

## Chapter 2

# Outsourcing in Spain's Automotive Auxiliary Industry: Evolution, Trends, Causes, Effects and Consequences

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**Abstract** Outsourcing is a technique implemented and consolidated through the organisation of production in the automotive sector, which consists of fragmenting the value chain into more specialised stages and deciding which activities, products and services are to be seen to within the firm and which externally. This article seeks, from among all the factors involved in the practice of outsourcing, to find indicators associated with the factors that are significant to the carrying out of outsourcing and to quantify the evolution, trends, causes, effects and consequences of its practice in the automotive auxiliary industry in Spain.

## 2.1 Introduction

The automotive auxiliary industry came into being from outsourcing by manufacturers (OEM). The reasons for the growing pace of outsourcing by the OEM (today over 75% of a vehicle's added value) are: specialisation, particularly as regards the technological contribution; lower costs; conversion of fixed cost into variable cost, which means running a lower risk; and improved profitability of capital employed for vehicle manufacturers (Kimura and Ando 2005). This sector covers a broad industry spectrum, ranging from steel to electronics and including chemistry, textiles, mechanics, glass and of course services (financial, insurance, etc.). Altogether it is thought that 65–75% of a vehicle's value comes from firms that manufacture automotive equipment and those that manufacture components, and hence the huge importance that suppliers have for the automotive sector.

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Outsourcing or vertical disintegration is a production organisation technique that has been implemented and consolidated in the automotive sector. It consists of fragmenting the value chain into more specialised stages and of deciding which activities, products and finished or semi-elaborated services are to be done within the firm and which are to be outsourced, regardless of whether the outsourced part is carried out within the same country or outside it (offshoring) and who the owner is (self or third parties) (Curzon 2001). Outsourcing is carried out for several reasons: to turn part of fixed costs into variable costs, to reduce costs, to lower investments for performing activity, to boost flexibility and technological knowledge, to improve the final product/service, to enhance productivity through specialisation and so on (Hitt and Holcomb 2007; Sturgeon et al. 2009).

## 2.2 Description of the Model

The aim and scope of the research based on this model is the quantitative study of outsourcing in Spain's automotive auxiliary sector, analysing its evolution, trends, causes, effects and consequences. From all of the factors involved in the practice of outsourcing (costs, flexibility, productivity, competition, investment, etc.), we seek to find indicators associated with the factors described previously that are significant with the practice of outsourcing. This article breaks new ground in that it quantifies the causes, effects and consequences of outsourcing in the automotive auxiliary industry in Spain.

Two initial hypotheses have been taken into consideration in this model:

- Technological changes or technical advances have not altered the consumption of intermediate inputs per unit of final product.
- There have not been disparate alterations between the prices of intermediate inputs and prices of the final goods, a condition which has been met since the linear regression technique has been applied.

Once established the initial hypotheses, the methodology has been the following:

In the first place the values of the variables have been compiled in the Spanish Annual Industrial Company Survey (Spanish National Institute of Statistics-INE) and in Structural Business Statistics (Eurostat), according to the European classification NACE Rev 1.1 by which components manufacturers has Code 343. The series of data compiled (ranging from 1995 to 2007) has been divided by the value of the invoicing in those variables in which it has been feasible. Next we have selected the variables that are more important and with greatest importance with regard to invoicing. Following this, we have grouped these by areas: costs, productivity, purchases, added value, investment etc.

Next the outsourcing value has been calculated, taking the following definitions into account (Díaz and Gandoy 2005):

- Raw materials: Goods acquired for transformation in the production process: These are goods in which the vehicle manufacturing firm contributes the greatest added value to the final transformation, due to the fact that they have high strategic value, high technological content, final product differentiators, etc.
- Merchandise: Goods acquired to be resold without subjecting them to a transformation process. These goods are incorporated into the vehicle without any subsequent transformation process in which the vehicle manufacturing firm does not contribute further added value. They are goods in which the components industry is very specialised; they are goods that are very standardised and the final product has little differentiating quality since any vehicle manufacturer has access to them
- Jobs done by other firms (TRE): the cost forms part of the process of one's own production, and the job is commissioned to and carried out by other firms.
- External services (SE): operation costs of different types (R + D + I, repairs and maintenance, professional services, etc.).

The calculation of the value of the fragmentation value of internal production (FPI) is as follows:

$$\begin{aligned} &\text{Raw materials/production value} + \text{Merchandise/production value} \\ &+ \text{Jobs done by other firms/production value.} \end{aligned} \quad (2.1)$$

$$\begin{aligned} &\text{The calculation of the value of outsourcing services (SE) is as follows} \\ &: \text{External services/Production value} \end{aligned} \quad (2.2)$$

The calculation of the value of complete outsourcing index (OT) is the following: Fragmentation of internal production (FPI) + Outsourcing of external services (SE).

$$OT = FPI + SE \quad (2.3)$$

With the value of complete outsourcing index (OT) and the value of the variables compiled and calculated, the linear ordinary least squares regression statistical technique has been applied, and their correlation has been analysed for levels of significance of  $p < 0.05$  and  $p < 0.01$  and correlation coefficient  $r$ .

With the results obtained, we have analysed the effects, causes and consequences that outsourcing has in the automotive sector in Spain.

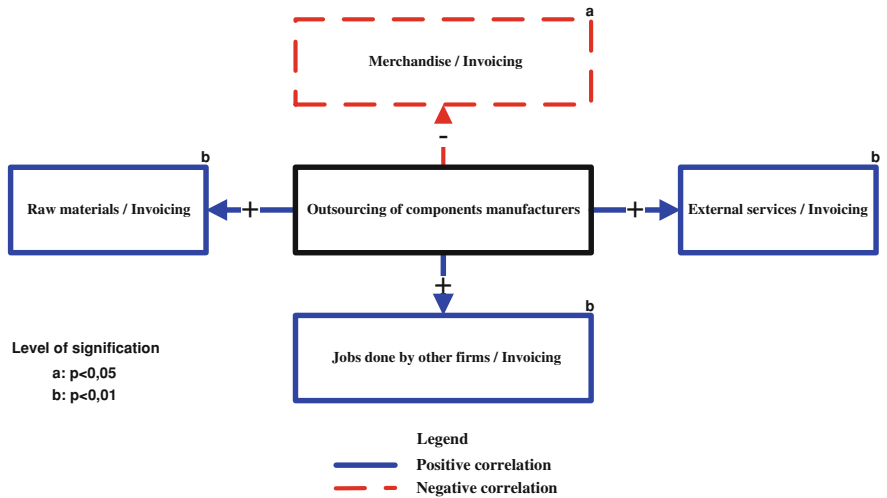
## 2.3 Results Obtained

The values obtained by applying the methodology presented are shown in Table 2.1.

As Table 2.1 reveals, the greatest importance of outsourcing in the auxiliary sector is shown in raw materials whose average values, variability and range have

**Table 2.1** Values obtained in calculating outsourcing index

Denomination	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Raw materials	0.403	0.413	0.453	0.443	0.424	0.477	0.519	0.532	0.538	0.544	0.561	0.542	0.577
Merchandise	0.032	0.032	0.025	0.023	0.026	0.023	0.028	0.014	0.020	0.018	0.013	0.020	0.025
TRE	0.024	0.029	0.026	0.028	0.038	0.037	0.044	0.044	0.041	0.041	0.045	0.047	0.050
FPI [1]	0.461	0.475	0.503	0.496	0.490	0.537	0.591	0.591	0.601	0.604	0.620	0.610	0.653
SE [2]	0.108	0.100	0.101	0.105	0.106	0.105	0.111	0.113	0.114	0.112	0.111	0.115	0.117
OT [3]	0.569	0.575	0.604	0.601	0.596	0.642	0.702	0.707	0.715	0.716	0.731	0.726	0.770



**Fig. 2.1** Relation between outsourcing of components manufacturers and purchases of raw materials, merchandise, external jobs and external services

been 0.49; 0.0037 and 0.174. Below are the external services whose average values, variability and range have been 0.10; 0.00003; and 0.017 whose value over the periods of study has remained constant. The value of merchandise and of external jobs has only a very slight influence on the total value of outsourcing.

Figure 2.1 represents the results obtained from applying the linear ordinary least squares regression statistical technique (p-value and correlation coefficient  $r$ ) between outsourcing index (OT) of components manufacturers and purchases of raw materials, merchandise, external jobs and external services. As can be seen in Fig. 2.1, as the value of outsourcing index grows, so do the purchases of raw materials, which are the products that greatest added value give to the product, while merchandise purchasing decreases. In turn there is growth in terms of external jobs, where the firm devotes more resources to raw materials, and external services grow meaning that the components manufacturers, due to the fact that they lack the necessary resources, acquired knowledge, people with adequate training and so on mainly stimulate cooperation with its suppliers for product/service development. The purchases of merchandise with the external jobs and external services are correlated negatively, which explains why components manufacturers invest fewer resources in cooperating with their suppliers in the development of these products. Figures 2.2, 2.3 and 2.4 represent the results obtained from applying the linear ordinary least squares regression statistical technique (p-value and correlation coefficient  $r$ ) between the value of the outsourcing index (OT) and the value of the variables/invoicing, representing the significant variables and their relation with the variable of outsourcing (OT).

As can be seen in Fig. 2.2, outsourcing of components manufacturers is determined by vehicle demand. This prompts vehicle manufacturers to outsource

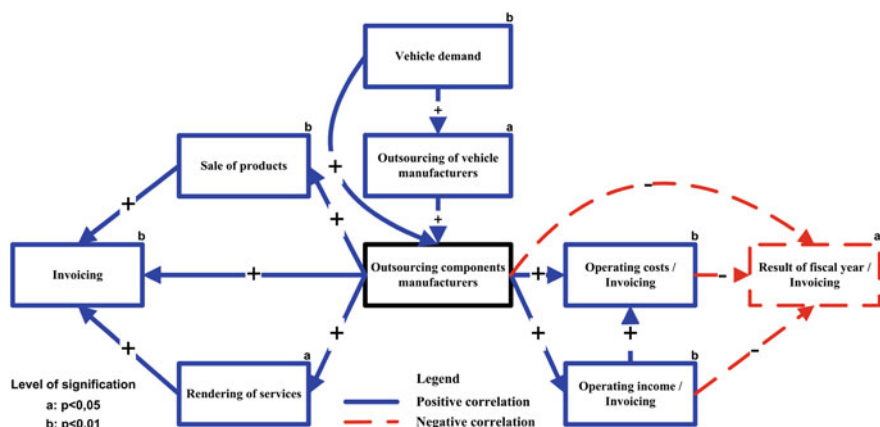


Fig. 2.2 Relation outsourcing index manufacturers-outsourcing components

in the auxiliary components industry; it causes components manufacturers to do so with their suppliers.

Because vehicle manufacturers increase their outsourcing, components manufacturers increase their invoicing owing to the increase in sales of products and rendering of services to vehicle manufacturers. By analysing Fig. 2.2 operating costs increase at a higher rate than operating income with respect to the invoicing, owing largely to the increase in the price of raw materials (more specifically to the price of steel) and of energy. Since 2003, steel prices have risen owing to the large demand for emerging countries such as China and India. This causes margins and profitability to reduce as invoicing by components manufacturers increases.

Figure 2.3 shows the relation between outsourcing index of components manufacturers (OT) and in the number of firms of the auxiliary automotive industry in Spain.

As the Fig. 2.3 shows, as the value of outsourcing index increases, the number of firms making up the sector decreases because the majority of firms making up the auxiliary sector have fewer than 20 workers. The number of firms with fewer than 20 workers decreases and the number of firms with more than 20 workers increases. This is for the most part due to three reasons:

- As has been shown, the rise in the value of outsourcing index increases invoicing yet profitability and margins are reduced, resulting in processes of purchases, acquisitions and strategic alliances in order to obtain economies of scale, reduce operating and structural costs in exchange for increasing profitability and margin and avoiding a possible temporary receivership or bankruptcy.
- The increase in the value of outsourcing index of vehicle manufacturers, raises the value of outsourcing index of the components manufacturers as represented in Graph 18 (outsourcing chain) causes cooperation among the firms to increase and firms have to have some minimum resources (know-how, staff, assets,

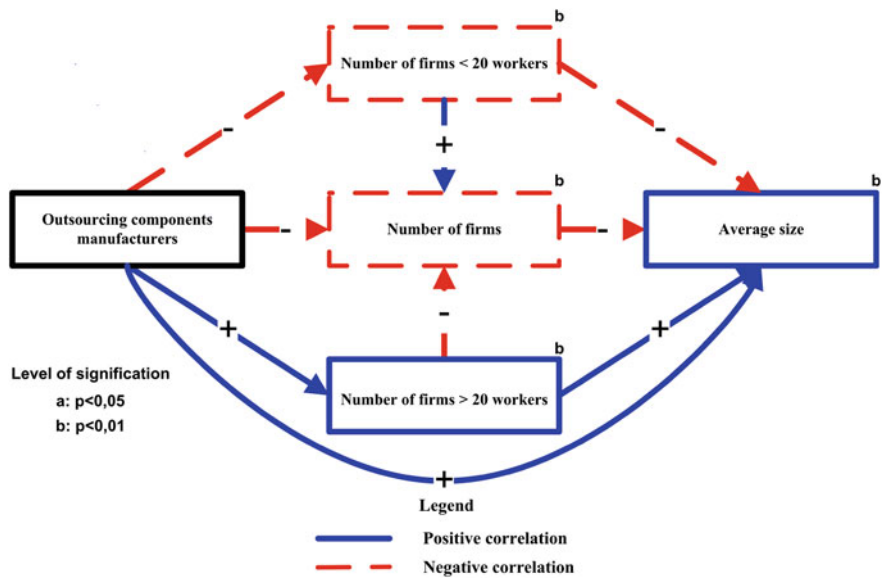


Fig. 2.3 Relation between outsourcing and number of firms

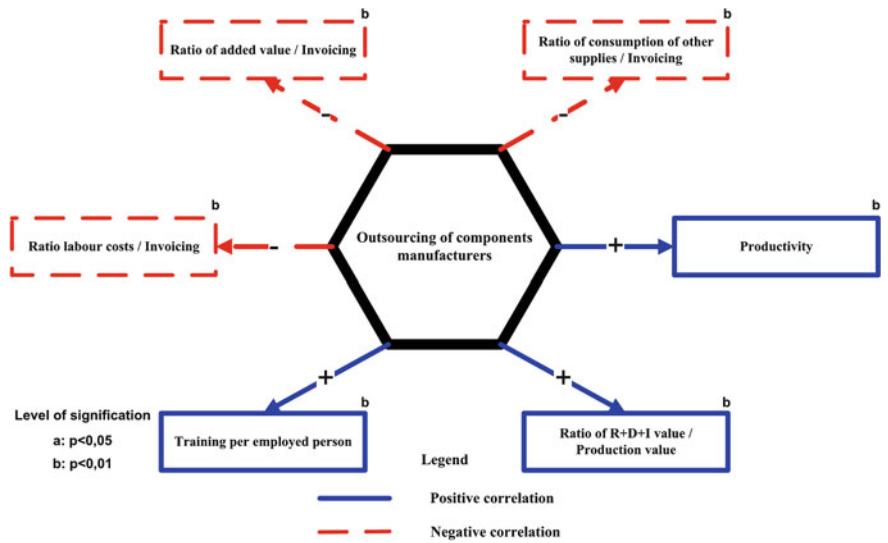


Fig. 2.4 Relation among outsourcing, cost reduction, investment and productivity

R + D + I, patents, etc.) in order to develop products/services both upstream to their buyers and downstream to their suppliers, meaning that acquisitions, purchases and strategic alliances take place in order to have these resources

available, since the level of competition in the sector increases and the firms increase the level technological of the products/services for the purpose of differentiation.

- To reduce the overlapping of the product offer by components manufacturers existing in the market.

If the vehicle demand is low, then there is a glut of production in both the vehicle manufacturer sector and the auxiliary sector, meaning that purchase processes, mergers and strategic alliances take place in order to eliminate this capacity glut and adapt the offer to the demand.

Therefore, in an environment where operating costs are on the rise (chiefly raw materials, energy and labour costs), there is a lack of supply, and operating costs increase at a higher rate than the operating income when invoicing increases, in order for an auxiliary sector to be independent and not have to resort to mergers or takeovers has to be included in a zone in which the value of the bottom limit is determined by low vehicle demand, which triggers a glut in production, and a top limit value that is determined by a high vehicle demand which causes firms to merge or be taken over in order to achieve economies of scale.

Figure 2.4 shows the relation among outsourcing index of components manufacturers, cost reduction, investment and productivity.

## 2.4 Conclusions

The key conclusions in the automotive auxiliary industry are the following:

- The chief cause of outsourcing of components manufacturers is vehicle demand.
- To boost the value of outsourcing, components manufacturers increase cooperation with their suppliers for the development of products/services.
- The components manufacturers increase their invoicing as a result of the boost in sales of products and rendering of services to the vehicle manufacturers.
- By increasing the value of outsourcing, the number of firms making up the sector decreases.
- In an environment in which operating costs are on the rise, there is a supply shortage and operating costs increase at a higher rate than operating income when invoicing increases. In order to be independent and not have to either merge or be acquired by another firm in the auxiliary sector has to be in a zone where the value of the lower limit is to be determined by low vehicle demand, which prompts a production overcapacity or glut, and an upper limit value that is determined by a high vehicle demand which causes firms to merge or be taken over for the consecution of economies of scale.
- Labour costs and the costs of other supplies with respect to invoicing decrease, productivity increases, staff training and the ratio value of the  $R + D + I$ /production value increases owing to increased demand for raw materials.



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