
Supply chain integration, a key strategic capability for improving product and service value propositions: empirical evidence

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Abstract: The globalised and highly competitive business environment highlights the need for manufacturing companies to manage beyond the boundaries of the organisation. Their aim would thus be to find and improve their capabilities and thereby offer new or improved value propositions. Therefore, supplier and customer integration, in addition to internal integration, become the key enablers to develop sustainable competitive advantages. The purpose of this study is to investigate the impact of this wide view of supply chain integration (SCI) on the strategic capabilities of manufacturing companies. These capacities are different for the product- and service-based values and can be used to build an integrated value chain model. Data from 106 manufacturing companies of the Basque Country were used to test such a model. Hierarchical analysis regression was used to determine the impact of each individual SCI dimension on the capabilities for creating product and service proposed value. In addition, different supply integration patterns are considered.

Keywords: SCI: supply chain integration; product based value; service based value; empirical evidence; Basque Country; manufacturing industry; supply integration patterns.

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1 Introduction

Environmental risks, such as the current economic downturn, continuous changes in consumers’ habits and outsourcing or globalisation, increase the pressure that a company faces to continuously seek new business strategies. The evolution of customer requirements is going beyond the sell-buy, instant demand interaction among the different processes of the value chain to include product design, manufacturing, distribution and after-sale processes. The companies are moving to a complete value offer, which makes business a dynamic and highly complex field where competition between isolated companies loses sense.

The history of strategic management reveals how the limits of the business models have been expanded over time (Sandulli and Chesbrough, 2009). For many years, companies have based their business strategies on internal development, relying on the use and promotion of their own capabilities. This fact, coupled with the reactive nature of their strategies, might restrict companies’ competitiveness. Currently, there is a greater

awareness about the potential of overcoming the traditional boundaries of businesses. It is also a consequence of the natural evolution of current businesses strategies such as outsourcing and internationalisation. In this sense, manufacturing companies are getting closer to their customers and suppliers to face this new and complex environment.

Supply chain management has become an interesting field for analysing the impact of close relationships on company performance. Traditionally, supply chain management has been linked to operational efficiency. Most of the best practices and well-known techniques address the search for solutions to logistics problems such as vendor managed inventory (VMI), collaborative planning forecasting and replenishment (CPFR) and supply chain operations reference model (SCOR). The main objective pursued by this traditional approach is value creation through the efficiency in the material and information flows. However, it misses another critical issue through which companies can create value: the product characteristics, its quality and functionalities. Considering both effectiveness and efficiency, it is possible to differentiate the supply and demand chains in each company's value chain.

The objectives of this paper are as follows: first, to establish a framework that clarifies the interaction between companies regarding value creation and delivery processes; second, to measure the impact of SCI into the value creation and delivery processes; finally, to study the performance of the different patterns of SCI. On the basis of the above-mentioned considerations, we set out the following research questions (RQs):

- RQ1: What framework should be considered to create and deliver value to fulfil customer expectations?
- RQ2: What is the impact of the SCI dimensions on product- and service-based value?
- RQ3: What is the impact of the different SCI patterns on product- and service-based value?

To answer these questions, we built an integrated value framework from the value chain perspective and empirically tested this framework on field work that was developed among manufacturing companies in the Basque Country.

The paper is organised as follows. Section 2 presents the theoretical background for SCI and value creation, as perceived in the literature. This analysis leads to the definition of an integrated value chain framework (Section 3) to answer RQ1. Section 4 states the research model and hypothesis. Section 5 describes the research methodology. Section 6 provides the description and results of the field work, trying to answer RQ2 and RQ3. In Section 7, we discuss the obtained results. Finally, Section 8 presents the conclusions and future research developments.

2 Theoretical background

2.1 Supply chain collaboration and integration

Supply chain management is a key issue for the success of companies and supply chains. It involves closely integrating internal functions within a company with the external operations of suppliers and customers (Fabbe-Costes et al., 2009). Because of the focus

of this research, we define SCI as the strategic collaboration of both intra- and inter-organisational processes (Flynn et al., 2010). In addition, in the literature, ‘collaboration’ and ‘integration’ are occasionally used interchangeably. It can be said that supply chain collaboration is increasingly considered a source of competitive advantage instead of a mere source of cost reduction (Kampstra et al., 2006).

The potential benefits gained through a collaborative strategy improve the company and supply chain performance in different areas, such as customer service, revenues enhancement, operational efficiencies, flexibility and cost reductions (Fisher, 1997). Both academics and practitioners highlight the relevance of collaboration throughout the value chains. Conversely, one of the main problems regarding the supply chain collaboration issue is the lack of understanding what collaboration means (Barrat, 2004). Several research works have also noted that companies must look beyond their organisational boundaries and evaluate how the resources and capabilities of suppliers and customers can be used to create exceptional value (Allred et al., 2011). However, the existing research on supply chain collaboration does not follow common definitions (Van der Vaart and van Donk, 2008), and there is very little empirical evidence of how different collaborative dimensions simultaneously influence different types of company performance (Huo, 2012).

Supply chain relationships can be divided into two main categories: vertical and horizontal (Barratt, 2004). The former could exist as relationships with customers, within a company (across internal functions) and with suppliers. The latter could include relationships with competitors, within a company and with non-competitors. For the purpose of this paper, we focus only on vertical relationships.

The research on SCI is characterised by the diversity of dimensions from which SCI is conceptualised. Some authors investigate SCI as a unidimensional construct (Rosenzweig et al., 2003); others differentiate between two dimensions: internal and external collaboration (Allred et al., 2011) and still others consider a wider approach of internal, customer and supplier integration (Huo, 2012; Flynn et al., 2010; Boon-itt and Wong, 2011). Internal integration refers to the degree to which a company can organise internally in a collaborative and synchronised way between different departments such that the company can comply with customers’ requirements and effectively interact with its suppliers (Zhao et al., 2011). External integration refers to the degree to which a company understands its customers’ requirements and collaborates with both them and its suppliers to develop inter-organisational strategies to satisfy customers’ requirements (Flynn et al., 2010; Boon-itt and Wong, 2011).

The strategy that a company can have in terms of integrating their supply chain is singular. It may depend on the context, on its capabilities or on the objective it wants to achieve. Frohlich and Westbrook (2001), based on the external integration dimensions, defined five external integration patterns that they called arcs of integration. However, they did not consider an internal dimension.

For this study, we consider the three SCI dimensions identified in the literature: internal, customer and supplier integration.

2.2 Value creation through demand creation and demand fulfilment chains

The discussion of companies’ competitiveness usually revolves around the concept of customer value. Organisations can modify the perception of value by improving product or service performance (product functionalities, friendly use, lead time, reducing price) or

some combination of both. The value chain and the value system (Porter, 1985) explain how the value is added to the product through the supply chain, thus highlighting the role of companies' capabilities and the links between companies. Porter's value system was later extended by other researchers and practitioners to manage business operations across what they called supply and demand chains (Walters, 2008; Hilletofth and Ericsson, 2007; Hilletofth et al., 2009).

Demand chain, which is also called demand creation chain, is essentially focused on how a company can create, improve and stimulate the demand. It is aimed at increasing the value offered to the downstream chain. Following Sherman (1998), the demand creation processes comprise new product research and development (R&D), market research, marketing and sales; thus, the intellectual capital and market expenses reside in these processes. Adding to this concept, Hilletofth (2011) proposes market intelligence and branding. This view can also be considered from the Balanced Scorecard perspective and through the innovation and learning perspective (Brewer and Speh, 2000).

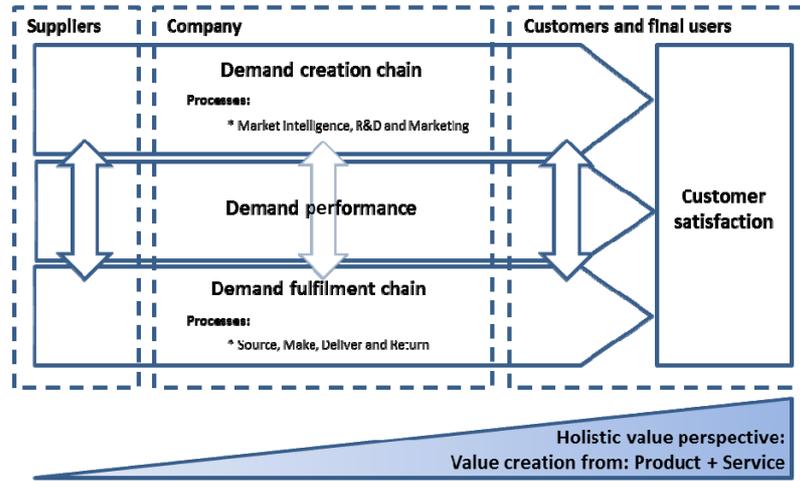
The supply chain or demand fulfilment chain is focused on the upstream value chain. It addresses the material flow, which includes procurement (source), manufacturing (make), delivering (deliver) and return (return) processes. The objective is to fulfil the customer orders satisfactorily. It involves excellent performance in all of the factors that the customer perceives, such as time and responsiveness, considering cost efficiency. Treacy and Wiersema (1993) argue that superior customer value can be delivered through operational excellence.

Although both supply and demand chain management are of fundamental importance for all businesses, one of them is usually prioritised in many companies (Esper et al., 2010). Demand-focused firms emphasise effectiveness at the expense of efficiency, whereas supply-focused firms rely on efficiency at the expense of effectiveness (Christopher and Gattorna, 2005; Jüttner et al., 2007).

3 An integrated value framework

Following the literature review and based on the value perspective, we propose an integrated value framework (Figure 1) that considers all of the above-mentioned issues: value is created from the demand creation chain and is delivered through the demand fulfilment chain. In addition, the demand performance chain should ensure harmony between the creation and delivery chains. This alignment of the approaches could be described as 'fit' in the strategic management literature.

This framework establishes a common and understandable reference point for adding value through collaborative initiatives. It clarifies the co-responsibility of the value chain companies in attending to the requirements and needs of the final customers. Thus, both demand creation and demand fulfilment chains contribute to customer satisfaction and, consequently, to business performance. This framework also gives rise to questions concerning the roles played by internal, customer and supplier integration in each chain. It is important to understand how the SCI can contribute to increasing the value created throughout the demand creation and fulfilment chains. The notion that companies should manage external and internal integration to develop competitive advantages is recognised. However, the initiatives and capabilities that they should develop to do so are not clear in the literature.

Figure 1 Value chain integrated framework (see online version for colours)

Following the proposed framework, customer satisfaction collects the success of the chains. It can be described as the customers' perceptions of how the products and services offered by the company satisfy their needs. According to this definition and the proposed framework, we can differentiate between the demand creation (effectiveness) and the demand fulfilment (efficiency) results.

Therefore, because demand creation chain is focused on effectiveness, we define three main processes: market intelligence, R&D and marketing. They should contribute to create an attractive product. The demand fulfilment chain success resides on the operations capability, focused on performing organisational activities efficiently and flexibly with a minimum waste of resources. Thus, the processes that are considered in this chain are related to materials' flows: source, make, deliver and return processes. They should contribute to service value.

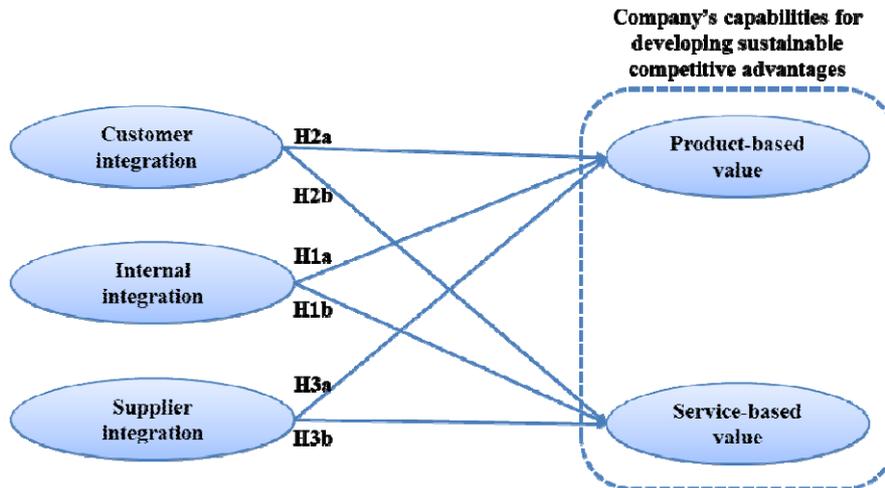
The companies' capabilities in product and service processes serve as leverage points for developing sustainable competitive advantages. The 'fit' between both chains relies on the effectiveness of the demand creation and the efficiencies of the demand fulfilment. It includes the processes that balance both perspectives to develop, deploy and manage appropriate strategies according to the customer expectations. Another important ability of this chain is obtaining real-time information to re-align the creation and fulfilment chains following market desires. Thus, the demand performance chain covers the following areas: business strategy and business performance. The decision-making processes used to re-balance the product and service chains are based on performance indicators, which are compiled through a business performance system. The development of competitive advantages is the result of how efficiently and effectively the company can respond to customer needs. The resources of the value chain should be coordinated to align demand creation and demand fulfilment chains. This performance chain is not considered in this research because the main objective of this paper is to determine the relationship between SCI and the capabilities for developing product and service value.

4 Research model and hypothesis

On the basis of the proposed framework, the next step of this study is to test the relationship between the internal and external integration (customer and supplier) with the product and service value. The ability of companies to integrate customers, suppliers and in-company functions is very difficult to replicate because of its socially complex nature and the distributed, tacit and private nature of the underlying knowledge (Krasnikov and Jayachandran, 2008). Following this reasoning, SCI can contribute to developing sustainable competitive advantages. Thus, we propose that all SCI dimensions are positively related to product and service value.

The following hypotheses are proposed (Figure 2): Internal integration is positively related to product- (H1a) and service-based value (H1b); Customer integration is positively related to product (H2a) and service value (H2b) and Supplier integration is positively related to product (H3a) and service value (H3b).

Figure 2 Research model and hypothesis (see online version for colours)



Because each company has unique SCI configurations, in this research, we also want to study the performance of the different SCI patterns in product- and service-based value. The implementation of the SCI patterns is based on the proposal of Frohlich and Westbrook (2001) for external integration strategies. This procedure applied for customer and supplier integration is also used in this paper for internal integration. The scores of each dimension were used to classify each manufacturer into the upper (75th), middle (25th–75th) or lower (25th) quartiles. The combination of the different quartiles for each supplier and customer integration results in five external integration groups: inward-, periphery-, supplier-, customer- and outward-facing patterns. Symmetric and asymmetric patterns can be defined. The symmetric patterns are the following:

- inward-facing pattern defines a company that scores lower than the 25th quartile in both customer and supplier integration
- periphery-facing pattern means that a company scores in the middle (25th–75th quartiles) in both external dimensions

- outward-facing pattern indicates that a company is highly integrated with both customers and suppliers (scores in the 75th quartile or above).

Asymmetric patterns are supplier- and customer-facing, which means that one supplier or customer (respectively) score is in the 75th quartile but that it scores lower regarding the other external dimension (customer or supplier, respectively).

Applying the same procedure to internal integration, we distinguish among low, mid and highly integrated companies.

Thus, we propose that there are significant differences in the performance of SCI patterns into the product and service value (H4).

5 Research methodology

5.1 Questionnaire design

The literature in this field was surveyed to identify valid measures and then to adapt the extant scales to measure SCI and the capabilities for improving product and service value.

Items were all measured using a seven-point Likert scale. This type of scale is commonly used in SCI studies, where higher values indicate stronger integration or better capability and performance. All of the items were adopted from the literature review.

The internal integration dimension (II) was measured by five items, and each external integration dimension (CI and SI) was measured by six items (Flynn et al., 2010; Boon-itt and Wong, 2011). To validate customer and supplier integration, we asked companies to focus only on their main customers and suppliers.

Product- and service-based values were measured by seven items each. The scales for product-based value were developed following the three processes identified under demand creation chain (market intelligence, R&D and marketing). The same approach was used to develop the service-based value scale (source, make, deliver and return). Because this was a new approach, there were no reliable and valid existing measures for these constructs; thus, we first checked the literature looking for related constructs. In addition, we proposed more items according to our observations during company visits and interviews with managers. Subsequently, we checked these proposed items with an advisory board that included both academics and practitioners.

5.2 Sampling and data collection

The data set was built from manufacturing companies in a specific Spanish region, the Basque Country. This is the third most industrialised region of Spain (in 2012, 21.7% of the gross domestic product (GDP) was generated by the manufacturing industry according to the Spanish Statistical Office data). The reason for focusing only on manufacturing firms (group C of NACE Rev.2) is that these companies should care for both product and service value. In 2013, in the Basque Country, there were 12,210 companies. Of these companies, 8333 were not considered because they employed fewer than 5 people. The population considered for this study was thus 3877 enterprises. The questionnaire was sent to companies through Basque cluster associations. A total of 106 completed responses were returned (2.7% of the population considered for this study).

The respondents come from different sectors and occupy different positions in their SC. A variety of industries have been covered, such as the aerospace sector – aero-(13 companies), automotive sector – auto-(27) and other metal industries (50), energy (5), paper (3), building materials (2), fast-moving consumer goods (1), graphic arts (2), pharmaceutical (1), electronics (1) and glass industry (1).

5.3 Reliability and validity

Content validity was supported by the previous literature, company managers’ interviews and the pre-test. To ensure the reliability of the instrument, a series of analyses was performed. First, the reliability of each construct was tested. In addition, exploratory factor analysis (EFA) was used to assess the scale unidimensionality. Then, Cronbach’s alpha was determined to assess scale reliability. Next, EFA with principal components analysis and varimax rotation with Kaiser normalisation were used to clarify the factors (Huo, 2012). Because of these analyses, some items were removed (Table 1). Once the item list was refined, the EFA results revealed that all items had strong loading on the construct that they intended to measure. Cronbach’s alpha values (Table 2) were higher than the generally agreed lower limit of 0.70 (Flynn et al., 1990). We also conducted a corrected item-total correlation (CITC) reliability test, and all values were greater than the minimum acceptable value of 0.30.

Convergent validity and discriminant validity were tested using structural equation modelling under the partial least squares method. The indicator of convergent validity, the average variance extracted (AVE), measures the overall amount of variance that is attributed to the construct in relation to the amount of variance attributable to the measurement error. AVEs above 0.5 are treated as indications of convergent validity. Thus, in our study, more than 50% of the variance of each construct was caused by their items (Table 1). Next, we analysed the discriminant validity to determine whether the constructs are different from each other. Discriminant validity is present when the variance shared between a construct and any other construct in the model is less than the variance that the construct shares with its indicators (Fornell et al., 1982). If the square roots of the AVEs are greater than the off-diagonal elements in the corresponding rows and columns in the correlations table, a construct is more strongly correlated with its indicators than with the other constructs in the model.

Table 1 Items used in the questionnaire

<i>Constructs</i>	<i>Code</i>	<i>Item description</i>
Internal integration	int1	In our company, we have a high level of responsiveness within our plant to meet other department’s needs
	int2	In our company, we have an integrated system across functional areas that allows the collection of and quick access to accurate information by all departments
	int3	Within our plant, we emphasise information flows among purchasing, inventory management, sales and distribution departments
	int4	Within our plant, we emphasise physical flows among production, packing, warehousing and transportation departments
	int5	Company managers promote collaboration between departments as a way to improve organisational performance

Table 1 Items used in the questionnaire (continued)

<i>Constructs</i>	<i>Code</i>	<i>Item description</i>
Customer integration	cus1	We have a high level of information sharing about market information
	cus2	We closely follow the comments and opinions of our main customers
	cus3	We share information with our main customers through information technologies
	cus4	Our customers provide us with information about their demand forecast key to our production planning
	cus5*	We involve our customers in our product development processes
	cus6*	We involve our customers in our process development processes
Supplier integration	sup1	We share relevant information (technical, production plan, demand forecast) with our main suppliers through information technologies
	sup2	We have a high degree of strategic partnership with suppliers
	sup3	We have a high degree of joint planning to obtain rapid response ordering process (inbound) with suppliers
	sup4	Our suppliers provide information to us about their production planning
	sup5	We involved our suppliers in our product development processes
	sup6*	We involved our suppliers in our process development processes
Product-based value	prod1*	Capability for being update with market knowledge
	prod2*	Capability for developing our brand
	prod3	Capability for developing new products
	prod4	Capability for developing improvements in existing products
	prod5*	Capability for developing quality in products
	prod6	Capability for using new technologies and knowledge
	prod7*	Capability for marketing and sales innovation
Service-based value	serv1*	Capability of the production system for being flexible
	serv2	Capability for reducing customer order response time
	serv3	Capability for delivering correct quantity with the right type of products on time
	serv4	Efficiency of our production system
	serv5	Efficiency of our inventory system
	serv6	Capability for developing accurate demand forecasts
	serv7*	Efficiency of our transportation system

*Items deleted after revision of the advisory group, pre-test and Exploratory Factor Analysis.

6 Results

6.1 Relationships between SCI dimensions and product and service value

Hierarchical multiple regression analysis was used to test Hypotheses 1–3. The results of hierarchical multiple regression analysis for product and service value are shown in Tables 3 and 4.

Table 2 Correlation and reliability analysis

	<i>CI</i>	<i>II</i>	<i>SI</i>	<i>Pv</i>	<i>Sv</i>	α	<i>CITC</i>	<i>AVE</i>
CI	(0.764)					0.756	0.526–0.613	0.584
II	0.597*	(0.806)				0.864	0.590–0.779	0.651
SI	0.514*	0.447*	(0.818)			0.876	0.671–0.773	0.670
Pv	0.462*	0.430*	0.397*	(0.810)		0.763	0.508–0.631	0.657
Sv	0.451*	0.555*	0.436*	0.469*	(0.744)	0.798	0.539–0.635	0.554
Mean	4.97	5.70	4.63	4.96	5.02			
SD	1.12	0.98	1.35	0.9	0.76			

* $p < 0.01$ (bilateral); CI: Customer Integration; II: Internal Integration; SI: Supplier Integration; Pv = Product value; Sv = Service value; α : Cronbach's alpha; CITC: Corrected item total correlation; SD = Standard deviation. Diagonal in parentheses: square root of AVE; Off-diagonal: correlations between constructs.

Table 3 Regression results for product-based value

<i>Model</i>	<i>Independent variables</i>	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
1	Constant	2.71	0.47		0.17***	–
	II	0.39	0.08	0.43***		
2	Constant	2.44	0.46		0.24**	0.07
	II	0.22	0.10	0.24*		
	CI	0.26	0.08	0.32**		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ Dependent variable: Value creation SE B = Standard error of non-standardised coefficient B and β = standardised coefficient.

Table 4 Regression results for service-based value

<i>Model</i>	<i>Independent variables</i>	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
1	Constant	2.57	0.37		0.30***	–
	II	0.43	0.06	0.55***		
2	Constant	2.42	0.36		0.34**	0.04
	II	0.35	0.07	0.45***		
	SI	0.13	0.085	0.24**		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Dependent variable: Value delivery. SE B = Standard error of non-standardised coefficient B and β = standardised coefficient.

The hierarchical regression analysis of SCI into product-based value shows that there is a direct and significant relationship between internal and customer integration into the capabilities for developing product value. Thus, this result supports H1a (significant at $p < 0.001$) and H2a (significant at $p < 0.01$), but not H3a.

Table 4 indicates that internal and supplier integration contributes to improve the model. Therefore, the results support H1b (significant at $p < 0.001$) and H3b (significant at $p < 0.01$), but not H2b.

6.2 SCI patterns

Most of the companies are classified into the low and mid internal integration levels (76 of 106) and as inward- and periphery-facing, considering external integration (86 of 106). The distribution of all of the companies in the different arcs of external integration and the three levels of internal integration is very uneven (Table 5). Discriminant analysis was run to ensure that both the external arcs of integration and the internal levels of integration were correctly classified for the SCI patterns. In both cases, the discriminant analysis confirmed that more than 90% of the respondents were correctly classified.

Owing to the limited number of cases within each of the 15 SCI patterns, non-parametric techniques were used (Kruskal-Wallis test) to determine whether there were differences in the performance between groups. Subsequently, Dunn's test was developed to specify the differences for each pair of groups.

Table 6 shows that there were statistically significant differences in product and service value capabilities between some of the SCI patterns. This partially supports H4.

Table 5 Frequency of internal and external SCI patterns

		<i>External arcs of integration</i>					<i>Total</i>
		<i>Inward</i>	<i>Peripheral</i>	<i>Outward</i>	<i>Supplier</i>	<i>Customer</i>	
Internal levels of integration	Low	21	8	0	0	1	30
	Mid	18	23	0	3	2	46
	High	3	13	5	6	3	30
<i>Total</i>		<i>42</i>	<i>44</i>	<i>5</i>	<i>9</i>	<i>6</i>	<i>106</i>

Table 6 Performance comparison between the SCI patterns into the explained variables

<i>Internal levels Capabilities of integration for:</i>		<i>External arcs of integration</i>				
		<i>Inward (1)</i>	<i>Peripheral (2)</i>	<i>Outward (3)</i>	<i>Suppliers (4)</i>	<i>Customers (5)</i>
Low	Product value	4.31 ²	5.20 ¹	–	–	4.00
	Service value	4.43	4.67	–	–	3.80
Mid	Product value	4.68	5.24	–	5.11	5.33
	Service value	4.81	5.27	–	5.40	5.20
High	Product value	4.11 ^{3,4,5}	5.02 ^{3,4}	5.93 ^{1,2}	5.61 ^{1,2}	6.11 ¹
	Service value	4.40 ^{3,4}	5.27 ³	6.16 ^{1,2}	5.70 ¹	5.66

Number in superscripts indicate the external pattern from which that group is significantly different at $p < 0.05$.

7 Discussion of results

After analysing the results, we found that four of the seven hypotheses have been supported and that another (H4) has been partially supported. Indeed, what can be concluded from the results is that internal integration is directly and positively related to both value dimensions. Nevertheless, customer integration is only significantly related to

product-based value, and supplier integration is related to service-based value. The performance analysis of the SCI patterns specified that significant differences are basically concentrated on the high level of internal integration.

Following our results, internal and customer integration leads to encourage value creation capabilities focusing on product-based value. Customer closeness and internal integration to transform market knowledge into ideas, and then into commercial products, are key aspects of business success. An increasing proportion of value creation comes from outside the boundaries of the focal company. If a company is able to establish close links both internally and with its customers, it is more likely to be immune to competitive imitation.

Service-based value is more related to the operational capability of a firm, which, without doubt, should be aligned with product strategy. It is focused on performing organisational activities efficiently and flexibly. Internal integration is, again, one of the main pillars of the demand fulfilment chain. The more integrated the internal functions are, the easier it is to identify synergies, wasted resources points and so on. Supplier integration is the second pillar in the service-based value performance. Although the contribution of customer integration is not statistically significant, it does not mean that it is not interesting. However, it makes no sense to integrate customers to improve service value while internal and supplier integration is weak. It seems that once customers establish their orders, the manufacturing company together with its suppliers should work to comply with the due date.

8 Conclusion, limitations and future research

This paper contributes to the SCM literature by proposing an integrated SC framework and through an empirical study about SCI in the Basque industry. The results are also interesting for the competitive strategy research. The model shows the relationships between the SCI dimensions and companies' capabilities for developing competitive advantages in both demand and supply chains. There are differences in the impact of SCI dimensions on the capabilities for developing product and service value (RQ2). Internal integration becomes the backbone of SCI owing to its relationship with both product- and service-based values. A higher level of integration makes external integration (RQ3) more relevant.

Although this study makes interesting contributions towards the understanding of SCI, there are some limitations and more opportunities for future research. Most respondents are senior executives who are involved in the operational, tactic and strategic decision-making processes; therefore, the data analysed are based on the companies' self-perceptive answers. Consequently, subjectivity and misunderstanding is a possibility. Additionally, it would be interesting to increase the sample size and extend it to other regions for comparative analysis. Furthermore, it would be interesting to test how these chains impact companies' performance. Further research is also needed to understand the interaction among the three SCI dimensions.

Finally, another step in this topic could be to go deeper into the processes that might be integrated under each SCI dimension, particularly in the demand creation chain.

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