DOCFRADIS

COLECCIÓN DE DOCUMENTOS DE TRABAJO
CATEDRA FUNDACIÓN RAMÓN ARECES
DE DISTRIBUCIÓN COMERCIAL

DOC 05/2019
Fecha Recepción: 03/07/2019
Fecha Aceptación: 08/07/2019
Fecha Publicación: 22/07/2019

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El efecto de la integración de la cadena de suministro y la proactividad ambiental en el rendimiento ambiental. El caso del sector hortofrutícola español

RESUMEN

Esta investigación trata de identificar el potencial efecto de la integración de la cadena de suministro sobre el rendimiento ambiental, destacando el papel de la proactividad ambiental. Para ello se utilizan datos de encuesta y de un panel de expertos del sector de la comercialización hortofrutícola. Los resultados confirman que la integración de la cadena de suministro y la proactividad ambiental tienen un efecto directo y positivo en el rendimiento ambiental. Sin embargo, estos efectos varían en función de las dimensiones de la integración consideradas. Este estudio ayuda a comprender otras formas de considerar otros efectos de la integración de la cadena de suministro más allá de los basados en temas operativos. Considera la integración de la cadena de suministro como un facilitador del rendimiento ambiental a través del análisis del papel de la proactividad ambiental en dichos procesos.

Palabras clave: Integración cadena suministro; agricultura; proactividad; integración; rendimiento ambiental.

The effect of supply chain integration and environmental proactivity on environmental performance. The case of the horticultural spanish sector

ABSTRACT

This research attempts to identify the potential effects of supply chain integration on environmental performance, highlighting the role of environmental proactivity. Empirical data collected from a survey and panel of experts from the horticultural marketing sector are used. The results confirm that supply chain integration and environmental proactivity have a direct and positive effect on environmental performance. However, these effects vary when considering different supply chain integration dimensions. This study helps to understand other ways of considering the effects of supply chain integration beyond those based on operational issues. It considers supply chain integration as an enabler of environmental performance by analyzing the role of environmental proactivity in such processes.

Keywords: Supply chain integration; agriculture; proactivity; integration; environmental performance.

JEL classification: M21; Q56.

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ISSN: 2253-6299
Depósito Legal: AS-04989-2011
Edita: Cátedra Fundación Ramón Areces de Distribución Comercial de la Universidad de Oviedo

The effect of supply chain integration and envoronmental proactivity on environmental performance. The case of the horticultural spanish sector

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1. INTRODUCTION

Environmental protection has been recognized as a crucial and timely organizational issue affecting the long-term development of firms (Madsen, 2009). Therefore, firms should make environmental sustainability another main organizational goal in addition to profit-making (Li, 2014). In a competitive market, this is translated into an increase in the ability of firms to grow and survive, where have to interact and satisfy other partners within the supply chain. Under these circumstances, a high level of environmental performance (EP) achieved by one firm can be brought to naught by its suppliers' and/or customers' poor environmental management (Faruk *et al.*, 2002).

Although a firm may choose to become directly involved and invest its own resources in improving the environmental practices of supply chain partners (Vachon and Klassen, 2006), the effectiveness of integrating environmental issues involves efforts beyond simple collaboration with customers and suppliers (Vachon and Klassen, 2008). This goes through a two-way exchange of environmental management knowledge in an integrated manner together with aiding and sharing management processes (Wong *et al.*, 2015). In this way, firms focus less on the immediate outcomes of their environmental efforts and more on the process by which more environmentally-sound operations or products might be achieved (Vachon and Klassen, 2006).

Most of the research into the environmentally sustainable supply chain has considered the identification of different practices related to an improvement in performance. However, these practices have also been associated with some essential restrictions to make the most of them. On the one hand, they require the integration of environmental criteria into the internal management system (Margerum and Born, 2000), and the strategic collaboration with supply chain partners (Klassen and Whybark, 1999). On the other hand, and to be globally competent, there has to be an extension of environmental management practices across the supply chain (Giménez and Tachizawa, 2012).

To achieve these benefits, firms need to include environmental criteria into their current management and information systems, at the same time they standardize and redesign them in order to support the coordination of environmental management activities among functions and across firms. An example of this can be seen in the horticultural sector in Spain when

carried out their own green revolution. This was made through the use of beneficial insects that improves the productivity of the crop and protect the environment as decreases the use of phytosanitary products (Valera et al., 2016). This implementation comprised sharing information about processes, protocols, and routines with their supply chain partners to support their efforts and reduce the resistance to change given the novelty of the approach.

Similarly, supply chain integration (SCI) can lead to controversial situations among supply chain partners because managing environmental issues can generate positive externalities. As a result, they can imply both conflicts (e.g., who assumes the costs), and opportunities (e.g., win-win situations), although this would depend on the predisposition of parties to agree. In this sense, SCI becomes an essential element for environmental sustainability within the supply chain as it coordinates with both suppliers and customers. In doing so, SCI can achieve collaborative advantages as a result of the relational rents derived from the close relationships and information sharing among functions and supply chain partners (Dyer and Singh, 1998).

From an environmentally friendly point of view, the main characteristics of supplier and customer integration are knowledge sharing and proactive environmental problem solving (Vachon, 2007). Therefore, the adoption of a proactive environmental strategy requires engaging with supply chain members to fully seize said characteristics (Klassen and Whybark, 1999). Thus, it can be said that the need for being environmentally responsible and the concept of supply chain management arise in parallel (Walton *et al.*, 1998).

Given these considerations, it is felt that more research is needed, bearing in mind the importance of SCI and environmental proactivity as determinants of excellent environmental performance. In this sense, this study posits that SCI plays a crucial role in helping environmental practices actually to impact on the performance. Also, this study posits that those firms with a genuinely proactive profile will perform better environmentally, leading them to obtain a competitive advantage.

Therefore, the aim of this study is twofold. Firstly, by disaggregating SCI into its traditional dimensions (internal, with suppliers and with customers), this study will be able to identify the potentially different effects of SCI on environmental performance. Secondly, it examines how the EP may vary when considering high or low levels of proactivity as SCI increases.

The remainder of this study is structured as follows. Section 2 introduces the literature review as well as the development of the hypotheses. In Section 3, the research method is introduced, including the model, variable definitions and measurements, and the data sources utilized in this study. Section 4 presents the main results, while Section 5 frames the discussion and its implications for theory and managerial practices. Finally, Section 6 summarizes the results and suggests a possible direction for further research.

2. LITERATURE REVIEW AND HYPOTHESES

Within the context of sustainable supply chains, firms operate in ways that fulfill the requirements of customers, suppliers, and society. Therefore, pressures from stakeholders, such as regulators, will influence the adoption of environmentally responsible behaviors (Delmas and Toffel, 2004; Zailani *et al.*, 2012). As a consequence, firms have institutionalized environmental practices because of pressure from external and internal forces, as well as from an awareness of the consequences of non-compliance with environmental imperatives (Narasimhan and Carter, 1998). Therefore, if firms have a legitimate concern for the environment and there is social approval, then environmental practices will be deployed more rapidly throughout the supply chain (Carter *et al.*, 2000).

Wolf (2011) theorized that downstream sustainable supply chain management integration and strategy integration would subsequently lead to environmental performance. There are also some studies that support the idea that integration and environmental management are closely related (Bowen *et al.*, 2001; Carter and Carter, 1998; Sarkis *et al.*, 2011; Vachon and Klassen, 2008).

The desire to be integrated with supply chain partners arises from the need to facilitate communication and cooperation among them (Ettlie and Reza, 1992). Extending this to the context of sustainable supply chain management, firms maintain intra-organizational processes while coordinating with external parties to facilitate inter-organizational fulfillment of shared environmental goals (Wong *et al.*, 2015).

Bearing this in mind, to achieve environmental sustainability, firms need to implement internal environmental management practices and closely work with suppliers and customers.

Thus, firms seeking to reap the most significant benefits from their environmental management processes must integrate cross-functional efforts and other supply chain members into these processes (Walton *et al.*, 1998; Rao and Holt, 2005). Besides, firms will only improve in the final phase of environmental management when they act as a whole system, by including customers, suppliers and other players in the supply chain (Walton *et al.*, 1998). Therefore, a supply chain perspective requires that cross-functional and cross-firm processes be integrated, including product design, suppliers' processes, evaluation systems, and inbound logistics. Accordingly, SCI can be considered as an enabler of EP because it reduces restrictions to strategic cooperation with supply chain partners. Therefore, the integration of environmental issues within firms that are strategically integrated will lead to better performance results. This is also attached to their proactive profile.

2.1. Internal integration and environmental performance

Internal integration recognizes that departments within a firm should be carefully coordinated and obstacles to inter-departmental communication and communication and cooperation must be removed (Flynn *et al.*, 2010). This eventually becomes a set of interconnected systems and processes that facilitate decision-making processes (Schoenherr and Swink, 2012).

Therefore, internal integration encourages communication between parts, assuring an increase of trust and confidence among departments (Ritchie and Brindley, 2000; Vallet-Bellmunt and Rivera-Torres, 2013). Working together leads to the pooling of goals and interests while also sharing costs. Thus, internal integration facilitates cross-functional cooperation towards environmental protection and encourages firms to adopt environmental management systems (Apsan, 2000; Wu *et al.*, 2012). This is possible because environmental management systems are conditioned to be agile and take into account both sides of information flows. These information flows are guaranteed when there is internal integration. Likewise, over time, a close relationship among departments can generate an effective relationship characterized by trust and commitment (Basnet, 2010; Nyaga *et al.*, 2010). Thus, top management can take advantage of this to improve employee participation in environmental initiatives (Zhu *et al.*, 2008).

Hypothesis 1: Internal integration is positively related to environmental performance.

2.2. External integration and environmental performance

SCI can be considered as interactive because advantages of integration with suppliers and customers come from sharing information and joint development (Danese and Romano, 2011; Lau *et al.*, 2010). Thus, external integration can enhance mutual understanding among supply chain partners, promote collaboration, and establish cross-firm problem-solving routines (Wong *et al.*, 2011). Also, it can increase knowledge sharing and professional know-how, help firms resolve conflicts, improve efforts of supply chain partners and improve performance (Koufteros *et al.*, 2005; Lau *et al.*, 2010). This implies exchanging knowledge about green techniques and managing source materials as well as cooperation with supply chain partners to further ecological design that meets environmental standards (Vachon and Klassen, 2006; Zhu and Sarkis, 2007). Both dimensions of integration foster environmental management programs as well as enabling firms to modify products by using recycled or less hazardous materials and redesign manufacturing processes to reduce waste (Klassen and Vachon, 2003; Vachon, 2007).

SCI implies a greater understanding of the firms involved. Therefore, as firms become more and more integrated, they will have fewer conflicting goals and better knowledge of suppliers and customers. In these circumstances, investments in environment-related activities become less risky as the organizations increase knowledge of each other. Additionally, such levels of integration provide a basis for achieving cooperative solutions to reduce the environmental impact of the material flows among supply chain members (Vachon and Klassen, 2006). Also, SCI can help to manage environments with high uncertainty (Bonn-itt and Wong, 2011; Germain *et al.*, 2008; Wong *et al.*, 2011). This advantage can assist with the development and implementation of new, more environmentally friendly supply chain practices, which often require an understanding of complex inter-firm links (Vachon and Klassen, 2006).

Legal imperatives impose many environmental activities. Thus, a supplier may be forced to shut down because of the improper use of hazardous materials or because it faces a regulatory obligation to restore an initial situation. In the same way, problematic customers might choose to boycott the firm's product because of environmental impacts. Therefore, those firms with a more integrated relationship with suppliers and/or customers may mitigate the negative consequences of environmental contingencies and respond quickly to develop alternatives to solve these issues through the supply chain. As a result, the EP will be higher when

integration and information systems are in place to facilitate the exchange of knowledge and tracking the level of achievement of environmental practices.

For instance, in intensive agricultural sectors like the one in the southeast of Spain, the use of fertilizers and phytosanitary products that contaminate water resources, soil and the produce itself is one that is considered across all supply chain partners due to the environmental impact that could potentially compromise both the continuity of agricultural exploitation and consumers' health. Thus, public administrations established strict regulations outlining the permitted levels of both fertilizers and phytosanitary products. In order to obtain an active fulfillment of these requirements, the participation of the whole supply chain is fundamental. In this sense, assuring the process from beginning to end would need the commitment and joint work of supply chain partners because otherwise the environmental objectives could not be met. In this sense, firms in the horticultural sector have had to adapt their crops to this kind of regulation in order to keep their products free of commercialized pesticides and reduce their waste pollution. Although this process could have taken a long time, most of the firms were able to adapt to these regulations in less than a year entirely.

In summary, the integration of suppliers and customers with regards to environmental efforts often leads to exchanging best practices and prevents adverse effects owing to misunderstandings (Wong *et al.*, 2015). Thus, firms that have poor integrated relationships with suppliers and customers will achieve little.

Hypothesis 2: Customer integration is positively related to environmental performance.

Hypothesis 3: Supplier integration is positively related to environmental performance.

2.3. Environmental proactivity and environmental performance

Achieving EP involves making adjustments to design, develop, and implement better systems that reduce wastefulness through improved quality of products, systems, and processes (Lindsey, 2011). Besides, environmental management systems can help firms accumulate knowledge and guarantee a balance between environmental protection and performance (Sharma *et al.*, 1999).

However, firms concerned with environmental issues can make decisions based on two very different options: environmental integration and green management (Vachon and Klassen, 2006; Wong *et al.* 2015). The former indicates a more proactive and strategic profile. Firms following this option will try to integrate environmental goals to their general strategy and establish internal and external relationships. In doing so, firms can deploy mutual problem-solving to take advantage of environmental protection ideas and expertise. The latter focuses on what firms do to reduce the environmental impact of their internal and external operations, through inspection and risk minimization, which include actions such as reducing energy consumption or reusing/recycling materials and packaging (Diabat and Govindan, 2011).

Therefore, in situations of adapting to external pressures, more reactive firms would respond by carrying out green management, that is to say, correcting what generates the problem in order to find a solution. Once solved, they obtain a temporarily improved environmental performance. However, this does not indicate that the firm will be able to respond in the future successfully. However, more proactive firms will continuously be learning and updating so that they are always ready to face almost every environmental contingency. Thus, they obtain a higher EP that can be maintained over time.

Although both perspectives seem to be consecutive, implementing environmental practices in different settings can result in different performance outcomes (Koh *et al.*, 2012). Therefore, firms leading directly to green management will have weak EP in comparison with those integrating environmental goals and implicating customers and suppliers.

Hypothesis 4: Environmental proactivity is positively related to environmental performance.

3. METHOD

3.1. Sample and data collection

To test the hypotheses mentioned above, data was collected from Spanish horticultural marketing firms. In particular, this research has focused on the southeast of Spain within the agri-food sector (mainly specialized in peppers, tomatoes, and cucumbers) as it has been an example of success and growth over the last forty years. This is due to its productive

specialization, which is based on three main pillars: (a) the closer ties between production, manufacture, and commercialization; (b) the regular introduction of new product varieties and other crops innovations; and (3) the introduction of quality systems that ensures traceability of their products.

To collect the data, two different sources were used. First, structured personal interviews were conducted between March and May of 2016. Secondly, five independent external experts were consulted. These experts were chosen from horticultural business associations and financial institutions closely linked to the financing of firms in the sector. Thus, because of the closeness to the sector and, in particular, to the firms in the sector, these experts have particular knowledge about the firms comprising the sample. The motivation for this was due to the difficulty in obtaining objective opinions about sensitive information. Based on the vast experience accumulated by practitioners in the horticultural sector, it was felt that it would be sensible to hear from experts on the subject of environmental performance.

The assessment of the questionnaire was carried out in three stages. First, the development of the questionnaire was based on the literature and reviewed by academic experts in both the agri-food sector and supply chain. Second, the wording of some questions was modified to accommodate the academic experts' suggestions. This final version was pre-test on five firms from the sample, which were personally visited to conduct discussions. Third, the final version was designed drawing on their feedback.

The initial population was made up of 302 firms. This sample was selected from a list of firms classified under the Statistical Classification of Economic Activities in the European Community (NACE) Rev. 2 business code 46.31 (wholesale of fruit and vegetables) and located in the southeast of Spain. For each selected firm, a key informant was identified, typically bearing the title of manager, president or director, and with knowledge about the firm's internal and external processes. The research unit was the horticultural marketing firms which carry out manipulation or transformation processes.

Of the initial sample of 302, 41 of them were impossible to locate because their contact information was not actualized, 148 did not carry out the whole transformation process (purely intermediaries), 23 refused to participate, and 37 were unavailable due to their work commitment. A total of 53 questionnaires were finally completed and included in this study.

To test for the potential existence of a common method variance, confirmatory factor analysis technique was used. Since we collected data from a single respondent per organization, the potential for common method bias might be an issue (Podsakoff et al., 2003). Therefore, all the variables were loaded into an exploratory factor analysis (EFA). The results show six factors with eigenvalues above 1.0 and explaining 88.80% of the total variance. The first factor explained 32.71% of the variance (not the majority of the total variance), which is acceptable for this study, where most of the construct are correlated, both conceptually and empirically. This suggests that the common method bias does not appear to be a problem.

3.2. Measures

The measuring instrument, that is, the questionnaire, was developed based on previously validated measures. The literature was surveyed to identify valid measures for related constructs and adapted to existing scales (see Table 1). Thus, the variables used in this research were developed according to the following description:

Dependent variable:
Environmental performance has been considered as a general measure following the dimensions proposed by Zhu and Sarkis (2004). Thus, experts were asked to compare each EP with those of competitors in terms of reducing air emissions, waste, hazardous/toxic materials, and environmental accidents. It was considered on a 5-point Likert-scale, where 1 indicates much worse, 3 equal and 5 much better.

Independent variables:
Supply chain integration was measured according to its dimensions: internal integration practices (Flynn *et al.*, 2010) and external integration practices (Flynn *et al.*, 2010; Narasimhan and Kim, 2002). With regards to external integration, this research follows those that have kept the supplier and customer elements of integration separate, to obtain their potentially distinct relationships with performance (Narasimhan and Kim, 2002; Shah *et al.*, 2002). Thus, respondents were asked to rate the extent to which statements, regarding information exchange and involvement both with supplier and customer, applied to their firm. They were considered on a 5-point Likert-scale, where 1 indicates strongly disagree, and 5 strongly agree.

The environmental proactivity was adapted from the indications given by Aragón-Correa (1998), being measured as a dichotomous variable. Therefore, respondents were asked to position their companies' strategies as defenders or prospectors with regards to environmental issues. Thus, a value of 0 represents less environmentally proactive firms, and a value of 1 represents those firms more proactive concerning environmental issues.

Control variables:

Additionally, the study considers two different control variables. First, the age of the firm was measured as the natural logarithm of the numbers of years elapsed since the firm's foundation. Second, the size of the firm was considered as a factor which could affect EP because it is supposed that larger firms possess more considerable and more heterogeneous resources to develop and implement environmental actions. It was measured as a natural logarithm of the number of employees.

4. RESULTS

A confirmatory factor analysis (CFA) was conducted to assess convergent and discriminant validity. The CFA results suggested that the model provided was a good fit for the data. The ratio of χ^2 (156.689) to degrees of freedom (101) is less than the recommended value of 3.0 for a satisfactory fit of a model to data (Hair *et al.*, 1998). All individual items in the measurement model had standardized coefficients that were significant ($p<0.001$), indicating that the constructs exhibited convergent validity. Collectively, these results provided evidence of convergent validity (see Table 1). Cronbach's alpha reliability coefficients were then computed, which ranged from 0.87 to 0.93. The values of composite reliability (CR) were also computed, which ranged from 0.87 to 0.93, and the values of the average variance explained (AVE), which ranged from 0.61 to 0.68. Table 2 shows the correlation matrix, means, and standard deviation of the construct used in the research model. The level of correlations provides initial evidence of discriminant validity of the constructs and suggests that multicollinearity is not an issue in this study.

Table 1. Confirmatory factor analysis

		Measurement Model*	
Factor and Scale Items	Factor Loading [a]	Standard Coefficient	t-Value
Customer Integration (CI) (α=0.93; 1st eigenvalue= 4.55; CR= 0.93; AVE=0.68)			
The link with our major customers is reinforced continuously by information networks	0.73	0.81	16.1
Customer's ordering is essentially developed by computerization	0.64	0.69	9.02
We carry out exhaustive follow-ups with our major customers	0.70	0.85	19.24
We have a high level of periodical contact with our major customers	0.88	0.93	37.78
We share reliable information and point of sale information with our major customers	0.86	0.86	20.65
Our major customers share demand forecasts with us	0.80	0.83	17.29
We share our production plan with our major customers	0.71	0.80	15.16
Internal Integration (II) (α=0.89; 2nd eigenvalue= 2.19; CR= 0.89; AVE=0.68)			
Data information among internal functions are integrated	0.71	0.78	11.03
We have periodic interdepartmental meetings	0.86	0.87	16.46
We use cross functional teams in internal process improvement	0.83	0.85	15.39
There is real-time integration among internal functions	0.69	0.79	11.48
Supplier Integration (SI) (α=0.87; 3rd eigenvalue= 4.07; CR= 0.88; AVE=0.61)			
We exchange information with our suppliers through information technology	0.90	0.61	6.56
We maintain long-term relationships with our suppliers	0.77	0.73	10.35
We share our production plan with our suppliers	0.49	0.91	23.37
We share our demand forecasts with our suppliers	0.84	0.78	12.76
We help our major suppliers to improve their processes to meet our needs better	0.69	0.84	16.53

***Measurement model indices: $\chi 2/df=1.55$, $p=0.07$, CFI=0.913, RMSEA=0.102, SRMR=0.07**

[a] Extraction method: Maximum likelihood. Rotation method: Varimax with Kaiser normalization

Explained variance: 88.80%

To test the hypotheses, probit analysis was performed to compare the relationship between SCI (H1, H2, and H3), and environmental proactivity (H4) with environmental performance (Table 3). When a dependent variable has more than two categories and the values of each category have a meaningful sequential order, where a value is indeed higher than the previous one, and the data follows a normal distribution, ordered probit is the most appropriate model to use (Dey et al., 2013; Poon and MacPherson, 2005).

Table 2. Descriptive statistics and correlations

	Mean	SD	Min-Max	1	2	3	4	5	6
1. Environmental Performance	2.66	1.11	1/5						
2. Customer Integration	3.43	0.87	1.43/5	0.3226*					
3. Supplier Integration	3.62	0.64	1.80/5	0.4627**	0.5471**				
4. Internal Integration	3.68	0.63	1.75/5	0.3096*	0.5731**	0.5057**			
5. Age	3.09	0.60	1.79/4.28	0.2355†	0.3764**	0.1723	0.3657*		
6. Size	3.87	1.52	0/7.60	0.4315**	0.3350*	0.2739*	0.2312†	0.3909*	
7. Environmental Proactivity	0.49	0.50	0/1	0.1317	0.1874	0.0570	0.0734	-0.2004	-0.2282†

Significant at: † p <.10, * p <.05, ** p <.01. N= 53

Hypothesis 1 posits a direct, positive relationship between internal integration and environmental performance. However, the results do not support H1 (Coef. =0.7714, p>0.10). Along the same lines, hypothesis 2 posits a direct and positive effect of customer integration on environmental performance. On the contrary, the results do not support H2 (Coef. =-0.1337, p>0.10). Likewise, hypothesis 3 states a direct and positive effect of supplier integration and environmental performance. In this case, the results support H3 (Coef. =0.6218, p<0.01). Lastly, hypothesis 4 posits that environmental proactivity has a positive effect on environmental performance. The results support H4 (Coef. = 0.6804, p<0.05).

Table 3. Empirical results for the probit regression

Environmental Performance	
	Coef.
Age	0.2308
Size	0.3633**
II	0.0771
CI	-0.1337
SI	0.6298**
Proact.	0.6804*
Wald χ^2	25.70**
Pseud R^2	0.1664

Significant at: † p <.10, * p <.05, ** p <.01. N= 53

The only dimension of SCI having a significant effect on EP has been supplier integration. Hence, it has been used to show the relationship with environmental proactivity. To do this,

the ordered probit model has been subjected to the restriction of the level of proactivity, considered as a dichotomous while the supplier integration progressively increases. In doing so, a comparison can be made of the probability of attaining a lower (outcome=1) or higher level (outcome=4) of EP given the increase in supplier integration.

Therefore, Figure 1 shows that when supplier integration increases, the lower results of EP (outcome=1 and outcome=2) decrease, and higher results (outcome=3 and outcome=4) increase. This trend becomes more visible from the crossing of lines, indicating that supplier integration positively affects environmental performance. Likewise, Figure 2 shows the same trend in attaining higher levels of EP. However, probabilities are higher for upper levels of performances (outcome=3 and outcome=4), happening the opposite for the lower levels (outcome=1 and outcome=2). It deserves to be highlighted that the point of crossing lines in Figure 2 is achieved for a lower level of supplier integration. That is, a lower level of supplier integration is needed in the presence of environmental proactivity to attain higher levels of environmental performance. This indicates that, although supplier integration has a positive effect on environmental performance, this effect is considerably enhanced by the presence of environmental proactivity.

Figure 1. Evolution of probabilities with no proactivity and increasing SI

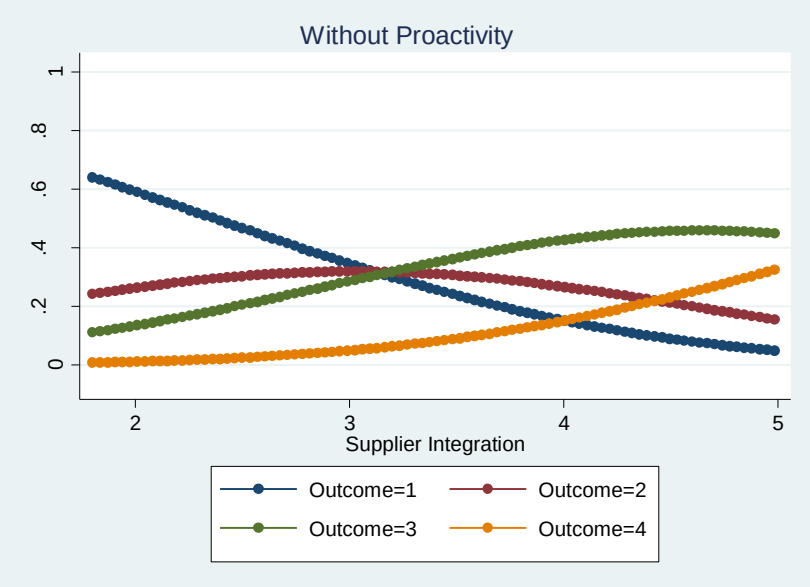
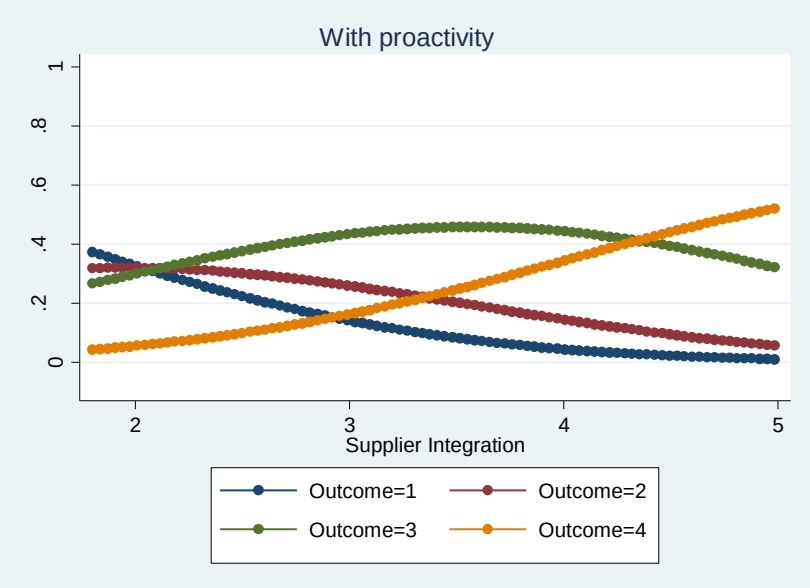


Figure 2. Evolution of probabilities with proactivity and increasing SI



Finally, age did not seem to have a significant relationship with environmental performance. It seems that in this sample, the experience, represented by the number of years the firm has operated in the market, did not play a role in contributing to environmental performance. However, the size of firms has a significant and positive effect on environmental performance. Thus, larger firms can make better use of their resources to carry out environmental activities and, at the same time, take advantage of synergies and economies of scale when deploying resources.

5. DISCUSSION

The main aim of this study was to examine the effect of SCI and environmental proactivity on environmental performance. It was argued that SCI could be considered as an enabler of environmental issues. Thus, carrying out integration within a supply chain (or being already integrated) will help firms attain better EP because they will already have developed the connections among parties and have stable communications channels.

This study provides evidence that SCI and environmental proactivity have a direct and positive effect on environmental performance. However, this effect varies when considering different SCI dimensions (internal, with customers and with suppliers).

Internal integration is considered as the first step towards external relationships and has concentrated much attention in the literature. However, when it comes to EP, those links created among departments and the stability of information flows do not affect the efficiency of environmental practices integrated within the firm. In the horticultural sector, most of the companies have no clear separation between departments. This happens regardless of their size as it is considered a cultural aspect. Thus, in most of the cases, employees belonging to different departments work in a collaborative area, working together under the same roof. Far from attaining the benefits of being fully integrated, this may go unnoticed, and be considered as a lack of strategic vision. Therefore, it is no use to be integrated if managers are not conscious of their internal relational resources. Therefore, normal development of internal integration can happen, while at the same time, resources could still be undervalued. However, when there is no proper internal alignment between departments and the firm, internal integration can be deemed to be useless as it will not reach their full potential.

However, in comparison with internal integration, supplier and customer integration have different implications because this mean working directly with external agents. This involves more complicated relationships, subject to other factors, where a single mistake may have serious consequences.

Customers are environmental evaluators of firms and ultimately responsible for transmitting consumers' requirements to firms. Bearing in mind that customers can be crucial for the competitiveness of firms, firms may feel obligated to maintain their customers' expectation about their environmental management above minimum requirements in order to be permanently accepted. However, continuously exceeding their environmental standards can have the opposite effect on EP, not only increasing inherent costs of maintaining that over-satisfaction but also generating a blurred image about their environmental objectives. This is common in the horticultural sector as previous health alarms (e.g., level of pesticides above the limit found in products in the market of destiny) have put producers under the gaze of the different stakeholders. Therefore, integration with customers is not enough as other factors might be interacting.

Integration with suppliers generates a constant flow of information that allows both parties to know better if, at any time, the other has met the requirements needed to keep working together. This can be extended to environmental requirements, where firms have to control

activities such as remanufacturing or green purchasing. Besides, along the supply chain, there is an imbalance in bargaining power, which is translated backward. Thus, as firms have higher negotiation power than suppliers, they can use it to improve those environmental product characteristics best valued by customers. Therefore, supplier integration facilitates the achievement of better environmental performance. Also, coordination of logistic flows between suppliers and the firm improves efficiency and reduces waste. Thus, improved communication through information technology can help to keep up to date with suppliers. For example, it is customary in the horticultural sector for firms to send messages to their suppliers in order to control supply flow and adapt to customers' demands.

Firms with a proactive environmental attitude have usually included environmental issues in their general strategy. In doing so, they analyze their environment trying to mitigate weaknesses and utilize their strengths to face changes. This gives them the stability needed to consider environmental goals as important as operational or financial objectives. Thus, firms with a proactive environmental profile are characterized by their constant seeking of information that takes advantage of close relationships established with supply chain partners. Although environmental criteria are growing in importance, they still tend to be viewed as secondary concerns. This means that primary operational performance criteria such as cost, quality, and delivery take precedence, often at the expense of environment-related goals and objectives (Vachon and Klassen, 2006). Therefore, this suggests that SCI influence environmental issues and not vice versa.

All of the above allow firms to maintain a strategic balance that is transmitted to employees at lower, operational levels. Therefore, lower level employees can understand the firm objectives, including environmental ones, because they perceive support from top management. In contrast, firms more prone to be reactive would not achieve those EP levels because they do not know how to anticipate changes and can only react to circumstances.

The results also indicate that no matter how long a firm has operated in the market, its ability to affect the EP is independent of its accumulative experience. This means that firms need to be in a continuous learning mode to better adapt to external exigencies. Environmental issues can be very different in nature, which makes them unpredictable. In these circumstances, its degree of novelty might be so high that firms need something more than experience to overcome them.

5.1. Theoretical implications

This study advances the literature in both SCI and environmental performance and the importance of being environmentally proactive. It contributes to clarifying some aspects of the nature of said relationships. Thus, it provides empirical evidence that SCI can be considered as an enabler of environmental performance. Also, it demonstrates that environmental proactivity is a crucial element without which results would behave differently. The first contribution is to provide and test an integrated model which incorporates different supply chain dimensions simultaneously as a collective effort.

The results enrich the understanding of the importance of maintaining a close relationship with other partners within the supply chain. Specifically, the relationship with the supplier seems to be of greater importance and sensitive to minimal changes. However, the relationship with customers seems to be more independent. Therefore, the role of SCI, although partially, is highlighted for its strategic capability to develop environmental performance.

5.2. Managerial implications

The findings of this study also have significant managerial implications that may help firms to improve the management of SCI and environmental proactivity. It contributes to the knowledge of both SCI and environmental issues. This is because it shows that SCI, together with environmental proactivity, can affect environmental performance. In the horticultural sector, this is of vital importance because of the changing regulations that become increasingly demanding. This means that managers should consider the capabilities developed with SCI to attain a better environmental performance as faster as possible. When trying to include environmental issues into the firm, it is essential to know to what extent external relationships have been developed and detect weaknesses. Given the particular characteristics of the horticultural sector, the prioritization of actions should be primarily focused on the customers' side. Also, and because of the strategic nature of SCI and proactivity, management should involve all employees in the process of attaining higher responsibility for environmental issues, and in particular those in the front line with customers. In doing so, they could take advantage of synergies derived from the establishment of steady relationships with supply chain partners.

5.3. Limitations and future research

Like all research, this study is not without limitations. The sample population, which is restricted to firms in a specific geographical area, may be a limitation. Thus, an initial extension of this research would be to replicate it in other agricultural clusters focused on other products such as strawberry or grapes, and secondly, to move it to other sectors. Of equal importance would be to go deeper into the study of the interrelation between the three critical dimensions of the SCI and its consequences on environmental proactivity and performance.

This research considers environmental proactivity as a dichotomous item and, as a result, can miss other elements that best represent the proactivity attitude. In the same way, it should analyze the EP in different ways to reveal its inherent complexity and interdependence.

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