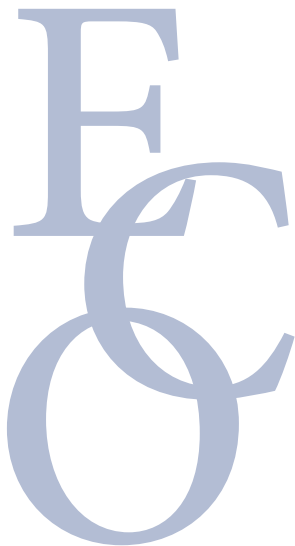


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in the Spanish Automotive Sector:  
Success Determinants for the  
Reverse Logistics Programs

Ma JOSÉ ÁLVAREZ GIL, NORA LADO,  
PASCUAL BERRONE and F. JAVIER HUSILLOS



**EUROPEAN UNIVERSITY INSTITUTE**

Department of Economics

**EUROPEAN UNIVERSITY INSTITUTE**  
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**Environmental practices and relational marketing in the Spanish automotive  
sector: Success Determinants for the reverse logistics programs**

**M<sup>a</sup> JOSÉ ÁLVAREZ GIL**  
Universidad Carlos III de Madrid  
Department of Business Administration

**NORA LADO\***  
Universidad Carlos III de Madrid  
European University Institute

**PASCUAL BERRONE**  
Universidad Carlos III de Madrid  
Department of Business Administration

**F. JAVIER HUSILLOS**  
Universidad de Burgos  
Department of Business Administration

March 23, 2006

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**Environmental practices and relational marketing in the Spanish automotive sector:  
Success Determinants for the reverse logistics programs**

**ABSTRACT**

In this paper, we examine the determinants for the success of reverse logistics (RL) programs. Based on a supplier-customer relationship framework, we argue that trust and relational commitment – two fundamental aspects of relational marketing –are essential in defining the performance of RL programs. Furthermore, we analyze the role of resources and their impact on the achievement of successful RL systems. Applying partial least squares (PLS) analysis, we test our contention using data of 158 Spanish firms in the automotive component manufacturers industry.

**Keywords:** Industrial marketing, relational marketing, trust, commitment, reverse logistics, green marketing.

**INTRODUCTION**

According to empirical evidence presented by Baker and Sinkula, 2005, environment-oriented marketing strategies have positive effects on company performance. These authors discovered a positive link between the degree to which marketing is oriented towards the environment, the success of a company's innovations, and the positive evolution of its market share. These results correlate with contributions to the theory of marketing made by studies initiated by Kohli and Jaworski (1990) and Narver and Slater (1990) on the degree to which companies are market-oriented and the beneficial effects that this has for them. This current of

research brought out the fact that companies that analyze the various actors in their competitive environment and respond to their needs and demands obtain greater performance in the long term.

Results from three recent meta-analyses on the effect of the degree of market-orientation on company performance both corroborate and generalize contributions made by this line of research. These studies conclude that the impact is positive and significant (Shoham, Rose and Kropp, 2005; Kirca, Jayachandran and Bearden, 2005; Rodriguez Cano, Carrillat and Jaramillo, 2004) and provide a solid basis for justifying the *raison d'être* of marketing in companies and the economy as a whole. However, it needs to be pointed out that the results of these meta-analyses are not identical; for example, Kirca, Jayachandran and Bearden, 2005, compare the effect of market-orientation for industrial firms compared to service companies and arrive at the conclusion that the effect of the impact on the results is greater for the former, whereas Rodríguez Cano, Carrillat and Jaramillo, 2004, obtain the opposite result. There are, therefore, points that need to be investigated more deeply, but which do not invalidate the general conclusion: sufficient empirical evidence has been gathered in a range of competitive and cultural environments to support the existence of a positive cause-effect relationship between the level of a company's market orientation (MO) and its long-term results.

In the light of the American Marketing Association's (AMA) new 2004 definition of marketing (Keefe, 2004) which states the goal of marketing is to deliver benefits to the organization and to its stakeholders, or interest groups, a new definition of the concept of market-orientation is required that takes not only customers and competitors into account, but also includes all other market forces and actors (Darroch, Miles, Jardine and Cooke, 2004). This new definition of the construct and the development of a new measure to go with it should take

into account the stakeholder theory that has been identified as a new school of thought in marketing (Greenley and Foxall, 1998). There are precedents in keeping with this, as this view had already been taken, in part, by Lambin (1996) and Lado, and Maydeu and Rivera (1998). These authors validated and use a scale of MO that not only includes the measures previously identified by Narver and Slater (1990), but also the degrees of distributor- and environment-orientation.

In more recent times, Stone and Wakefield (2000) have taken the Kohli and Jaworski market-orientation model as their basis and have expanded it to the environmental context. They include the pertinent generation of market research to analyze society's current and future environmental needs whilst preserving the aspect of the dissemination of this knowledge throughout all the organization's departments as well as the response-capability aspect by means of programs that create and drive the organization's and the public's perception of concern for the environment. Stone, Joseph and Blodgett (2004) take up the idea proposed by Miles and Munilla (1993) regarding the conceptualization of eco-orientation as an emerging business philosophy, develop a measure for this based on the Kohli and Jaworski market orientation model, and apply it in an empirical study. Their results suggest that companies that are more eco-oriented obtain better business results. Lambin (1996) and Maydeu and Lado (2003) define market orientation as the implementation of a marketing concept.

This research comes within this framework. Its aim is to analyze the intensity with which companies implement environmental practices. One of the environmental practices that has been highlighted is the importance of incorporating environmental considerations into supply chain management. What is more, a link has been discovered between this and a company's economic competitiveness and performance (Rao and Holt, 2005). This study takes another step forward in

the study of marketing whilst placing special emphasis on environmental issues by analyzing, in the first instance, environmental practices in Spanish companies. We then go on to focus on a specific environmental practice which is currently growing in importance: reverse logistics (RL).

Taking RL into consideration in the management of a product's life cycle is a priority in company environmental management today (Toffel, 2003; 2004). The ever more active role played by consumers, with their growing concern for environmental issues, and the development of regulations, have been cited as some of the factors that have led to an increase in activities such as the return, reconditioning and recycling of materials, finished and in-process products, and packaging (Richey, Chen, Genchev and Daugherty, 2005). These are the activities on which RL processes are based (Rogers and Tibben-Lembke, 1999).

Companies are currently beginning to consider these programs as a viable option for winning and retaining competitive advantages in mature markets that are sensitive to this issue (Sarkis, 2003). In the case of the automotive sector, for example, it has been found that RL programs have a positive effect on customer satisfaction (Marien, 1998).

The study of RL programs is not only taking on special importance both for companies, for the market, and for society as a whole due to their implications and importance for economic growth (Marien, 1998; Toffel, 2003), but also because of the new European Community regulations on the environment (Schultmann, Zumkeller and Rentz, 2006). An earlier study by Alvarez et al (2005) drew attention to the factors that determine the implementation of RL programs. Its basic theoretical focus was the stakeholder theory, which takes into consideration stakeholders' attributes of power, legitimacy and urgency. Hypotheses are then put forward on the impact of a number of external, organizational, and individual factors (the individual factors



refer to the characteristics of the company directors) on decisions taken on the implementation of an RL system.

The appropriateness of relational marketing being applied to the context of supply chain management and relationships between suppliers and buyers has been both highlighted and contrasted in marketing literature, and, most especially, industrial marketing (Sigauw, Baker and Simpson, 2003, Morgan and Hunt, 1994). Sigauw, Simpson and Baker (1998) find that the degree of supplier MO has an impact on the degree of distributor MO, on their trust and commitment and, in the final analysis, on their satisfaction and on results. Despite the great interest in relational marketing that has sprung up, very little conceptual work and empirical research has been devoted to studying its influence on company environmental decisions in general, on its consequences for specific decisions within the channel (Sigauw et al, 2003), and for product and material life-cycle management in particular (with some exceptions, such as Daugherty et al, 2003, for example).

We maintain that marketing theory has something to contribute to the understanding and improvement of RL programs as these by necessity entail relationships of exchange and the creation of value between the various parties involved, most directly the relationships between the supplier and the manufacturer that take part in these initiatives. The goal of this study is to apply the basics of relational marketing to explaining the success of RL programs. To this end, we first intend to analyze environmental practices in Spanish firms in general terms, and later focus on RL.

The study is structured in the following way: firstly, the concept of RL is set out, followed by the theoretical framework and the hypotheses it is intended to contrast. Next, methodological aspects are detailed, and these are then followed by the section devoted to the

results, in which explanations are given on the analyses that are performed. Finally, the main conclusions and limitations of the study are set out.

## CONCEPTUAL BACKGROUND

### What is Reverse Logistics?

Although there is total agreement on the growing importance of RL, there is no such agreement on its definition. Different authors define it from different points-of-view: some highlight economic aspects (Rogers and Tibben-Lembke, 1999; 2001), whilst others put the emphasis on environmental factors (Kroon and Vrijens, 1995), the aspects or activities that it encompasses (activities, products, etc.) and, finally, other authors turn their attention to RL as a competitive strategy (Daugherty et al, 2001). For Rogers and Tibben-Lembke (1999, p.9) RL is “the process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or for proper disposal”. Another definition, this time offered by an interdisciplinary research group from a number of European universities specialized in the field under the acronym of “Revlog”, is as follows:

“Reverse logistics comprises all operations connected with the reuse of products and materials and refers to all activities to collect, disassemble and process used products, product parts, and/or materials in order to ensure a sustainable (environmentally friendly) recovery.” ([www.fbk.eur.nl/OZ/REVLOG.htm](http://www.fbk.eur.nl/OZ/REVLOG.htm)).

It is also interesting to consider the opinion held by companies as this provides a balance between the academic approaches to the subject and the necessary inclusion of the real world of business. Carrefour, for example, defines RL as:

"Operations, administrative and IT processes to manage the return of merchandise and/or logistic support in the supply chain in the most effective and efficient way possible." (Carrefour. La implantación de la Logística Inversa en una Multinacional de la Distribución. p.3, <http://www.upct.es/~gio/deflogisticainversa.htm>)

In all cases, common elements can be seen relating to the recovery of materials and assets and the participation of a number of channel members, from the supplier of raw materials to the end consumer, in reverse. Cooperation and agreement between the companies taking part in the initiative are required, and this involves specific investments of assets and commitments of a business, organizational and relational nature.

### **Theoretical Framework and Hypotheses**

Cooperation and time orientation stand out as the particular features of current company relationships in the quest for efficiency. This trend has been reflected in the academic world by the development of a line of research devoted to explaining the relational phenomenon in the framework of industrial marketing from a variety of perspectives. The literature that analyzes types of company cooperation, such as alliances and other joint programs, has highlighted the study of the foundations for the creation of trust and the control of opportunist behavior which can be such sensitive areas for success in relationships, especially when there are investments in specific assets at stake. In scenarios where these conditions exist, trust has been identified as a key precedent to cooperation between companies and the efficient economy of agreements of this type in general terms (Sako, 1991; Smith, Carroll and Ashford, 1995). Sigauw et al (2003)

defined relational exchange and confirmed that it is a type of value creation and transfer between independent members of a channel. For this to come about, the supplier has to take on the mantle of an advisor, and show that s/he is predisposed to solving the distributor's or manufacturer's problems. The authors call for more studies to be done that apply the theoretical framework of relational marketing to relationships in the channel and that examine specific environments.

Furthermore, it is stated that the trust that exists between supplier and buyer, manufacturer and distributor, and between any of the channel members from manufacturer to customer, represents a source of competitive advantage, as it reduces the costs of the transaction, improves company flexibility for adapting to market changes, facilitates investment in specific relationship assets and improves information exchange (Dyer and Chu, 2000; 2003). In overall terms, we find authors and studies that maintain that, on the macro level, the general level of trust in a society has implications for national economic success (Fukuyama, 1995).

Trust can be understood as the degree to which a company has faith in the other partner in an exchange (Morgan and Hunt, 1994). Honesty, sincerity, the certainty that there will be no opportunist behavior, and transparency in information-sharing are all elements that go to develop trust in a relationship. Relational commitment, for its part, is defined as the belief that the relationship is important enough for the greatest effort to be devoted to it in order to for it to be preserved. The committed partner understands that the relationship is developing correctly, wants it to last indefinitely, and is ready and willing to work towards that end, devoting the effort and resources that are required (Morgan and Hunt, 1994). The definition given by Moorman, Zaltman and Deshpandé (1992) states that commitment to a relationship is the everlasting desire to maintain a relationship that is valued positively.

Dyer and Chu (2000, 2003) analyzed the variables that influenced the development of trust in supplier-buyer relationships in a variety of countries and cultures and confirmed that it improves a company's economic results. In their empirical study of automotive component manufacturers the authors provide evidence that the supplier's trust in the customer reduces transaction costs, increases information sharing, and has a beneficial impact on financial and economic performance.

Although we can find a number of Spanish studies on trust and relational commitment, we focus our analysis on those that are most directly related to this research. A relevant precedent therefore is the paper by Camarero and Gutiérrez Chillán (2000) that examines the factors that drive the relational aspect of market exchange. The chosen sector is the same as that found in the Dyer and Chu (2000) study, manufacturer-supplier relationships are analyzed in the specific case of the automotive sector, and the conclusion that is drawn is that a climate of trust and commitment is the foundation on which a fruitful and long-lasting relationship is built. Similar results have been found for relationships between other levels of the supply-manufacturer-distributor-customer-chain. Specifically, the case of the relationship between the manufacturer and the distributor was worthy of attention from Bigné and Blesa (2003) in a study on types of manufacturer market orientation behavior that help to generate distributor trust and satisfaction.

The relationship between the trust and organizational commitment variables has been well-established in literature on channel member relationships, as has been recently contrasted by the results of an interesting meta-analysis conducted by Geyskens, Steenkamp y Kumar (1999). When going more deeply into the understanding of the dynamics between trust and commitment, it is essential to take a relationship's time component into account together with its

implications for said variables (Wilson, 1995). According to Dwyer, Churr and Oh (1987), relationships go through five stages: (1) awareness, (2) exploration, (3) expansion, (4) commitment and (5) dissolution. The honesty component of trust develops in the relationship's exploration stage, whereas the components of benevolence are not etched until the relationship develops and becomes more relaxed, when expectations are formed and promises are made regarding interactions and future exchanges. Commitment, however, is consolidated at a later stage. Another explanation for trust and commitment entering into the equation at different stages of the relationship is that they take into consideration progress made with time invested and the emotional involvement that is required for a commitment to jell.

The seminal contribution made by Morgan and Hunt (1994) and the Geyskens et al (1998) meta-analysis refer to the trust and commitment that one of the channel members deposits in the other, without limiting the perspective of the study to either the customer or the supplier, nor giving precedence to either one focus or the other. Nevertheless, the majority of studies focus on measuring customers' trust in suppliers, and there is a lack of studies from the reverse and necessarily complementary view.

In the case of RL, we find a program that can involve two or more parties in the development of a system that enables flows of materials, products, packaging, information, etc., in the opposite direction to the chain, from the point of consumption to the point of origin, where they are processed for the reasons specified in the relevant section (Richey et al, 2005). This is a way of obtaining closure or completing a product's life cycle and where resourceful relationships can be found.

Programs of this type require resources and generally entail specific investments being made in order for them to be developed and implemented. Said investments are specific to a

particular logistics program and are not necessarily transferable to other RL programs that there might be a desire to initiate with different customers or members, and they are made by the suppliers, who must proceed to recover and recycle, reuse or eliminate products or materials recovered from the customer (Daugherty, Myers, and Richey; 2002).

According to a number of authors (Daugherty, Myers, and Richey, 2002; Turner, LeMay and Mitchell, 1994), due to their special nature, RL programs require close collaboration between the parties involved in order for delivery times to be met efficiently. Making them work is a significant challenge, with the degree of commitment achieved between the parties involved being a precedent to the efficiency of the programs.

Another key aspect is the commitment of resources (Richey et al 2005). This is an organizational factor that determines the identification and later successful implementation of market opportunities. RL programs have acute resource requirements (Rogers and Tibben-Lembke, 2001) and, as such, making the required resources available is absolutely essential if the program is to succeed (Daugherty et al, 2001, 2003).

We put ourselves in the position of a supplier of materials and components to a manufacturer with whom we have a RL program in place and, on the basis of the literature review that was undertaken, postulate the following hypotheses:

**Hypothesis 1:** *the greater the level of trust the supplier has in the customer with whom the reverse logistics program is being conducted, the greater the level of the supplier's relational commitment.*

**Hypothesis 2:** *the greater the degree of the supplier's relational commitment with the customer with whom the reverse logistic program is being conducted, the better the performance of the program.*

**Hypothesis 3:** *the greater the level of the supplier's trust in the customer with whom the reverse logistic program is being conducted, the better the performance of the program.*

**Hypothesis 4:** *the nearer the level of the resources committed to reverse logistics activities approach the optimum level these require, the better the performance of the program.*

## METHODS

### Methodology, measures, questionnaire and sample

Taking into consideration the fact that, on one hand, earlier studies had been done in Spain and other countries on the supplier-customer relationship and the role of trust applied to the automotive sector (Camarero and Gutiérrez Chillán, 2000; Dyer and Chu, 2000) and the importance of this sector of activity, and, on the other hand, that previous studies on RL had focused on this same industry (Daugherty, Myers, and Richey, 2002, Daugherty et al, 2003), it was decided to apply the study to the automotive component industry.

A database of automotive component manufacturers operating on Spanish soil drawn up by Dun and Bradstreet was used to identify the universe covered by the study. The term “Automotive Industry Component Manufacturers” was closely defined by an exhaustive review of activities classified in SIC codes (see Annex 1). This analysis resulted in 11 activities being selected for the study.

In this way a population was determined made up of 1150 companies of which 200 were randomly selected. Field work was carried out by the TNS-área company between November, 2004, and February, 2005, using the personal interview as the means of information gathering.

The final sample is made up of the 158 companies that satisfactorily replied to the questionnaire. Of these, 77 are exporters, whereas 81 are not. For the proportions estimation, when adopting a pessimistic standpoint with  $p=q= 0.50$  and a 95% trust interval, the tolerated margin of error, given the size of the sample, is 7.2 %. For the variables where an average is



estimated and measurements are taken on scales from 1 to 7, the maximum variation of the sample has been taken, that is, 6.6. In this case, the margin of error is 0.40, again with a 95% trust interval.

The design of the environmental practices questionnaire was based on studies by Aragón-Correa (1998) and interviews with experts. Four personal interviews were carried out with sector companies in different geographical areas that were fundamental to the design of the questionnaire. We detected that the scales that are generally used to measure the degree of commitment and trust have not been developed using the procedure explained by Rossiter (2002) and which has been presented as the new paradigm for developing measurement scales in marketing.

Rossiter criticized the predominant measure development paradigm used up to the present time in marketing, the mainstay of which is the seminal article by Churchill (1979). Churchill proposed various stages for developing measures applicable to marketing which have led to a second generation of research studies in the field that have shown attention to and concern for both the properties of reliability and the validity of the measurement tools. We find that, in Spain today, the majority of published empirical studies have used Churchill's (1979) procedure up to stage four, which is the scale purification stage.

Rossiter's C-OAR-SE procedure starts with concept (C) definition, continues with the classification of the object (O), then goes on to classify the attribute (A), identify the rater (R), form the scale (S), and enumerate and write up the report (E). This process has received criticism from various parties (see Diamantopoulos, 2005; Finn and Kayande, 2005) and some of its aspects are regarded as problematic. For this reason, this research keeps to the aspects suggested by Rossiter which have not been considered so controversial. The emphasis will be put on the

content validity, as all scales are supported by the literature review and subject to interviews with experts, but the reliability of the scale will not be overlooked, and neither will the study of other types of validity that are not merely the content validity.

In our case, the subject, the RL program, as an abstract collective subject, might include a variety of activities and processes. This was seen in its definition and was ratified by expert opinion. In order to treat it as a unique and specific subject we intend to examine one particular program, measure the degree of trust and commitment to the principal customer with respect to RL and, in order that all the interviewees should understand RL in the same terms, shall set out a definition of the concept in the questionnaire. In this way, the object will be both unique and specific. We shall also analyze what the commitment of resources and results variables involve with regard to RL. The attributes that interest us are trust in the relationship, relational commitment, resource commitment and efficiency. Effectiveness, or, in other words, the results, is a formative attribute, and so only the main components should be included, seeking to develop a good item for each component. The components are based on the bibliographical review (Daugherty et al, 2001, 2003, Richey et al, 2005) and the interviews conducted with experts. As for the attributes of trust, relational commitment and resource commitment, these are attributes with reflexive indicators which will be selected in accordance with the bibliographical review (Morgan and Hunt, 1999, Daugherty et al, 2001, 2003) and will be verified by the opinion of the experts. The chief executive of the company will be interviewed and s/he is the person who makes the evaluation and responds. We thus obtain definitions of the following:

- (a) The supplier's trust in the RL program main customer, as perceived by automotive component company executives.

- (b) The supplier's commitment to the RL program main customer, as perceived by automotive component company executives.
- (c) The supplier's resource commitment to the RL program, as perceived by automotive component company executives.
- (d) The effectiveness of the RL program conducted with the main customer, as perceived by automotive component company executives.
- (e) A suitable definition of the components of each of the constructs was based on the above-mentioned bibliographical review and on interviews held with four companies in the sector. This allowed us to identify the items which were to be included in the questionnaire and to trial it. A summary of the questionnaire can be found in Annex 2.

Estimates were made using SPSS 10.1 and PLS-Graph 3.0 (Chin, 2001) software.

## **RESULTS**

An initial analysis provides an overview of the broad spectrum of environmental practices as part of which RL can be classed. This is a first approach to the subject and a means of introducing the questionnaire. The environmental practices were divided into five areas of interest: materials used, product and part design, manufacture, internal organization and return of materials from customer (Aragón-Correa, 1998). The executives were asked to determine the degree to which these activities were implemented in their organizations on a scale on which 1 indicated: "we do not conduct these activities and have no intention of doing so", and 7: "we are at the forefront, we are leaders in this field". The results are summarized in the table 1.

[Insert Table 1 about here]

The results for the implementation of advanced environmental management practices are modest and scoring is widely dispersed. There is a low degree of implementation as far as activities relating to a reduction in the range of materials used and their recycling for later reintroduction in the production process is concerned. The highest averages can be found in the sections devoted to manufacture and internal organization. Risk prevention systems, the systematic control of spills and energy, the drawing up of environmental management handbooks, the recycling of packaging and waste products, as well as the use of reusable containers, all obtain the highest scores, almost 5. At the opposite extreme, the recycling of water and the use of environmental arguments in marketing activities follow the trend set in the preceding case.

The interviewees were asked questions on eight activities connected with their customer materials return practices. According to the questionnaire results, only two of these are implemented to any reasonable extent: returns due to customer dissatisfaction or because the product requires small repairs. The remainder, those activities relating to the return of materials and their later reintroduction into the production chain, resale either as a spare part or as raw material, obtained scores between 1.8 and 2.6 on a scale of seven degrees of implementation. A principal component analysis allowed the “reception of materials from the customer” to be clearly identified as a dimension of the environmental practices, with this being reflected in the corresponding aspects and sections of the questionnaire. As this is not the prime aim of this study, we shall focus on the details.

In conclusion, we see that practices relating to RL are only implemented to a small degree. A following question offered the interviewees the definition of RL (see Annex 2) and they were then asked whether their company had an RL system in place or not. Only 43 of the

158 companies interviewed replied positively. We now continue our analysis of the results working with the sub-sample made up of the 43 companies that stated that they had RL systems in place.

The “Resource commitment”, “Relational commitment” and “Trust” variables are latent variables (LVs) with reflexive indicators and “Results” is a latent variable with formative indicators. In order to evaluate the internal consistency of the indicators and their degree of reliability in the table 2 we set out the reliability indicators for LVs with reflexive indicators.

[Insert Table 2 about here]

All the constructs have acceptable levels of reliability (Nunnally, 1978). The left-hand column of the following Table shows the “Results” LV formative indicators. Table 3 also gives the bilateral correlations between the five indicators. The high correlation between indicators four and five suggests collinearity problems with the formation of this latent variable, and this will be taken into account when estimating the model.

[Insert Table 3 about here]

Given the characteristics of the sample and the variables, when making the estimations of the measurement model and of the relationships between the proposed variables, it was decided to use the structural equations with latent variables technique using partial least squares (PLS).

The estimation was done using the PLS-Graph 3.0 program with the following options:

- (a) Original scale of the manifest variables (they are neither centered nor standardized).
- (b) External B Mode (formative) estimation for Results LV and A Mode (reflexive) for remaining LVs.
- (c) Internal estimation with path.
- (d) Bootstrap process (100 samples) and Jackknife (42 groups with number of samples equivalent to number of observations per estimation) validation.

With regard to the size of the required sample, the suggested minimum of thirty for this case has been exceeded in accordance with recommendations by Chin, Marcolin and Newsted (1996) (see also Wold, 1985)

To contrast convergent and discriminant validity, the correlations between the LVs and the square root of the AVE (average variance extracted) were used (see Table 4). The average variance extracted is greater than 0.5 for the LV with reflexive indicators, which indicates a good degree of convergent validity (Chin, 1998). For its part, discriminant validity is confirmed, as the elements along the diagonal are greater than the correlations that can be found in the line and column that correspond to each of the variables.

[Insert Table 4 about here]

The contrasting of the model will be done in two parts. First, the proposed model is contrasted by individually evaluating the relationship with each of the five results. Then the whole model is analyzed, including a number of indicators in this LV.

The following is a summary of the results of the estimation of the five models where one of the results indicators is taken into consideration on an individual basis, that is, where only one of the indicators that are the objectives of RL is the dependent variable:

- (a) The result that is best explained by the model (58%) is “Improved relationship with customer”. This estimation has a structural relationship of 0.45 between the “Relational commitment” LV and the indicator.
- (b) The model explains the “Cost control” and “Increased performance” indicators to similar degrees: 35% and 38% respectively. In both models, the strongest structural relationship can be found between the “Resource commitment” LV and the final variable, 0.64. Nevertheless, the significance of the remaining structural relationships shows differences between the two models: when the objective is cost control, the relationship of trust with the customer is not significant, yet when the objective is performance, this relationship becomes negative and significant.
- (c) Finally, the other objectives of RL that are explained by the proposed model are: “Environmental regulations” and “Recovery of assets or products”, with 27% and 26% respectively. In the asset recovery model, the relationship between the “Resource commitment” LV and the indicator is significant (0.39).

In order to check that there are no collinearity problems between the five indicators, and to identify the importance or relationship that they have with some of the model’s LVs, a number

of estimations were made using combinations of the indicators that together make up the results variable.

As previously stated, there might be a collinearity problem with the cost control and increased performance indicators. When the cost control indicator is removed from the model, the values of the structural coefficients and the square root remain similar, which indicates that there is no problem with the formation of the variable. In fact, when the indicators are related in linear regression, the variance inflation factor gives no cause for concern.

Finally, it was considered that it would be interesting to verify the formation of this LV excluding the “Improved relationship with customers” indicator. It can be seen in this model that the group of indicators that includes “Asset recovery”, “Cost control” and “Increased performance” is related to the other LVs in the model. With this combination, the model explains 40% of the dependent LV. The structural relationship with “Resource commitment” can also be seen to be strengthened. It is interesting to note that in models where the dependent LV is dominated by the “Improved relationship with customers” indicator, the strongest structural relationship found is “Relational commitment”.

These initial analyses led us to propose two types of dependent LVs. That is, gathering the five indicators together in two groups that help to better explain the RL model. As such, there is a first LV, “Results 1”, which includes indicators 3, 4 and 5 (“asset recovery”, “cost control” and “increased performance”), and a second LV, “Results 2”, that includes indicators 1 and 2 (“compliance with environmental regulations” and “improved relationship with customers”). This model allows the two main focuses of RL to be distinguished.

In table 5, the estimation of the proposed model that takes into consideration two dependent LVs is presented.



[Insert Table 5 about here]

In Chart 1, the values that correspond to the structural relationships are the standardized parameters; the values of the relationships between measures are not standardized. The values over 1 represent the load adjustment, and the values under 1, the weight adjustment that the algorithm assigns to each indicator. These are used for the construction of indexes. They are in brackets for the reflexive LVs, whilst for the formative indicators the opposite is true.

In this model, all the structural relationships are significant to a degree of 0.05% (t values obtained through bootstrap simulations), and the Results dependent variable is explained to a total of 90%. The LV related to the economic part of RL is explained to 35%, whilst the LV related to relational marketing is explained to 55%.

[Insert Chart 1 about here]

## **CONCLUSIONS**

The broad and rich body of research devoted to the study of the degree to which companies are market-oriented has contributed conclusive evidence that this orientation has a positive impact on company results. There is currently a call for greater academic attention to be paid to companies' environmental orientation and for the development of measures and studies on the level of implementation.

This study attempts to contribute to this research stream by analyzing the degree to which environmental practices are implemented in companies in the automotive component industry in Spain, whilst devoting special attention to the development of RL systems, which, due to their topicality and growing relevance, are worthy of a more detailed study. RL involves an agreement on collaboration between two or more members that are on different levels of the channel that

exists and goes from the customer to the point of origin of the raw materials, and entails the investment of specific and significant resources. For these reasons, contributions that can be made adopting a relational marketing focus are extremely apposite for a study of this type, and it constitutes an original contribution.

The results of our research are in line with earlier studies (Aragón-Correa et al, 2004) in suggesting that implementing environmental practices is rather a weak point of the companies analyzed, and, in the case of RL, they are still at the infant stage. Only 27 % of the companies interviewed stated that they had implemented some type of RL. Nevertheless, it is interesting to note that a greater number of companies stated that they conduct some of the activities that come under the banner of RL when they were specifically asked about certain environmental practices, such as the recovery of a product with which the customer was not satisfied. A first possible interpretation of this result is that companies may carry out RL activities but that these are not recognized as such by company directors. This explanation does not stand up, however, when we consider that we took special care to clearly define RL in our questionnaire taking into account the whole gamut of possible activities. Another admissible explanation would be to interpret it as companies undertaking isolated RL practices that do not form part of any structured or more general RL program.

Alvarez et al (2005) made some advances in the explanation of the factors that drive companies to implement RL programs in an earlier study which took the stakeholder theory into consideration. The conclusion was that the implementation of RL programs depends on the relevance of certain stakeholders, specifically, the power, legitimacy and urgency of customers, employees and government authorities, as well as the proactiveness of company directors. Pressure from shareholders, however, had the opposite effect.

Here our proposed model goes one step further and attempts to explain the success of RL programs by incorporating variables into the explanatory model that are fundamental aspects of relational marketing: trust and relational commitment (Morgan and Hunt, 1994, Geyskens, Steenkamp and Kumar, 1999, Daugherty et al 2003). By means of RL activities, companies can more effectively comply with environmental regulations, improve their relationships with their customers, recover assets, control costs and increase performance. The relational marketing variables contribute to the achievement of these objectives. The results obtained from initial analyses led us to propose two types of dependent, latent variables.

The five efficiency indicators and the results of the RL programs were therefore combined in two different groups. A first latent variable was identified that included the asset recovery, cost control and increased performance indicators and labeled “Results 1”, whilst a second variable, which we called “Results 2”, was also identified and included indicators on the degree to which RL programs are successful in their relative objectives of complying with environmental regulations and improving relationships with customers. This model better encapsulates the two main focuses of RL and all the structural relationships are significant in the model. It also explains of the dependent variable results to a total of 90%. Meanwhile, the economic success of RL programs is explained to 35% by resource commitment. Trust has a direct impact on improving the relationship with the customer and complying with environmental regulations, and constitutes orientation towards all the other “stakeholders” who are not shareholders in the company. It also has an indirect impact through relational commitment. Trust and relational commitment explain 55% of the success of RL in improving relationships with customers and complying with regulations.

If this is the case, there is one more question that needs to be answered: why don't Spanish firms implement more intensive RL programs with greater determination?

RL programs require large investments to be made. Our study shows that they have positive effects on the results, but it does not establish whether they allow the investment scales to be tipped favorably for the firm in the short term, nor does it show the length of time that is required for this to happen. Earlier studies suggest that reticence to implementing RL systems originates in shareholders (Alvarez et al, 2005), who, perhaps, do not see any short-term cost-effectiveness in these programs. The driving forces behind the programs come from customers, workers and the government. The greater deployment of RL therefore depends on the pressure that these groups exert.

Our results are in keeping with those of Stone, Joseph and Blodgett (2004), in the sense that the greater the environmental orientation (in our case, with regard to a specific practice), the better the results. They also coincide with results for RL obtained by Daugherty et al, 2003.

We have found empirical evidence in favor of all the hypotheses that were postulated, although the model with a better predictive capability is the one that distinguishes between two types of dependent variables. This point had not been taken into account when the hypotheses were formulated. The innovative character of this study together with a lack of earlier works did not allow us to draw up more detailed hypotheses on the effects model variables would have on the various results indicators when considered individually.

As far as achieving the objectives of cost control, performance and asset recovery are concerned, the conclusion is that an appropriate commitment of resources is necessary for a positive impact to be felt in the efficiency of RL programs. In other regards, the relational commitment and trust variables explain the degree to which the objectives of improved customer

relationship and compliance with environmental regulations are achieved. The commitment of the supplier to continuing the relationship and the customer's trust and perception of honesty and benevolence determine these programs' success, allowing a better relationship to be had with customers and regulations on the environment to be better complied with. The conclusions arrived at by Svensson (2004) for the same industry as studied here suggest that one of the criteria used by automotive manufacturers when selecting their suppliers is the degree of commitment these have to the relationship. This would involve additional benefits for the supplier due to his/her commitment to RL.

Evidently, if we take into account the model with the key relational marketing variables and its precedents (Morgan and Hunt, 1994), it is essential to start from a basis of shared values if trust and relational commitment are to be achieved, and, in this case, these values, which are fundamental to defining the company culture, are especially related to concern for the environment. In keeping with Stone and Wakefield (2000), it would be a case of sharing eco-orientation. This is the company culture that reflects a firm's sensitivity to environmental matters and requires that company directors put emphasis on issues of this type (Aragón-Correa et al, 2004), aspects of which are the generation and dissemination of ecological knowledge and a response capability.

According to Morgan and Hunt (1994), the precedents of relational commitment are the costs of terminating a relationship and the benefits, in this case, the specific assets, are part of the cost of terminating the relationship. The precedents of trust are communication, which favors it, and opportunist behavior, which damages it.

The conclusions that have been drawn have to be interpreted prudently on the basis of the study's limitations. These are typical of a survey that collects the perceptions of company

directors and which, moreover, focuses on a specific sector of activity and analyzes a particular sample, thus not allowing the conclusions to be generalized to other sectors with different features, subject to different influences from pressure groups and different restrictions in their environment. It is suggested that future lines of research include objective results measures in the model, as well as placing this within a more general model that would take into account and measure companies' degrees of environmental orientation. A natural extension to the study would also be obtaining data from the second party, in this case, the customer in the RL relationship, and then the continuation of the work started by Barnes, Naudé and Michell, (2005), on analyzing the perceptions of the dyad and obtaining a holistic view of these relationships.

## REFERENCES

- Álvarez, M., Berrone, P., Husillos, F., and Lado, N. 2005. The explanatory power of trust and commitment and stakeholders' salience: Their influence on the reverse logistics programs performance, *Universidad Carlos III de Madrid. Departamento de Economía de la Empresa. WP 2005 series*. Getafe, Madrid.
- Andaleeb, S. S. 1995. Dependence relations and the moderating role of trust: implications for behavioral intentions in marketing channels. *International Journal of Research in Marketing*, 12(2): 157.
- Andaleeb, S. S. 1996. An experimental investigation of satisfaction and commitment in marketing channels: the role of trust and dependence. *Journal of Retailing*, 72(1): 43-55.
- Aragon-Correa, J. A. 1998. Strategic proactivity and firm approach to the natural environment. *Academy of Management Journal*, 41: 556-567.
- Aragon-Correa, J. A., Matias-Reche, F., and Senise-Barrio, M. 2004. Managerial discretion and corporate commitment to the natural environment. *Journal of Business Research*, 57(9): 964-976.
- Aulakah, P. S., Kotabe, M., and Sahay, A. 1996. Trust in cross-border marketing partnerships: a behavioral approach. *Journal of International Business*, 27: 1005-1032.
- Baker, W., and Sinkula, J. 2005. Environmental marketing strategy and firm performance: Effects on new product and market share. *Journal of the Academy of Marketing Science*, 33(4): 461-475.
- Barnes, B., Naude, P and Michell, P 2005. Exploring Commitment and Dependency in Dyadic Relationships *Journal of Business to Business Marketing*, 12, 3; 1-17.
- Bigné, E., and Blesa-Pérez, A. 2003. Market orientation, trust and satisfaction in dyadic relationships: a manufacturer-retailer analysis. *International Journal of Retail and Distribution Management*, 11(31): 574-590.
- Camarero, C., and Gutiérrez-Cillán, J. 2000. Significado and razones de la orientación relacional en los exchanges comerciales a largo plazo. *Revista Española de Investigación de Marketing*, 4(7): 21-50.
- Carter, C. R., and Ellram, L. M. 1998. Reverse logistics: A review of the literature and framework for future investigation. *Journal of Business Logistics*, 19(1): 85-103.
- Chin, W. W. 2001. PLS-Graph User's Guide. Version 3.0, *User's manual that accompanies PLS-Graph version 3.00 provided by Wynn Chin*.
- Chin, W., Marcolin, B., and Newsted, P., 1996. Partial Least Squares Latent Variable Modelling Approach for Measuring Interaction Effects: Results From a Monte Carlo Simulation Study and Voice Mail Emotion, Adoption Study. *Proceedings of the 7th International Conference on Information Systems*, Cleveland, Ohio.
- Churchill, G. 1979. A Paradigm for Developing Better Measures of Marketing Constructs *Journal of Marketing Research*, XVI, February, 64-73.

- Darroch, J. Miles, M. Jardine, A. and Cooke, E. 2004 The AMA 2004 Definition of Marketing and its Relationship to Market Orientation, *Journal of Marketing Theory and Practice*, 12, 4:29-38.
- Daugherty, P. J., Autry, C. W., and Ellinger, A. E. 2001. Reverse Logistics: The Relationship between Resource Commitment and Program Performance. *Journal of Business Logistics*, 22(1): 107-123.
- Daugherty, P. J., Myers, M. B., and Richey, R. G. 2002. Information support for Reverse Logistics: the influence of relationship commitment. *Journal of Business Logistics*, 23(1): 85-106.
- Daugherty, P. J., Richey, R. G., Hudgens, B. J., and Autry, C. W. 2003. Reverse logistics in the automobile aftermarket industry. *The International Journal of Logistics Management*, 14(1): 49-62.
- Diamantopoulos, A. 2005 The C-OAR-SE procedure for scale development in marketing: A comment *International Journal of Research in Marketing*, 22; 1-9.
- Drumwright, M. 1994. Socially responsible organizational buying: Environmental concern as a non-economic buying criterion. *Journal of Marketing*, 58(3): 1-19.
- Dwyer, F, Schurr, P. and Oh, S. 1987. "Developing Buyer Seller Relationships" *Journal of Marketing*, 51, (April): 11-27.
- Dyer, J., and Chu, W. 2000. The Determinants of Trust In Supplier-Automaker Relationships in the U.S., Japan and Korea. *Journal of International Business Studies*, 31(2): 259-285.
- Dyer, J., and Chu, W. 2003. The role of trustworthiness in reducing transaction costs and improving performance: Empirical evidence from the United States, Japan, and Korea. *Organization Science*, 14(1): 57-68.
- Finn, A. and Kayande, U. 2005 How fine is C-OAR-SE? A generalizability Theory Perspective on Rossiter's procedure, *International Journal of Research in Marketing*, 22; 11-21.
- Fukuyama, F. 1995 *Trust. The Social Virtues and the Creation of Prosperity*, The Free Press, New York.
- Gao, Y, Sirgy, J and Bird, M 2005. Reducing buyer decision-making uncertainty in organizational purchasing: can supplier trust, commitment, and dependence help? *Journal of Business Research*, 58 (4): 397-415.
- Geyskens, I., Benedict, J., Steenkamp, E. M., and Kumar, N. 1998. Generalizations about trust in marketing channel relationships using meta-analysis. *International Journal of Research in Marketing*, 15(3): 223-248.
- Gounaris, S. P. 2005. Trust and commitment influences on customer retention: insights from business-to-business services. *Journal of Business Research*, 58 (2): 126-140.
- Greenley, G. and Foxall, G. 1998. "External Moderation of Associations among Stakeholders Orientations and Company Performance", *International Journal of Research in Marketing*, 15; 51-69.
- Keefe, L. 2004. What is the meaning of "marketing"?, *Marketing News - American Marketing Association*: 17-18. Chicago.



- Kirca, A., Jayachandran, S., and Bearden, W. 2005. Market orientation: A meta-analytic review and assessment of its antecedents and impact on performance. *Journal of Marketing*, 69(2): 24-48.
- Kohli, A. K., and Jaworski, B. J. 1990. Market orientation: The construct, research propositions and managerial implications. *Journal of Marketing*, 54(2): 1-18.
- Kumar, N. 1996. The power of trust in manufacturer-retailer relationships. *Harvard Business Review*, 74: 92-106.
- Kwon, I. G., and Taewon, S. 2005. Trust, commitment and relationships in supply chain management: a path analysis. *Supply Chain Management: An International Journal*, 10(1): 26-33.
- Kroon L. and Vrijens G. Returnable containers: an example of reverse logistics. *International Journal of Physical Distribution & Logistics Management* 1995; 25(2): 56-68
- Lado, N., Maydeu, A., and Rivera, J. 1998. Measuring market orientation in several populations: A structural equations model. *European Journal of Marketing*, 32(1/2): 23-39.
- Lambin, J. J. 1996. The misunderstanding about marketing, today, marketing is too important to be left to sale marketing function. An empirical study in the private insurance sector. *CEMS Business Review*, 1(1/2): 37-56.
- Marien E. J. 1998. Reverse Logistics as competitive strategy. *Supply Chain Management Review* 8, 1:31-54..
- Maydeu, A., and Lado, N. 2003. Market orientation and economic results in the European insurance industry: A mediational model. *The International Journal of Service Industry Management*, 14(3): 284-309.
- Miyamoto, T., and Nexhmi, R. 2004. Determinants of three facets of customer trust A marketing model of Japanese buyer-supplier relationship. *Journal of Business Research*, 57(3): 312-319.
- Moorman, Ch, Zaltman, G. and Deshpandé, R. 1992. "Relationships Between Providers and Users of Marketing Research", *Journal of Marketing*, 57, (January) 81-101
- Morgan, R. M., and Hunt, S. D. 1994. The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(July): 20-38.
- Narver, J. C., and Slater, S. F. 1990. The effect of market orientation on business profitability. *Journal of Marketing*, 54(4): 20-35.
- Nunnally (1978) *Psychometric Theory* (2nd Edition). New York:Wiley.
- Rao, P and Holt, D. 2005 Do green supply chain lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, 25, 2, 898-916.
- REVLOG. 1999. Reverse logistics definition., Vol. 2004:  
<http://www.fbk.eur.nl/OZ/REVLOG/PROJECTS/TERMINOLOGY/Definitions.html>.

- Richey, G., Chen, H., Genchev, S and Daugherty, P 2005 Developing effective reverse logistics programs *Industrial Marketing Management*, 34, 830-840.
- Rodriguez-Cano, C., Carrillat, F., and Jaramillo, F. 2004. A meta-analysis of the relationship between market orientation and business performance: evidence from five continents. *International Journal of Research in Marketing*, 21(2): 179-200.
- Rogers, D. S., and Tibben-Lembke, R. 1999. *Going backwards: Reverse logistics trends and practices*: Reverse Logistics Executive Council.
- Rogers, D. S., and Tibben-Lembke, R. 2001. An examination of reverse logistics practices. *Journal of Business Logistics*, 22(2): 129-148.
- Rossiter, J. 2002. The C-OAR-SE procedure for scale development in marketing. *International Journal of Research in Marketing*, 19: 305-335.
- Sarkis, J. 2003. A strategic decision framework for green supply chain management. *Journal of Cleaner Production*, 11: 397-409.
- Schultmann, F., Zumkeller, M., and Rentz, O. 2006. Modeling reverse logistic tasks within closed-loop supply chains: An example from the automotive industry. *European Journal of Operational Research*, 171(3): 1033-1050.
- Shoham, A., Rose, G., and Kropp, F. 2005. Market orientation and performance: A meta-analysis. *Marketing Intelligence and Planning*, 23(4/5): 435-455.
- Siguaw, J, Simpson, P and Baker, T. 2003 Preliminary evidence on the composition of relational exchange and its outcomes: The distributor perspective *Journal of Business Research*.56, 4; 311-322
- Siguaw, J, Simpson, P and Baker, T. 1998. Effects of Supplier Market Orientation on Distributor Market Orientation and the Channel Relationship: The Distributor Perspective *Journal of Marketing*. 62, 3: 99-124.
- Stone, G., and Blodgett, J. M. 2004. Toward the creation of an eco-oriented corporate culture: a proposed model of internal and external antecedents leading to industrial firm eco-orientation. *The Journal of Business and Industrial Marketing*, 19(1): 68-99.
- Stone, G., and Wakefield, K. 2000. Eco-orientation: An extension of market orientation in an environmental context. *Journal of Marketing Theory and Practice*, 8(3): 21-32.
- Svensson, G. 2004. Supplier segmentation in the automotive industry: A dyadic approach of a managerial model *International Journal of Physical Distribution & Logistics Management* 34 (1/2): 12-22.
- Tellefsen, T. 2002. Commitment in business-to-business relationships The role of organizational and personal needs *Industrial Marketing Management*, 31, (1): 645-652
- Tellefsen, T., and G.P., T. 2005. The antecedents and consequences of organizational and personal commitment in business service relationships. *Industrial Marketing Management*, 34(1): In press.

- Tibben-Lembke , R. 1998. The impact of reverse logistics on the total cost of ownership. *Journal of Marketing Theory and Practice*, 6(4): 51-60.
- Toffel, M. W. 2003. The growing strategic importance of end-of-life product management. *California Management Review*, 45(3): 102-142.
- Toffel, M. W. 2004. Strategic management of product recovery. *California Management Review*, 46 (2): 120-141.
- Turner, G., LeMay, S. Mitchell 1994. Solving the reverse logistics problem: Applying the symbiotic logistics concept *Journal of Marketing Theory and Practice* 2, 2: 15-28.
- Wilson, D. 1995. An Integrated Model of Buyer-Seller Relationship *Journal of the Academy of Marketing Science*, 23, (4): 335-345.
- Wold, H. 1985. "Partial Least Squares," in S. Kotz and N. L. Johnson (Eds.), *Encyclopedia of Statistical Sciences (Vol. 6)*, New York: Wiley, 581-591.

**TABLE 1. In-company environmental practices**

Degree to which the following activities are implemented in the company. (1= we do not conduct these activities and have no intention of doing so ... 7= we are at the forefront, we are leaders in this field)

Items	Average	Typical deviation
<b>1. MATERIALS USED</b>		
1.1. Reduction in range of materials used for manufacture of our products	2.90	2.27
1.2. Reduction in raw material (i.e.: use of recycled materials) for manufacture of our products	2.34	2.00
1.3. Discontinuation of use of legally usable materials for manufacture of our products due to the belief on our part that they are not satisfactory from an environmental point-of-view	2.62	2.21
<b>2. DESIGN</b>		
2.1. Use of product "Life-Cycle Analysis" (LCA)	2.75	2.11
2.2. Use of joints between easily-breakable parts to facilitate disassembly/removal	2.73	2.21
2.3. Clear identification of materials used to facilitate disassembly/removal	3.34	2.45
2.4. Use of standardized parts to facilitate reuse	3.20	2.35
<b>3. MANUFACTURE</b>		
3.1. Prevention systems to cover possible environmental accidents and emergencies caused by the company	4.54	2.51
3.2. Fume and spill filters and controls.	4.42	2.57
3.3. Systematic control of energy use to reduce company demand	3.76	2.45
3.4. Recycling of water used by the company for reuse in other processes and/or before it is released into the drains	2.50	2.15
3.5. Use of standardized and reusable containers/packaging	3.93	2.56
<b>4. INTERNAL ORGANIZATION</b>		
4.1. Use of environmental arguments in marketing activities	3.36	2.16
4.2. Recycling of general company waste products and materials	5.14	2.18
4.3. Environmental management handbooks for internal use	4.24	2.31
4.4. Use of advanced prevention and safety at work systems	5.20	1.92
<b>5. TYPE OF MATERIAL RECEIVED FROM CUSTOMER</b>		
<b>RECEIPT OF MATERIAL FOR:</b>		
5.1. small repairs and later return to same customer (customer-service operations)	3.80	2.50
5.2. small repairs and introduction into production chain	2.64	2.22
5.3. small repairs and sale as spare part	2.11	1.90
5.4. disassembly to recover parts that are introduced into the production chain	2.27	1.99
5.5. disassembly to recover parts that are used as spare parts	2.13	1.93
5.6. crushing and internal use	1.73	1.57
5.7. crushing and external use	1.85	1.66
5.8. recovery of a product with which the customer is not satisfied	3.49	2.44

N=158

**TABLE 2. Reliability of the measures****TABLE 2. RELIABILITY OF THE MEASURES**

Resource commitment 0.856	They allow us to achieve absolutely all the objectives we pursue. (ResC1) They allow us to take the best advantage of reverse logistics activities.(ResC2)
Relational commitment 0.819	The relationship that my company has with the customer is worthy of our making the greatest effort to preserve it. (RelC1) My company has the firm intention of preserving the relationship with this customer indefinitely. (RelC2) We are willing to devote people and resources to reverse logistics activities that we conduct with this customer (RelC3)
Trust 0.882	We are sure the customer tells us the truth. (Tr1) When we share our problems with our customer we trust that s/he will understand them.(Tr2) We feel sure that our customer takes into consideration the way his/her decisions and actions affect us. (Tr3)

(Cronbach Alpha)

**TABLE 3. Correlations between results indicators**

Correlation between indicators	1. environment	2. customers	3. assets	4. costs	5. performance
1. Compliance with environmental regulations (EnvReg)	1				
2. Improved relationship with customers (RelCust)	0.508	1			
3. Asset/Product recovery (AssetRec)	0.513	0.371	1		
4. Cost control (Costs)	0.381	0.434	0.536	1	
5. Increased performance (Prfm)	0.302	0.326	0.530	0.872	1

**TABLE 4. Discriminant validity**

Correlations between LVs	1	2	3	4	5
1. Resource commitment	0.934				
2. Relational commitment	0.406	0.855			
3. Trust	0.443	0.574	0.901		
4. Results1	0.595	0.231	0.139	0.868	
5. Results2	0.534	0.682	0.626	0.485	0.827

Correlations between LVs and, along the diagonal, the square root of the AVE

**TABLE 5. Model estimation results**

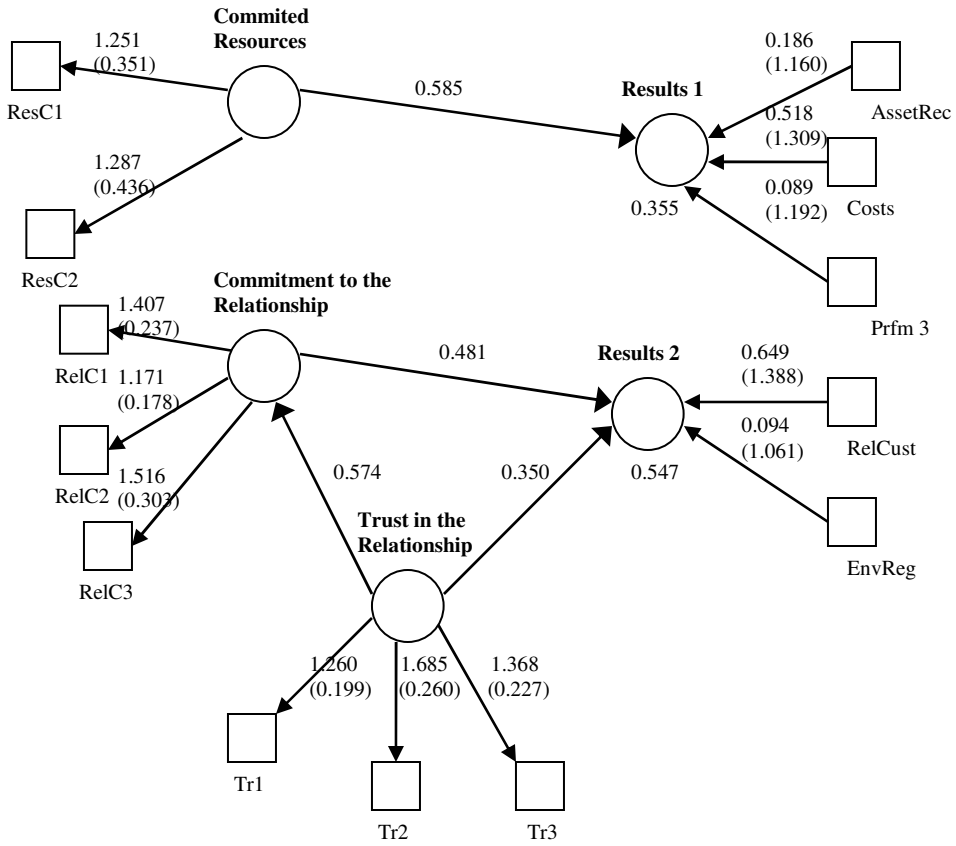
Structural Relationships	Coefficient	t Bootstrap (100)	t Jackknife (42)
b <sub>1</sub> Resource commitment-			
Results 1	0.585	5.39	4.53
b <sub>2</sub> Relational commitment-			
Results 2	0.481	3.21	2.66
b <sub>3</sub> Trust -			
Results 2	0.350	2.13	1.71
b <sub>4</sub> Trust -			
Relational commitment	0.574	4.71	3.95

Construct \ Statistics	Sq root	Average redundancy	Average Communality
Resource commitment			0.87
Relational commitment	0.329	0.241	0.73
Trust			0.81
Results 1	0.355	0.267	0.75
Results 2	0.547	0.374	0.68



**CHART 1. Results of model estimation**



**ANNEX 1. Activities that are the subject of the study**

SIC	ACTIVITY
3465	Automotive stampings
3519	Internal combustion engines
3537	Tractors, trailers and stackers
3647	Vehicular Lighting Equipment
3694	Electrical equipment for internal combustion engines
3711	Motor Vehicles and Passenger Car Bodies
3713	Truck and bus bodies
3714	Motor Vehicle Parts & Accessories
3715	Truck trailers
5012	Automobiles and Other Motor Vehicles
5013	Motor Vehicle Supplies and New Parts

## ANNEX 2. Questionnaire.

(Items always rotated within each sub-group)

### I ENVIRONMENTAL PRACTICES IN THE COMPANY.

Please score **the degree to which your company implements** the following activities on a scale from 1 to 7.

(1= we do not conduct these activities and have no intention of doing so ... 7= we are at the forefront, we are leaders in this field)

#### 1. MATERIALS USED

1.1. Reduction in range of materials used for manufacture of our products

1.2. Reduction in raw material (i.e.: use of recycled materials) for manufacture of our products

1.3. Discontinuation of use of legally usable materials for manufacture of our products due to the belief on our part that they are not satisfactory from an environmental point-of-view

#### 2. DESIGN

2.1. Use of product "Life-Cycle Analysis" (LCA)

2.2. Use of joints between easily-breakable parts to facilitate disassembly/removal

2.3. Clear identification of materials used to facilitate disassembly/removal

2.4. Use of standardized parts to facilitate reuse

#### 3. MANUFACTURE

3.1. Prevention systems to cover possible environmental accidents and emergencies caused by the company

3.2. Fume and spill filters and controls.

3.3. Systematic control of energy use to reduce company demand

3.4. Recycling of water used by the company for reuse in other processes and/or before it is released into the drains

3.5. Use of standardized and reusable containers/packaging

#### 4. INTERNAL ORGANIZATION

4.1. Use of environmental arguments in marketing activities

4.2. Recycling of general company waste products and materials

4.3. Environmental management handbooks for internal use

4.4. Use of advanced prevention and safety at work systems

#### 5. TYPE OF MATERIAL RECEIVED FROM CUSTOMER

RECEIPT OF MATERIAL FOR:

5.1. small repairs and later return to same customer (customer-service operations)

5.2. small repairs and introduction into production chain

5.3. small repairs and sale as spare part

5.4. disassembly to recover parts that are introduced into the production chain

5.5. disassembly to recover parts that are used as spare parts

5.6. crushing and internal use

5.7. crushing and external use

### II. "REVERSE LOGISTICS" ACTIVITIES

**"Reverse logistics"** will be understood as the management of the return of raw materials, in-process inventory, finished products and packaging, with the objective of conducting **activities such as** recycling, repairing, reusing, remanufacturing, directly reselling or disposing of them in an appropriate manner".

Do you conduct reverse logistics activities? (Y) (N)

**A) Resource commitment to reverse logistics activities**

Please indicate your **degree of agreement or disagreement** with the following statements on RESOURCE COMMITMENT TO REVERSE LOGISTICS ACTIVITIES by ticking a number from 1 to 7:

(1= totally disagree...4= neutral... 7= totally agree)

	Totally disagree						Totally agree
1. Allows us to achieve absolutely all the objectives we set.	1	2	3	4	5	6	7
2. Allows us to take the greatest advantage of reverse logistics activities.	1	2	3	4	5	6	7
3. Hampers the successful implementation of reverse logistics activities.	1	2	3	4	5	6	7

**B) Relationship with main customer with whom reverse logistics activities are conducted**

Please indicate your **degree of agreement or disagreement** with the following statements on the MAIN CUSTOMER WITH WHOM REVERSE LOGISTICS ACTIVITIES ARE CONDUCTED by ticking a number from 1 to 7:

(1= totally disagree...4= neutral... 7= totally agree)

	Totally disagree						Totally agree
1. The relationship my company has with this customer is worthy of us making the maximum effort to preserve it. [112]	1	2	3	4	5	6	7
2. My company aims to preserve the relationship we have with this customer indefinitely.	1	2	3	4	5	6	7
3. We are prepared to devote people and resources to the reverse logistics activities we conduct with this customer.	1	2	3	4	5	6	7
4. We are certain that this customer tells us the truth.	1	2	3	4	5	6	7
5. We trust that this customer will understand any problems we have that we share with him/her. [117]	1	2	3	4	5	6	7
6. We can count on this customer taking into consideration the way his/her decisions and actions affect us.	1	2	3	4	5	6	7

<b>D) Assessment of reverse logistics activities.</b>
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Please indicate **HOW EFFECTIVE** your company has been in **achieving the following objectives** through conducting Reverse Logistics activities with your **main customer** by ticking a number from 1 to 7.  
(1 = not at all... 4= to a certain extent... 7= to a great extreme)

	Not at all efficient				Extremely efficient		
1) Compliance with environmental regulations.	1	2	3	4	5	6	7
2) Improved relationships with customers.	1	2	3	4	5	6	7
3) Asset recovery (products).	1	2	3	4	5	6	7
4) Cost control.	1	2	3	4	5	6	7
5) Increased performance.	1	2	3	4	5	6	7