected and perceived service is developed through eight gaps, and analysed according to the causes. The strategic implications and improvement actions are then discussed.

### INTRODUCTION

Quality of after-sales services is becoming one of the most important sources of competitive advantage for durable goods manufacturers (Chikan and Demeter, 1997). In this paper, starting from an in-depth analysis of the literature concerning the characteristics and dimensions of service in the manufacturing sector, a model for measuring and managing the after-sales service is proposed, and applied to a leading European company involved in technical assistance and repairing services in garages possessed or authorised by the firm.

Garvin (1984) proposed a matrix for the definition of quality, according to two dimensions: the nature of the quality (intrinsic or functional) and the type of evaluation (absolute or subjective), to which the different approaches to measuring correspond. In contrast to the case of the measurement of the quality of the operations (De Toni et al., 1995), the problem of the quality service measurement is that the "user's approach" must be adopted, which - according to Garvin - implies a subjective evaluation (due to the service characteristics of intangibility and customer involvement) and the consideration of the functional nature of the quality (due to the service characteristics of heterogeneity and production/consumption simultaneity) (Chase and Erikson, 1988).

## SERVICE CHARACTERISTICS AND MEASUREMENT

Starting from a survey of the most significant articles regarding service, which appeared in the best journals on marketing and operations management from 1984 to 1998, sixteen characteristics typical of the service have been individuated. They are grouped - according to the number of citations - into three classes: primary, secondary and tertiary. It was then noted that the secondary and tertiary characteristics ultimately derive from the five primary characteristics, and there are links also between the primary characteristics themselves (Table I).

Table I. Service characteristics: primary, secondary, and tertiary

PRIMARY CHARACTERISTICS	CORRELATED CHARACTERISTICS:		
	PRIMARY	SECONDARY	TERTIARY
intangibility	instorability, production/consumption simultaneity	difficult to measure	difficult to show, problems in fixing the price, cannot be re-sold, cannot be patented
instorability	production/consumption simultaneity	distribution problems	
production/consumption simultaneity	instorability, customer involvement	difficult to measure	difficulty of the economies of scale, short distribution channels
customer involvement in the process	heterogeneity	difficult to measure, importance of human resources	difficulty of the economies of scale, importance of time, importance of seat and facilities
heterogeneity (difficult to standardise)		difficult to measure	

As can be seen, the difficulty of measuring is one of the characteristics, though indirect, of the service. The authors have synthesized a model specifically for the after-sales service: it considers several elements of the "service system", according to Eiglier and Langeard's (1975), Gronroos's (1990), and Gummesson's (1993) models, and is based on an adaptation of the ServQual model (Zeithaml et al., 1990) - one of the most widely applied by firms - for "gaps analysis".

### A MODEL FOR MEASURING THE AFTER-SALES SERVICE

The presented model (Figure 1) permits an analysis of the origin of customer satisfaction with the after-sales service, starting from both the customer understanding by the firm and the determinants of the customers' expectations (individual, environmental and firm's variables - Rust and Oliver, 1994). The service specifications are made based on the customer understanding by the firm, and the service is delivered based on the service specifications. The delivered service is filtered by variables arising from the firm's reputation, and the risk perception and "sense of control" of the customer (Bateson,

1992). The customer is satisfied if the perceived service is above the level accepted as minimum (GAP7 elevated), and the service becomes a competitive weapon if the perceived service coincides with the expected service (GAP6 reduced). The difference between the expected service and the minimum accepted service (GAP8) usually depends on the importance of the service for the customer (high importance, small gap).

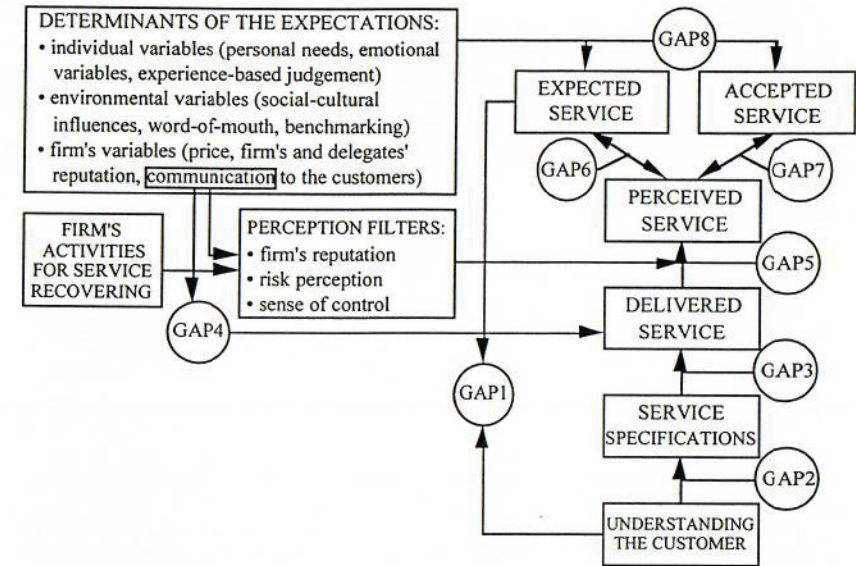


Figure 1. The model for measuring the after-sales service (evolution, proposed by the authors, of the ServQual)

Eleven dimensions for the after-sales service have been individuated, from among the numerous ones described in the literature for service activities (Fitzgerald et al., 1991): six dimensions of the objective (or intrinsic) type (physical support quality, competence of the personnel, courtesy of the personnel, responsiveness, accessibility/flexibility, and reliability of the service) and five dimensions of the subjective (or extrinsic) type, that is linked to the customers (server's credibility, server's communication, sense of security of the customer, server's capacity to regain customer's reliance, price/service ratio). Breaking down the quality of the after-sales service into the above-mentioned dimensions, first of all enables the measurement of the expected service (ES) level, as a weighted sum of the partial scores:

$$ES = \sum_{i=1}^{11} (w_i e_i)$$

where  $w_i$  is the degree of importance of the  $i$ -dimension according to the customer, and  $e_i$  the expected level in that dimension (values from 0.0 to 5.0).

If the customers also specify  $a_i$  (the minimum level in each service dimension), the acceptable service (AS) level may be measured, which represents the minimum value to obtain customer satisfaction:

$$AS = \sum_{i=1}^{11} (w_i a_i)$$

The so-called "tolerance zones"  $z_i = e_i - a_i$  (Johnston, 1995) - GAP8 in Figure 1 - are generally inversely proportional to the importance  $w_i$ .

Then the perceived service (PS) level is evaluated for the same dimensions:

$$PS = \sum_{i=1}^{11} (w_i p_i)$$

where  $p_i$  is the perceived level in this dimension (a value from 0.0 to 5.0).

The customer is satisfied if:  $GAP7 = PS - AS > 0$ .

The objective gap between customer's expectations and perceptions is thus given by:

$$GAP6 = ES - PS = \sum_{i=1}^{11} w_i (e_i - p_i)$$

If this gap is low, or indeed negative, service becomes on "order-winning" criteria (Berry et al., 1995) for that firm.

Customer satisfaction and the service as a competitive weapon depend on a series of gaps (GAP1, 2, 3 and 4 in Figure 1), each of which is determined by specific factors (the causes of the four gaps of the ServQual model have been adapted to the case of the after-sales technical assistance service):

- gap between the expected service by the customer and the understanding of the customers by the managers (GAP1), caused by: inadequacy of the strategic focus on the customer, and communication difficulties between the front office and management;
- gap between the result of the customer understanding and definition of the service specifications (GAP2), caused by: limited resources, and an incomplete or incorrect definition of the objectives (in both cases, on the part of the head office as well as the front offices);
- gap between the service specifications and the delivered service (GAP3), caused by: inadequacy of the technicians, inadequacy of the equipment, lack of co-ordination, loss of control on the part of the front office;
- gap between the communication with the customer and the delivered service (GAP4), caused by: inadequate communication, differences in the supply standards of the front offices, exaggerated promises.

Furthermore, not all the service contents delivered are also perceived (GAP5).

## THE APRILIA'S CASE STUDY

### The Company

The model has been tested in Aprilia, one of the leading motorcycle companies (about 500 million Euro of revenues in 1998 and more than 300,000 units produced, between scooters and motorcycles, from 50 to 1000cc), winner of 12 world racing championships from 1987 to to-day (4 "mark" e 8 "driver" titles).

The firm has a well consolidated reputation in terms of innovation and product performance. Now it has realized that a major effort in the after-sales service, which plays a fundamental role in the case of motorcycles, can further increase its competitive advantage. It has adopted a "prospector strategy" (Kellogg and Nie, 1995) instead of considering after-sales service as a merely passive activity. The firm is supporting its service development with an extensive use of IT, which is changing the way service is delivered (Van Looy et al., 1998).

### The after-sales service

The Aprilia Consumer Service (A.C.S.) company was established to improve customer satisfaction and at the same time produce margins. A.C.S. is responsible for selling the spare parts and accessories for the products, and assisting the network of branches and connected garages in the repairing activities. The customer meets the front office of the branches face to face, but can contact the head office by means of a free telephone number or the Internet web. The linkage between the head office of the A.C.S. and its branches is assured by service managers, who act as supervisors.

The company's policies regard three main areas: supplying spare parts; technical assistance (repairing); customer care (warranty, information and attraction/reassurance). Measurement is of fundamental importance in all three areas, both to standardise the service and reveal customer satisfaction. Now we will focus on the technical assistance service.

### Customer satisfaction with the technical assistance service

The application of the model permits measurement of the service level and the consequent customer satisfaction. First of all, the eleven dimensions individuated for the after-sales service in general have been adapted to the after-sales technical assistance service, consisting in the repair of motorcycles in garages, either possessed or authorised by the firm.

In particular for the objective dimensions: the physical support quality consists in the size and cleanness of the garages and their relative equipment; the competence of the personnel is mostly the technical level of the mechanics and their capacity to solve the problems, the courtesy of the personnel regards the receptionists, the responsiveness is the repairing time, the accessibility/flexibility is the customer's distance from the garage and the time needed to obtain assistance on the road, and reliability of the service is the punctuality in consigning the motorcycles.

For the subjective dimensions: the server's credibility and communication are influenced by the customer care activities (for information and attraction/reassurance), the sense of security for the customer depends on the transparency of the repair prices, the server's capacity to regain customer's reliance is related to the repair warranty conditions, and the price/service ratio (for the out-of-warranty interventions) depends on the customer's

view of the price relative to the work done.

By means of an annual survey, using a questionnaire, a sample of customers answer statements measured on the Likert scale (Dick and Hagerty, 1971), for each of the above-mentioned dimensions of service, and the service levels and gaps are measured (Table II). The determinants of the expectations (classified according to those in Figure 1) are also investigated.

Table II. Dimensions of the after-sales repairing service (O= objective, S= subjective), degree of importance ( $w_i$ ), expected level ( $e_i$ ), acceptable level ( $a_i$ ), tolerance ( $z_i=e_i-a_i$ ), perceived level ( $p_i$ ), gaps expected vs. perceived service ( $e_i-p_i$ ) and perceived vs. minimum accepted service ( $p_i-a_i$ )

	$w_i$	$e_i$	$a_i$	$e_i-a_i$	$p_i$	$e_i-p_i$	$p_i-a_i$
1) equipment, size, cleanness of the garages (O)	0.07	3.0	2.0	1.0	2.9	0.1	0.9
2) problem solved by the mechanics (O)	0.25	4.6	4.4	0.2	4.4	0.2	0.0
3) courtesy of the receptionists (O)	0.09	4.2	3.5	0.7	3.9	0.3	0.4
4) repairing time (O)	0.17	4.5	4.3	0.2	4.1	0.4	-0.2
5) distance from the garage (O)	0.05	3.6	2.5	1.1	3.3	0.3	0.8
6) punctuality in consigning the motorcycles (O)	0.06	4.5	3.8	0.7	3.9	0.6	0.1
7) customers' care (S)	0.03	4.0	3.3	1.3	3.8	0.2	0.5
8) informations to the customers (S)	0.02	3.1	1.8	1.3	3.2	-0.1	1.4
9) transparency in repair price (S)	0.05	3.7	2.8	0.9	4.0	-0.3	1.2
10) repair warranty conditions (S)	0.06	3.8	3.0	0.8	4.0	-0.2	1.0
11) price in relation to the service given (S)	0.15	4.2	4.0	0.2	2.8	1.4	-1.2

The expected (ES), the acceptable (AS) and the perceived (PS) services, calculated as described above, with the values in Table II (which, for reasons of privacy, have been modified in respect to the true ones of the firm), are equal to:

$$ES = \sum_{i=1}^{11} (w_i e_i) = 4.18; AS = \sum_{i=1}^{11} (w_i a_i) = 3.69; PS = \sum_{i=1}^{11} (w_i p_i) = 3.80.$$

Customer satisfaction is evaluated as the difference between the perceived service (PS) level and the minimum acceptable service (AS) level: the bigger this is, the greater the customer satisfaction. In this case, the value is not very good: 0.11.

The service support as an "order-winning" criteria is instead evaluated by the difference between the expected service (ES) level and the perceived service (PS) level: the smaller this is, or even negative, the more the service assumes the aspect of a competitive weapon. Even in this case the value is not very good: 0.38.

The firm can act on the motives that determine PS, AS and ES. To do this, an in-depth gap analysis is conducted, examining the above-cited causes of Servqual's four types of gaps (1, 2, 3, and 4 in Figure 1), and classifying the riskiness of each gap and the relative

impact factors on three levels: innocuous, risky, critical. The riskiness of each gap corresponds to the higher level of risk noted in its factors.

### Strategic implications and improvement actions

A "strategic matrix" is constructed by Aprilia Consumer Service, where, for all the service dimensions, there are specified (Table III): the degree of importance for the customer ( $w_i$ ), the customer's expectations meetings ( $e_i-p_i$ ), the differentiation potentiality ( $D_i$ ) through this dimension, the actual positioning (revealed by the annual marketing research) in regard to the competitors (for example, competitors A, B and C), the company's short and medium-long term objectives. These latter are described in terms of: metrics (and the corresponding values), resources (and costs) needed, actions to be taken to attain such objectives (for example, regarding the dimension "technical problem solved by the mechanics" i.e. the personnel's competence: technical training and updating programmes, compensation systems aimed at involving and linked to the results, periodic meetings between the workshop staff, the receptionists and the managers, etc.).

The eleven dimensions individuated for the after-sales service are distinguished by importance: high power dimension ( $w_i \geq 4$ ), medium power dimension ( $3 \leq w_i < 4$ ), and low power dimension ( $w_i < 3$ ).

Table III. Aprilia's "strategic matrix" for the after-sales service ( $w_i$  is the degree of importance for the customer,  $e_i-p_i$  the expected vs. perceived service level,  $D_i$  the differentiation potentiality)

	$w_i$	$e_i-p_i$	$D_i$	position vs. competitor:			short and medium-long term objectives		
				A	B	C	metrics (values)	resources (costs) needed	type of actions
1) equipment	0.07	0.1	low	++	=	-	... (...)	... (...)	...
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
11) price	0.15	1.4	high	=	-	+	... (...)	... (...)	...

### CONCLUSIONS

The managerial implications of the model and the correlated instruments (such as the gap analysis and "strategic matrix") are clear: the service level is articulated into eleven dimensions to give a better measurement, the customer satisfaction and the differentiation strategy through the service are evaluated, the causes of the gaps are individuated and classified by risk, benchmarking is conducted and, as a consequence, the firm's objectives and plans are defined in detail, that is for each service dimension, including timing and the necessary resources/costs.

For manufacturing firms where the after-sales service (particularly the repairing service) is crucial and/or can become a competitive weapon, a suggestion is advanced on how to measure and control the service quality, and make plans for improvements.

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