Measuring and managing after-sales service: Aprilia's experience

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Abstract: The fundamental role played by after-sales service 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 after-sales service is proposed and applied to a leading European company involved in technical assistance and repair activities. The presented model permits an analysis of the origin of customer satisfaction with after-sales service, starting from both the determinants of customer expectations, and 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.

Keywords: after-sales service; technical assistance characteristics; service model; service measures; case study.

Reference to this paper should be made as follows: De Toni, A. and Tonchia, S. (2004) 'Measuring and managing after-sales service: Aprilia's experience', *Int. J. Services Technology and Management*, Vol. 5, No. 4, pp.385-393.

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1 Introduction

The quality of after-sales service is becoming one of the most important sources of competitive advantage for durable goods manufacturers [1]. 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 after-sales service is proposed, and applied to a leading European company involved in technical assistance and repair services in garages possessed or authorised by the firm.

Garvin [2] 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 [3], 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) [4].

2 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 2002, 16 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 are ultimately derived from the five primary characteristics, and there are links also between the primary characteristics themselves (Table 1).

Table 1 Service characteristics: primary, secondary, and tertiary

Primary	*Correlated characteristics*		
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

Table 1 Service characteristics: primary, secondary, and tertiary (continued)

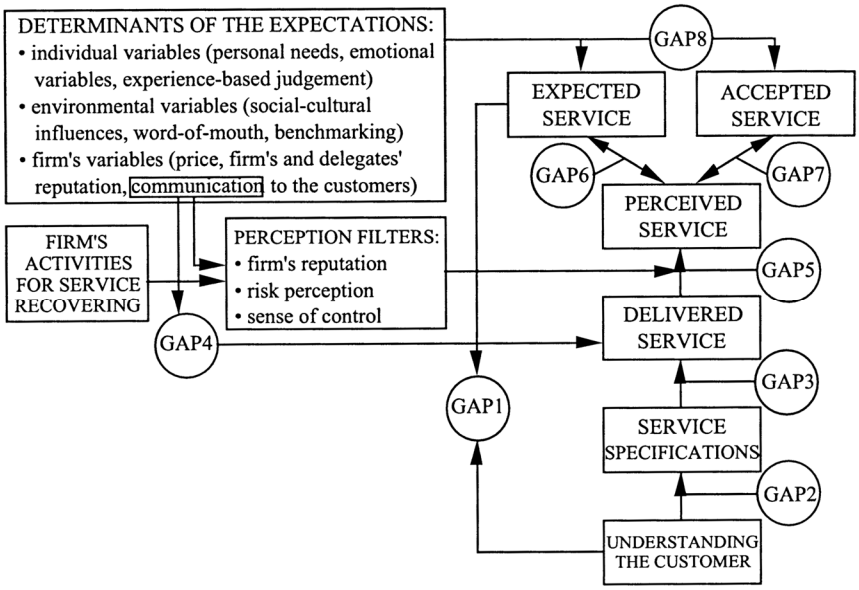
Heterogeneity (difficult to standardise)	Difficult to measure

As can be seen, the difficulty of measuring is one of the characteristics, though indirect, of the service. The authors have synthesised a model specifically for the after-sales service: it considers several elements of the 'service system', according to Eiglier and Langeard's [5], Gronroos's [6], and Gummesson's [7] models, and is based on an adaptation of the ServQual model [8] – one of the most widely applied by firms - for 'gaps analysis'.

3 A model for measuring after-sales service

The presented model (Figure 1) permits an analysis of the origin of customer satisfaction with 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 [9]). 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, risk perception and 'sense of control' by the customer [10], corrected by the firm's activities for service recovering [11]. 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 after-sales service (evolution – proposed by the authors – from Zeithaml's 'ServQual', [8])



Eleven dimensions for after-sales service have been individuated, from among the numerous ones described in the literature for service activities [12]: 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 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:

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

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:

$$AS = \sum_{i=1}^{11}(w_i a_i) \tag{2}$$

The so-called 'tolerance zones' $z_i=e_i-a_i$ [13] - 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:

$$PS = \sum_{i=1}^{11}(w_i p_i) \tag{3}$$

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:

$$GAP6 = ES - PS = \sum_{i=1}^{11} w_i(e_i - p_i) \tag{4}$$

If this gap is low, or indeed negative, service becomes on 'order-winning' criteria [14] for that firm.

Customer satisfaction and service as a competitive weapon depend on a series of gaps (GAP 1, 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 coordination, 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).

4 The Aprilia case study

4.1 The company

The model has been tested in Aprilia, one of the leading motorcycle companies (about 550 million Euro of revenues in 2002 and more than 350,000 units produced, between scooters and motorcycles, from 50 to 1000cc), winner of 17 world racing championships from 1987 to today (seven 'mark' and ten 'driver' titles).

The firm has a well-consolidated reputation in terms of innovation and product performance. It has now realised that a major effort in 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' [15] 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 [16].

4.2 After-sales service

The Aprilia Consumer Service (A.C.S.) company was established to improve customer satifaction 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 through the internet. 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 are focused on 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.

4.3 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 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.

The adaptations for the objective dimensions are: the physical support quality consists of the size and cleanness of the garages and their relative equipment; the competence of the personnel is mostly the technical level of the mechanicians and their capacity to solve the problems; the courtesy of the personnel gives focus to the receptionists; the responsiveness is equated to the repairing time; the accessibility/flexibility constitutes the customer's distance from the garage and the time needed to obtain assistance on the road; and reliability of the service is equivalent to the punctuality in consigning the motorcycles.

The adaptations for the subjective dimensions are: 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 is measured on the Likert scale [17] for each of the above-mentioned dimensions of service, and the service levels and gaps are measured (Table 2). The determinants of the expectations (classified according to those in Figure 1) are also investigated.

Table 2 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 mechanicians (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) information 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 2 (which, for reasons of privacy, have been modified in respect to the true ones of the firm), are equal to:

$$ES = \sum_{i=1}^{11}(w_i e_i) = 4.18;\ AS = \sum_{i=1}^{11}(w_i a_i) = 3.69;\ PS = \sum_{i=1}^{11}(w_i p_i) = 3.80 \qquad (5)$$

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. Again, 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.

4.4 Strategic implications and improvement actions

Service quality, and in particular after-sales services, are of crucial importance for competition among durable goods manufacturers. Services are no more a simple support for sales but have become a competitive weapon [18]. As a consequence, the service value chain has to be considered [19] which includes the company and its dealers [20].

So, a 'strategic matrix' is constructed by Aprilia Consumer Service, where all the service dimensions are specified (Table 3): 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) with 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 mechanicians' 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 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 3 Aprilia's 'strategic matrix' for 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).

				position vs. competitor			*short and medium-long term objectives*		
	w_i	$e_i - p_i$	D_i	*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	=	–	+	.... (....)	.... (....)	....
							.... (....)	.... (....)	....

5 Conclusions

From the research conducted emerges the growing importance of after-sales service for manufacturing firms. This type of service creates added value, gives competitive advantage and can produce relevant margins, too. At the same time, however, it is difficult to measure.

In this paper, a model for measuring after-sales service has been furnished, and tested in a major leading company. The model, starting from after-sales service dimensions, measures the expected, accepted and perceived levels of service, and consequently the customer satisfaction and order-winning capability due to the technical assistance. The correlated 8-gap cause analysis, together with the strategic matrix proposed, is also instruments for managing and improving the service quality.

The managerial implications of the model and the correlated instruments are clear: the service level is articulated 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 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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