THE OUTSOURCING OF PRODUCT SERVICE PROVISION FOR DURABLE CONSUMER GOODS. A METHODOLOGY FOR PROCESS AND PERFORMANCE ASSESSMENT OF THIRD PARTY SERVICE SHOPS

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ABSTRACT
Product-related services play a key role in manufacturing contexts as a long-term potential revenue source, a mean to uncover customer needs, and a strategic driver for customer retention. In durable goods industries, however, the provision of after-sales services is often outsourced by manufacturing companies. This paper develops a methodology for process and performance monitoring of third-party after-sales service providers, focusing on their main operative processes: customer contact, scheduling, execution and reporting of field services, warehouse management, human resources management and marketing.
The methodology is tested on a sample of 14 service shops operating in the household appliance businesses. Preliminary results show that these firms have a low awareness of their performances, and allow to appreciate how the different processes contribute to the overall cost and margins for each kind of service, or for the different brands serviced. Thanks to this methodology, service shops can draw a quantitative picture of their business, identify criticalities and elaborate improvement strategies.

Keywords: service shops, performance management, cost/revenue analysis

INTRODUCTION

After-sales activities are acknowledged as a relevant source of revenue, profit and competitive advantage in most manufacturing industries. This may explain the change in the role of after-sales, traditionally considered only a cost generator and a "necessary evil" (Lele, 1997), in durable goods industries. The change is in favour of a view that considers after-sales as a source of competitive advantage and business opportunity (Armistead and Clark, 1992). The increasing importance of intangible factors is changing the concept of the product which, traditionally seen as a tangible entity, tends at de-materializing and becoming a component of a more complex platform (Thoben, 2001). As a consequence, the strategic management of services, and among them of the after-sales business and operations, should acquire a major role in manufacturing firms. Nonetheless, the transition from a product manufacturer into a service provider constitutes a major managerial challenge for any manufacturing company. Services, in fact, require organizational principles, structures and processes new to product manufacturers, which encompass the whole product life-cycle, from its conceptual phase to its dismissal point (Oliva and Kallenberg, 2003).

From the context outlined, it is possible to understand how the strategic management of the provision of field services (e.g. repair) for goods such as cars, domestic appliances or ICT consumer products, although a "traditional" activity, acquires a major importance. The field service insourcing vs. outsourcing decision, the relationship with third service providers, the management of field service performance (cost, quality, time) have, in fact, a strong impact on the long-term company financial performance.

This paper addresses the outsourced field service provision from the standpoint of the third-party service provider, in a specific context. The actors considered are, in fact, service shops (SMEs and micro-companies, often family businesses), providing field service for white goods. The paper focuses on a criticality for these companies, that is the measurement and management of processes, costs and revenues.

THE PROVISION OF FIELD SERVICES FOR MANUFACTURED GOODS

The execution of field service activities (e.g. product check-up, repair) can be performed directly by manufacturing companies, or it can be outsourced to third party providers. A common trend in durable consumer goods industries is to decrease vertical integration, by outsourcing non-core activities. Outsourcing is "the act of transferring some of an organisation's internal recurring activities and decision rights to outside providers, as set forth in a contract" (Greaver, 1999). Outsourcing implies leaving or transferring the ownership of the resources needed to execute those activities to the external provider. The degree to which decision making responsibilities and performance measurement are transferred may vary, and thus also the level of control exerted by the outsourcer. Four options can be pointed out, as shown in table 1.

Table 1 – Outsourcing decisions of activities (Saccani et al., 2005)

		Execution (ownership)	
		Internal	External
Control (decision making)	External	CAPACITY SUPPLIER	EXTERNALISATION
	Internal	INSOURCING	OUTSOURCING

The conceptual framework in table 1 can be applied to the execution and management of after-sales activities. Capacity Suppliers can be defined as third parties, owning resources and carrying out activities according to someone else's specifications. Externalisation, instead, occurs when the organisation outsources also the decision-making about product-service specifications and management rules. Control may be exerted only through customer satisfaction or supplier performance evaluation. Insourcing, on the other hand, describe the option of keeping internally both ownership and control ("make" decision). Finally, the Outsourcing option includes the involvement of a third party in the execution of activities and ownership of resources, but keeping an internal control.

Hull and Cox (1994), and more recently Nordin (2005) state that there is little published academic research about after-sales services in manufacturing contexts: some literature, however, explore the insourcing vs. oursourcing option for the provision of field support. Armistead and Clark (1991), for instance, suggest that the definition of the service organizations and distribution channels involved are related to the service volumes and the required level of in-house control. Loomba (1996) and then Goffin (1999), through case study research, investigate the factors influencing the choice of the support channel. The drivers pointed out are: the type of sales channel, the product complexity, the desire to

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earn direct after-sales revenue, the cost of creating direct distribution channels, and the required degree of control over customer support quality. Nordin (2005), however, observes that the above factors may give ambiguous or contradictory suggestions, leading to choices that are "maladjusted" in some ways. Firms try to compensate maladjustments by increasing internal resources and competence, or by reinforcing governance mechanisms.

In business practice, it is quite common that consumer goods companies outsource activities related to distribution and after-sales technical support. When service delivery is outsourced, contractual agreements define the degree of control exerted by the product manufacturer, for instance through the exclusivity of the agreement (mono-brand vs. multi-brand service providers), the definition of information and physical flows between the parties, the governance of spare parts purchasing, the performance measurement, the financial flows, and so forth. Recently, Saccani et al. (2007) carried out an empirical analysis of the configuration choices of the after-sales supply chain, through the study of seven durable consumer goods manufacturers.

BUSINESS CONTEXT

Field service provision for household appliances

Since most household appliances need to be repaired on-site (at the customer's), a high parallelism of service facilities (service shops) is a widespread choice. In addition, the impact of fixed costs is quite high, therefore the field service provision is generally outsourced by manufacturers. In Italy, as emerged from a survey by the ASAP Service Management Forum (Perona et al., 2007), 93% of household appliance manufacturers are positioned in the outsourcing cell of table 1, keeping internally only performance measurement of the field service provision. Moreover, for 91% of the sample of white goods manufacturers surveyed, the network is made of multibrand service shops, i.e. servicing also competitors' brands, while only 9% define exclusivity agreements with their (mono-brand or mono-group) network. The network is, in 57% of cases, made of a number of service shops between 100 and 200, spread around Italy.

Service shops: managerial and business issues

On the Italian soil there are more than 7.000 service shops operating in the white goods, brown goods and small appliance industries. The business is, therefore, highly fragmented and the average size of these companies (1,8 persons!) explains that they are mostly family businesses.

In this context, service shops are suffering for some industry trends: i.) decreasing prices of small, white and brown appliances push customers to prefer to substitute rather than to repair their appliances, since the purchase cost is increasingly closer to the repair cost (if not lower); ii.) the higher duration and reliability of products that, together with the shortening of life cycles, reduces the need for servicing; iii.) the effects of the European norm 99/44/CE, applied in Italy from 2002, that increases the duration of the legal warranty from 1 to 2 years for consumer goods.

These trends have the effect to reduce volumes and revenue generated by field service work. Along with that, the very small average dimension of the Italian service shops, and the relative lack of managerial and ICT related competence (most of these businesses are run by middle-aged technicians experienced with mechanical and electromechanical technologies more than with electronics and ICT) make it difficult to foster an evolution of their business models that should be technology-based and oriented to a wider service offer, besides the simple field service. As it emerges from the research quoted above (Perona et al., 2007) most of the service shops population presents a low usage of information systems and a low level of performance monitoring.

RESEARCH DESIGN

Methodology

The empirical research illustrated in this paper aims at:

i.) defining and testing a model and a methodology for process analysis and performance measurement of service shops; ii.) applying the to evaluate the process management and performance of a set of service shops; iii.) singling out performance drivers (exogenous and endogenous), in order to identify the levers that these service shops can use to improve their organization and performance.

The research followed therefore three steps:

1.   Definition of the process reference model and of the research tools
2.   Case studies (data collection)
3.   Data elaboration, analysis and cross-case comparison

Reference model

Starting from a literature review and some previous work by the authors, the process model presented in figure 1 was defined. Figure 1 points out four primary processes, e.g. activities directly related to the field service process (Customer contact; field service scheduling and preparation; field service execution; field service reporting), as well as four support processes (warehouse and materials management; human resources management; marketing; IT systems management). They are hereafter described.

Figure 1 – The process model

The first activity of the field service process is *Customer contact*: a service shop operator has the first contact with the end customer, usually by phone. The customer may ask for an information or for an intervention. In the first case the operator tries to satisfy the request, in the second he/she tries to gather the information to make a preliminary diagnosis and if possible, to seta a time for the on-site intervention.

The second activity is *Field service scheduling and preparation*: this process, although sometimes overlapping with the customer contact, has been singled out in order to analyse the scheduling criteria, as well as the tasks performed after the intervention is scheduled and before it is executed, such as the preparation of tools and spare parts expectedly needed on the technician's van.

The third phase is *Field service execution*, encompassing the tasks carried out by the technicians to reach the customers (journey), and to execute the repair activity.

The fourth and last activity of the primary chain is *Field service reporting*. It includes two main reporting activities: the ones carried out on-site and addressed to the customer (e.g. intervention registration, invoicing), and the back-office ones, generally carried out in the service shop, in order to transfer some technical and administrative information to the manufacturers.

For what deals with the support's chain we have, first of all, the *Information Systems* usage. Then, there is the *Warehouse and materials management*. This process encompasses the definition and implementation of spare parts management criteria, the monitoring of inventory levels, and the order cycle to the spare parts suppliers (appliance manufacturers or spare parts wholesalers). As a third process, we have the *Human resources management*: it includes recruitment, training, and labour organisation. Due to the small dimensions of the shops analysed, this activity is generally managed by the service shop owner. The fourth and last activity is *Marketing*: this activity was pointed out in order to analyse the willingness of the shops to invest in advertisement and promotion, and the channels used.

Case studies

The empirical analysis was carried out on 14 service shops. Their average turnover (2006) is of 733.000 €, and they employ 10 people on average. However, case companies vary significantly in size, as shown in table 2. The choice of the sample companies allows to cover most of the main white goods, small appliances and heating groups operating in Italy.

Table 2 –The case companies

| Company | Employees | Size class | Turnover(€) | Business serviced | | | | Main Business | N° of Brands |
				White goods	Small Appliances	Heating	Professional appliances		
1	48	Big	3.253.000			X	X	Heating	Medium
2	12	Big	736.000	X				White goods	Medium
3	11	Big	637.000	X	X			White goods	High
4	11	Big	500.000	X	X	X		Heating	Low
5	9	Medium	1.432.000	X	X			White goods	Medium
6	9	Medium	371.000			X		Heating	Low
7	9	Medium	865.000	X				White goods	Medium
8	8	Medium	541.000		X			Small appliances	Low
9	6	Medium	396.000	X	X			White goods	High
10	6	Medium	410.000	X			X	White goods	Low
11	6	Medium	550.000	X			X	White goods	Low
12	5	Small	428.000	X				White goods	Medium
13	2	Small	32.000	X	X			Small appliances	Medium
14	2	Small	111.000	X				White goods	Low
Avg	10	-	733.000	-	-	-	-	-	-

Only three of the companies are monobrand (i.e. they serve only one manufacturer's products), while the other eleven are multibrand, although they have all one main brand, accounting for at least 45% of the total technical assistance revenue. All the service shops analysed have field service and technical assistance as their core businesses: nonetheless, many of them (31%) also sell spare parts and finished products. The average share of product sales on the overall revenue is 9%, with a minimum of 0% and

a maximum of 60%, while for what deals with spare part, we have an average of 11%, ranging between 0 and 42%.

Data analysis and cross-case comparison
The research design put a particular emphasis on the definition of methods to evaluate the cost related to each process, and on the carrying out of an activity-based cost/revenue analysis. Most service shops, in fact, do not generally perform this kind of analyses, which would be instead of great help in order to monitor their business and to make sound managerial and strategic decisions.
Therefore, we evaluated the process costs, through an Activity Based Costing methodology (Innes and Mitchell, 1990). Moreover, the profit-and-loss and balance sheets accounts were re-classified (e.g.: fixed vs. variable costs; direct vs. indirect) as well as the revenue (grouped by kind of service, brand serviced, or warranty vs. after-warranty): that allows to move form a fiscal perspective – the only one adopted by most service shops - to a managerial one.
After that, the physical and economic performance monitored underwent a cross-case analysis, in order to find out relevant drivers, that allow to explain differences. Among them, the shop size, the business serviced, and the number of brands managed.

EMPIRICAL FINDINGS
This section focuses on the description of the main empirical findings issue from the data analysis. For space reasons, the results will be described only for two primary process: customer contact and field service execution. Finally, some findings obtained from the cost/revenue analysis will be illustrated, trying to identify some connections between them and the processes ones.

Customer contact
The diagram in figure 2 provides a classification of calls received by cause, obtained averaging out the sample data.

*Figure 2 – Distribution of customer calls (sample average)*
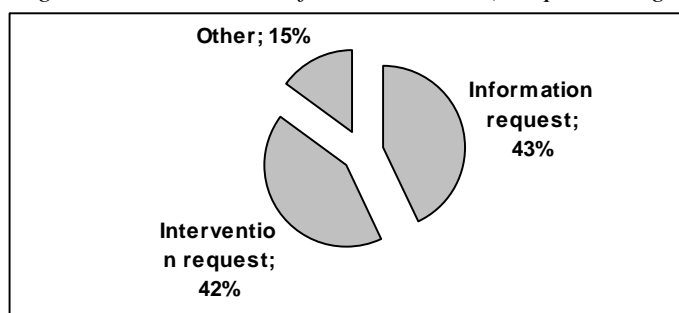
First of all, the diagram shows that only 42% of calls concern a request for intervention and therefore are likely to generate revenue. However, the main category, request for information (concerning the product usage or related to the purchase of a new appliance) is a "customer service" activity that contribute to customer satisfaction and retention.
The number of phone contacts managed by the sample companies range from 800 to 24.000 per year, with an average productivity index of 7.600 calls per employee devoted to customer contact per year. Figure 3 shows that the number of calls per employee is higher in the white goods business and increasing the shop size: large and white goods service shops are then the most efficient in this process. A performance indicator of customer contact effectiveness is represented by the calls outcome, that can be positive (intervention scheduled or information provided), negative, or suspended (the shop need a

further contact with the customer). Figure 4 shows the outcome of information and intervention request, to analyse the relationship among it and business serviced, size class and n° of brands.

Figure 3 – Customer calls: segmentation per size and business
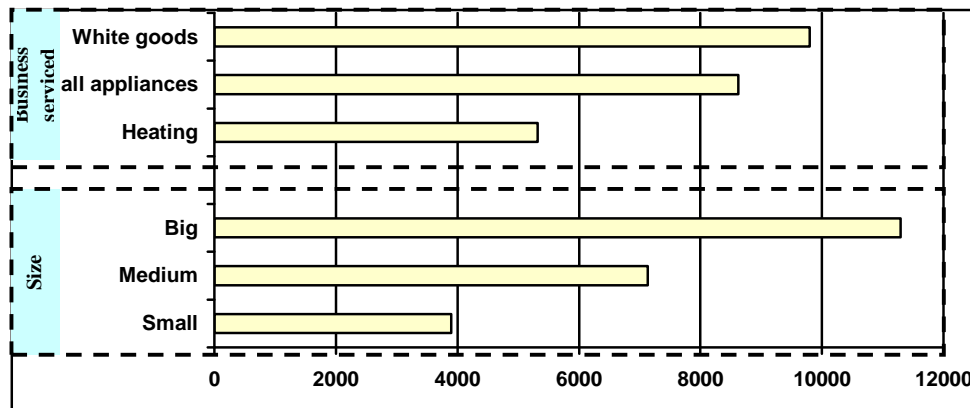
The outcome is positive on the first attempt on average in 68% of cases, against 13% of negative and 20% of suspended. A significant share of calls, therefore, ends up with a negative outcome or with the need of a follow up, usually performed by the operator, that seeks the information needed (or discuss the schedule with the technicians) and, then turns back to the customer to "close" the call. From figure 4 it is possible to notice that the share of positive outcome increases in the small appliances business, and with the shop size. On the other hand, the negative outcomes increase with the number of brands, probably due to the higher variability of problems and lower relative skills of employees.

Figure 4 – Customer calls outcome analysis
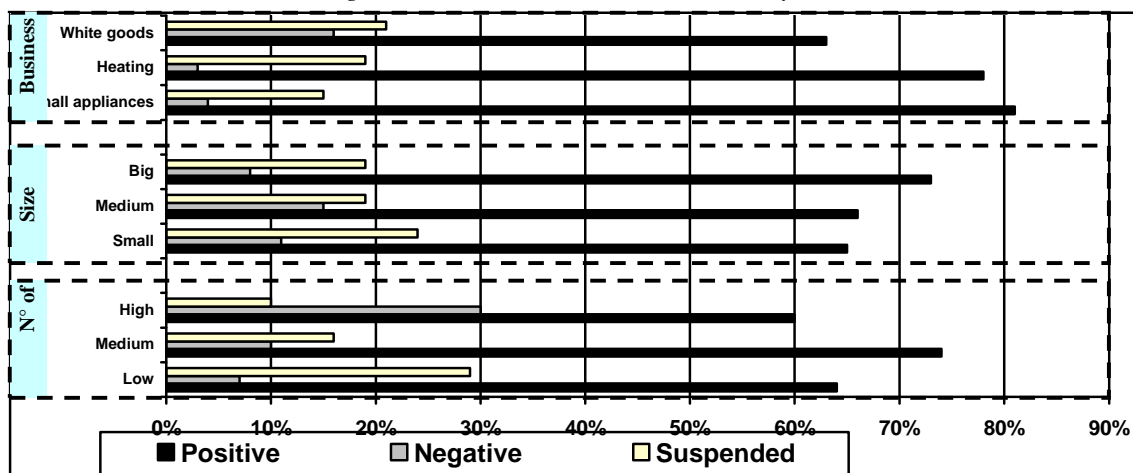

Field service execution
On average, 34% of field service (repair) interventions are executed during the warranty period, against 66% carried out after the warranty expires. The incidence of out of warranty interventions is highest in the heating business (82%): on the contrary, in the small appliance business, the share of warranty work is higher than out-of-warranty one; this is due to the decreasing price of small appliances, that push customers to prefer substitution to reparation after the warranty period. Moreover, it is relevant to notice that the incidence of out of warranty interventions increase with the shop size; as well, the ratio

out of warranty / warranty intervention increases decreasing the number of brands managed. Therefore, large shops managing few brands are more efficient than the others.

An indicator of efficiency is represented by the number of intervention per technician, with an average value of 1.380, that means almost 6 interventions per day per technician. This indicator is highest in small appliances business, due to the fact that small appliances are carried to the shop by customers. Indeed, the number of interventions per employee tends to increase decreasing the number of brands managed by shops.

Another effectiveness indicator is represented by the Response Time, that means the time between the customer request and the solution of the problem by the technician. This parameter is in a range between 0,5 and 5 days, with an average value of 2. Figure 5 shows the data analysis on this performance.

Figure 5 – Response time analysis
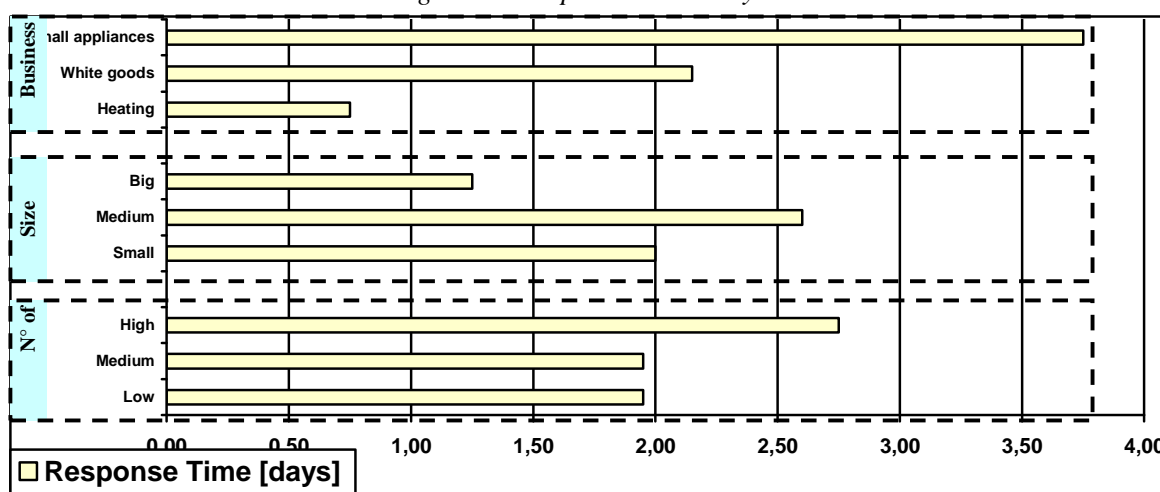
As shown by figure 5, heating is the business with the lowest response time: boilers need to be repaired immediately, for the customer's comfort and safety. Another important evidence is that larger service shops perform better than smaller or medium ones, with a response time of 1,25 day against 2 or 2,6. As a last point, the response time increase with the n° of brands (2,5 vs. 1,75 days), showing that the complexity introduced by a high number of brands is really difficult to manage for these firms.

Cost/revenue analysis

The sample companies' average cost structure, depicted in figure 6, shows the dominance of materials and labour cost over the other categories. On average, the weight of indirect costs is one fourth of the total, while fixed costs account for 41%.

Data shows that fixed costs are higher for shops having heating as their main business (54%), compared to ones operating in the white goods or small appliances (39% and 29% respectively). Figure 7 classifies revenues by the activity which generates them. Repair work is by large the main source of revenue, except for two shops, which make the most income from spare parts and finished products sales respectively. As expected, revenue coming from warranty work is lower than form out-of-warranty one: moreover, also volumes are higher for out-of-warranty (66% versus 34% of total intervention volumes).

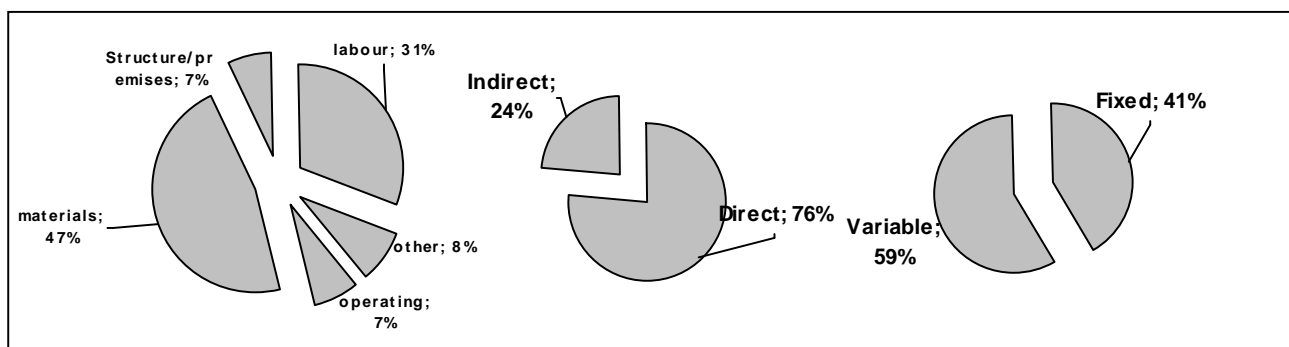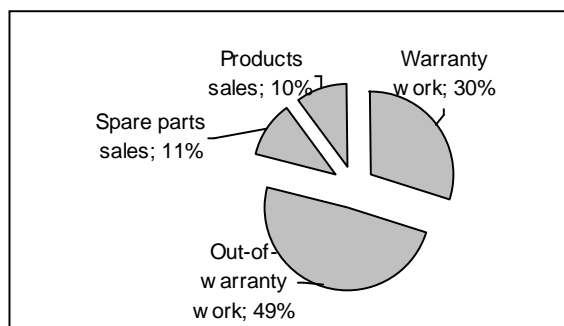*Figure 6– Average cost structure of the sample*

Figure 7 – Revenue classification by service

The average value of cost per employee within the sample is of around 56.000 €, while the average revenue is 70.000 €, with an average margin of 14.000 € per employee. The sample segmentation shows that shops managing a low number of brands and shops servicing small appliances have lower cost per employee. The revenue per employee, on the other hand, is significantly higher for shops servicing white goods, which, although having higher costs per employee, are the best performers, with an average margin of 18.600 € per employee.

Unexpectedly, the effect of size is instead not clear: small and large shops do not differ much in unit cost and revenue, while the best performance is obtained by medium shops, with an average margin of 17.300 € per employee.

Analysing the return from the repair activities only, then, it is possible to notice the higher average unit return is obtained by shops operating in the white goods business achieve higher margins per intervention. Moreover, managing a low or medium number of brands is more profitable than managing a high number of them.

CONCLUSION

The research study described in this paper developed a methodology to monitor processes and performance of service shops, in particular those with very small size, often lacking managerial skills and support systems.

The methodology, tested on a sample of 14 companies performing field service support for household appliances proved robust, and allowed to draw a picture of the case companies, to compare the way processes are carried out as well as their efficiency and effectiveness outcome

The preliminary evidence pointed out in the previous sections show the importance of accurately managing the telephone customer contact, and the field service preparation, execution and reporting, in order to improve customer satisfaction and increase the internal efficiency. From the cost and revenue

analysis is possible to infer that focalization on a small or medium number of brands (1 to 10) proved more efficient and effective than servicing a very large portfolio of brands. Moreover, large service shops than to have better process performances (especially on the effectiveness side), but this is not reflected very significantly in the economic performance.

The undergoing and future research activities aims at enlarging the sample of studied companies, in order to allow results to undergo a statistical validation, and to analyse the drivers and antecedents of the analysed performance more in detail.

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