

Reinventing the wheel? A critical view of demand-chain management



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ABSTRACT

Demand–supply alignment as a means for value creation in the marketplace is not a new concept either in the marketing or supply chain management literature. Recent developments in demand chain management (DCM) revamp this issue, which is particularly critical for today's firms. DCM studies, however, remain isolated from wider academic debates and are unclear on the processes required for the demand–supply alignment inside the firm, incurring the risk of becoming irrelevant. Through a systematic literature review and qualitative content analysis, we leveraged the existing knowledge on interfaces between intra-firm departments to identify the dimensions of demand–supply alignment and map the drivers, enablers and consequences of implementing such an alignment. These outcomes, together with theoretical perspectives, are used to improve the idea of DCM, ground theoretical reflections on the concept and suggest avenues for research. This study should interest researchers and practitioners willing to adopt the DCM strategy.

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1. Introduction

An emergent strand of research suggests that to face global and complex competition and deliver superior value to customers, the alignment between the demand and supply chains is particularly relevant (Esper, Ellinger, Stank, Flint, & Moon, 2010; Jüttner, Christopher, & Baker, 2007; Piercy, 2009; Rainbird, 2004). Conceptualised under the name of demand-chain management (DCM) or demand–supply chain management (DSCM), the notion is proposed as a “new business model” (Jüttner et al., 2007, p. 377) capable of providing value in today's marketplace through the combination of the strengths of marketing (i.e. effectiveness) and supply chain management (i.e. efficiency). Studies on DCM raise again a fundamental debate – the alignment between the supply- and the demand-related processes – that is at the origin of the marketing discipline itself (Bartels, 1965) and was also included in early definitions of supply chain management, as in the seminal contribution of Fischer (1997) on the “right supply chain for your product”.

Although leading back to a critical issue for today's firms, DCM studies remain highly conceptual and unclear in relation to one of its main concepts: the alignment between the supply and demand chains (Hilletofth, 2011). The literature uses heterogeneous terms and partial

definitions to represent this idea. For instance, Hilletofth (2011) suggests that DCM involves the “coordination” of demand and supply processes and argues that equal importance should be assigned to both types of processes. Rainbird (2004), in turn, proposes that an effective DCM mainly involves the “interaction” between supply and demand activities. Jüttner, Godsell, and Christopher (2006) take a customer-oriented approach to suggest that DCM relates to the “integration” of demand-creation and demand-fulfilment processes. Furthermore, there is a lack of understanding concerning the organisational efforts required to implement the alignment proposed by the DCM approach (Hilletofth, 2011; Jüttner et al., 2006), especially in relation to the internal organisation of the focal firm in a network (Rexhausen, Pibernik, & Kaiser, 2012).

Although lack of clarity in relation to key concepts may be relatively common in new strands of research, as researchers are entering new grounds, much has been written on the management of the different touch points existing between intra-firm departments that execute supply and market-related activities, namely the organisational demand–supply interfaces. The seminal work of Lawrence and Lorsch (1967) explores the need for departments to work together in order to achieve the expected performance outcomes. Since then, researchers have been exploring why two or more interfacing organisational departments should combine their efforts and how they could achieve that (e.g. Barratt & Barratt, 2011; Ellinger, 2000; Gimenez, 2006; Griffin & Hauser, 1996; Ruckert & Walker, 1987; Shapiro, 1977). Additionally, according to Corsaro and Snehota (2011), the concept of alignment is frequently associated with how individuals and work groups line up practices, interests, information, goals and behaviours.

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The extant DCM literature could therefore be neglecting rich academic developments that would help in improving and stabilising DCM conceptualisation. Existing knowledge on interfaces emerging from the studies on the relationship between departments responsible for demand and supply activities inside the company should help clarify what this demand and supply chain “alignment” proposed by the DCM approach means and how it could be implemented. Such reflections could create the means to improve the DCM notion of alignment and contextualise it into wider academic debates. Given this context, we pose the following research questions to explore the knowledge on interdepartmental interfaces: *RQ1: What are the main components of aligned intra-firm demand-supply interfaces? RQ2: What are the drivers, enablers and consequences of intra-firm demand-supply interface alignment?*

Considering “interface” to mean the point of encounter between dispersed departments, work teams, activities and subjects, we used it as the main search term in a systematic literature review of the papers that have studied the various intra-firm demand-supply interfaces. Then qualitative content analysis was employed to analyse the issues emerging from the papers collected. The data analyses provided a detailed view of the specific demand-supply interfaces so far examined in the literature and evidences linked to the critical issues associated with managing their alignment. The outcomes were synthesized into a comprehensive conceptual framework that identifies the construct of “integration” as the one summing up the heterogeneous terms used to express the demand-supply alignment. The framework also depicts the core components of integration (i.e. cooperation and collaboration) and maps the factors at play (drivers, enablers, moderators and outcomes) in integrating supply and demand departments. Reconnected to related academic debates, these research outcomes were used to expand and critically examine the idea of DCM and to ground reflections on the concept both from marketing and supply chain management perspectives.

The remainder of this paper is organised as follows. In the next section, we provide a theoretical background on the DCM literature to position the contributions of this work. A methodological section follows that presents the method used to select, sort and analyse the papers. Then, we describe the data analyses outcomes. In the discussion, research outcomes are summed up in a comprehensive framework of intra-firm departmental integration. We then reconnect our framework to related contributions in marketing and supply chain management literature to improve the DCM approach, conclude and propose suggestions for future research.

2. Theoretical background

Two different approaches to the notion of DCM have been developed: one is more oriented to supply chain management issues, and the other focuses mainly on the competitiveness resulting from the DCM strategy (Agrawal, 2012; Hilletoft, 2011).

2.1. DCM as a supply chain management approach

DCM has been defined as a specific approach to manage the supply chain (Frohlich & Westbrook, 2002). According to De Treville, Shapiro, and Hameri (2004, p. 617), a demand chain is “a supply chain that emphasizes market mediation to a greater degree than its role of ensuring efficient physical supply of the product”. In this vein, Bustinza, Parry, and Vendrell-Herrero (2013) propose that the adoption of a supply chain versus a demand chain management approach depends on the type of offering and on the level of customer involvement in the value aggregation process. A supply chain management approach is then more appropriate for product offerings that normally ascribe lower degrees of customer involvement into value production, while demand chain management is preferable when the offering also includes service aspects and customers who play a central role as value creators.

De Treville et al. (2004) also explore the advisable conditions to favour a demand or a supply chain approach and propose a typology of nine different degrees of supply chain adaptation to the demand, depending on the combinations of supply lead time capabilities and demand information transfer. Frohlich and Westbrook (2002), referring to the internet-based integration, suggest to manufacturers to focus on demand-supply integration while advice service providers to mainly focus on demand integration.

The DCM approach has also been seen as a strategy to achieve wider customer relationship management objectives when managing the supply chain. Cambra-Fierro and Polo-Redondo (2008), for instance, studying how demand chain management can affect customer satisfaction, found that adaptation to customers' needs significantly determines the level of customer satisfaction. Heikkilä (2002), scrutinizing the customer-supplier relationship, also explored how to find balance between customer satisfaction and supply chain efficiency. The author highlights positive reciprocal influence between good relationships with customers and improvements of supply efficiency: good customer-supplier relationships contribute to reliable information flows that, in turn, result in higher supply efficiency. Moreover, good understanding of customers' needs builds a good basis for fruitful cooperation between customers and suppliers, increasing the supply chain efficiency and customer satisfaction (Heikkilä, 2002). Therefore, a three-step process to overcome the trade-off between supply and demand chain focus is suggested: 1) understand customers' needs, 2) develop manageable alternative modular service offerings, and 3) improve operational efficiency involving the customer.

2.2. DCM as a means for competitiveness

DCM has also been conceptualised as the coordination between the demand and the supply processes across intra- and inter-organisational boundaries in order to obtain superior competitive advantage (Hilletoft, 2011; Jüttner et al., 2006, 2007; Rainbird, 2004). Most of these studies have been devoted to definitional aspects of DCM, aiming to identify its constituent dimensions and positive contributions, especially to competitive advantage. In this vein, Hilletoft (2011) conducted a literature review to clarify the conceptualisation of DCM by determining its constituting elements, benefits and implementation requirements. Concerning the definition of DCM, he identifies that some core relevant aspects characterising DCM are: market orientation, coordination of demand and supply processes, equal importance assigned to demand and supply processes, and the contribution of both supply and demand chains to value creation, differentiation, innovativeness, responsiveness and cost-efficiency. Concerning the main DCM benefits, the author proposes that DCM leads to enhanced competitiveness, demand chain performance and supply chain performance. Finally, the main requirements for implementing DCM include organisational competences, demand-supply chain collaboration and information technology support.

Jüttner et al. (2006), in turn, refer to the alignment theory and define DCM as the alignment between demand-creation processes (domain of marketing) and demand-fulfilment processes (domain of supply chain management) in order to develop superior customer value, and deploy resources efficiently. Similarly, Rainbird (2004) argues that DCM mainly involves the interaction between the departments of the supply and demand chains. Accordingly, the author pinpoints that DCM is not just a particular kind of supply chain, but involves the dynamic interaction between demand and supply and its link to competitive advantage. In his own words: “The best factory in the world is useless if it is producing the wrong product. The best innovation is worthless if it cannot be implemented. Competitive advantage can however be spawned by excellence in either supply chain processes or demand chain activities, or of course preferably both” (Rainbird, 2004, p. 249).

2.3. Some issues to be addressed

Although both approaches have their differences (see Table 1), two issues can be raised about the DCM literature. First, there is a lack of clarity on what it means to align the supply and demand chains or on how to find balance between customer needs and supply chain efficiency. For instance, Jüttner et al. (2007) talk about the need to manage the organisation of the “working relationships” between the marketing and supply chain areas, while Rainbird (2004) focuses on the “interaction” between the areas. Hilletoft (2011) then explores the implementation of “coordination” between activities and the “synchronization” of demand and supply processes. Authors raise attention to the notions of alignment, coordination, integration, interaction and relationships between the two chains, but do not explore in detail the differences between these concepts and how they interrelate. The term “alignment” in itself is rather broad and has been used in the literature to refer to different aspects (Corsaro & Snehota, 2011). According to Corsaro and Snehota (2011), some researchers have explored the alignment of actors’ cognitive representations, perceptions, and interpretations of the business contexts, while others focus on the alignment of practices, interests, information, knowledge systems, goals and behaviours. The latter-mentioned research focus resembles the idea of alignment raised by the DCM literature, which, however, does not build on this existing knowledge.

Second, as Hilletoft (2011, p. 207) identifies, there is a “large gap between the concept and the application of DSCM”. Few studies focus on the DCM implementation issues. The notion of “chain”, for instance, is intrinsically linear and neglects reflections on the complexity and dynamism of contemporary productive systems, as identified by the investigations on networks of the IMP group. Furthermore, little is known on how the alignment between processes and people working at the demand-supply interfaces can be achieved. Hilletoft (2011) contends that demand-supply chain integration must be obtained first internally in the company and then externally with customers and suppliers, but does not explore how this could be achieved and how difficult such endeavour might be. Even Jüttner et al. (2006), who discuss the organisational consequences of their DCM model, argue that more research on implementation issues is still needed.

Therefore, we still lack a clear view on how the alignment between the demand and supply chains can be defined. More knowledge is also needed on the enablers, drivers and consequences of implementing a closer relationship among these multiple supply and demand departments that interface to deliver value to customers. Misunderstanding these issues might limit the adoption of the DCM approach, which brings back to the table a fundamental idea of the marketing and supply chain management fields – the need to align supply processes with market needs. It would then be difficult to know if DCM could really be a fruitful competitive strategy (Jüttner et al., 2007) and lead to the creation of value for customers (Rainbird, 2004). Although the DCM concept is relatively new, much has been written on the demand-supply “interface(s)” inside the firm. We therefore conducted a systematic review of this literature on interfaces and used qualitative content analysis to create knowledge that could help improve the DCM approach, as described next.

3. Methods

The systematic literature review method, originated in medical science and widely applied in management studies (Cook, 1997; Tranfield, Denyer, & Smart, 2003), was employed to select a representative sample of the published material on interfaces in a structured, transparent, and reproducible manner. Qualitative content analysis (QCA) was then used to analyse the textual material and synthesize its important topics and concepts (Cullinane & Toy, 2000). Content analysis can be quantitative and qualitative. Both involve the systematic codification and analysis of textual data (Hsieh & Shannon, 2005), but the former aims to quantify the appearance of categories throughout the text, while the latter comprises the interpretation of the underlying themes associated with these categories (Abbasi & Nilsson, 2012). QCA thus maintains the systematic nature of content analysis without requiring researchers to count codes and perform quantitative analyses (Mayring, 2004). It enables a detailed description of a phenomenon of interest, through the creation of categories and conceptual models (Elo & Kyngäs, 2008), leading to theory development. QCA therefore enabled us to obtain a better understanding on the concept of “alignment” and insights on the critical issues associated with the management of demand-supply interfaces. The main aspects of our methodology are described next.

3.1. Systematic literature review: the selection of published material

A systematic literature review was employed to select the sample of texts used in the research. Systematic literature reviews involve an extensive and rigorous search for texts in relevant research outlets (Tranfield et al., 2003) and, as such, allowed for the identification of a wide array of relevant sources on our subject of interest. Even so, the sample selected is based on convenience, because text units were selected due to their availability (Abbasi & Nilsson, 2012). Our search for the texts was conducted in four well-established databases: EBSCO, PROQUEST, Emerald and Science Direct.

Given our research questions, we searched for texts on interfaces between supply and demand departments. We restricted the search to scientific journals, because textbooks, working and conference papers, and Internet articles may go through less rigorous review processes. Such measure is commonly employed in systematic literature reviews (see Wolf, 2008). Also, only peer-reviewed management journals with impact factor in 2011 were selected. We opted to limit the search to journals of the management field because the term “interfaces” has been used in different areas, such as electronics and computing (e.g. Hoffman, 1990), to refer to other types of interfaces than interfaces between processes, people or departments. In addition, we did not specifically look for terms such as “alignment”, “coordination”, “interaction” or “integration”, which have been used in the DCM literature, because they provided a high number of hits unrelated to theme of the study. We also wanted to leave room for the emergence of different relevant aspects related to the interface between supply- and demand-related departments. Table 2 lists the papers selected in each journal.

The next step was to select the unit of analysis, which is the piece of text that includes the content to be analysed and can be a word,

Table 1
DCM characteristics: evolution of the approach.

DCM conceptualisation and main issues debated	DCM as a supply chain management approach	DCM as a means to achieve competitiveness
Prevailing interpretation	A demand-oriented approach in managing the supply chain	The integration between the demand chain and the supply chain
Relationships focused	Inter-company i.e. customer-supplier dyadic relationships	Intra- and inter-company relationships
Aspects debated	Advisable conditions to adopt the approach e.g. degree of service aspects included in the offering; lead time and demand information transfer capabilities	Requirements to adopt a DCM, i.e. organisational competences such as market orientation, coordination/integration
Benefits identified	The supply chain performance, e.g. market responsiveness, flexibility	The value chain performance into the market, i.e. competitive advantage, supply chain performance and demand chain performance

sentence, paragraph, section or even an entire item, e.g. book, chapter, or paper (Cullinane & Toy, 2000). Because we wanted to learn more about how the different authors conceptualised the alignment between the different interfacing areas and what they found out in their studies about the implementation of such alignment, we decided to use the paper as the unit of analysis. In this way, our unit of analysis was aligned with the research questions (c.f. Elo & Kyngäs, 2008) and also enabled the collection of demographic data on the extant research analysed.

An initial search for papers was conducted combining the word “interfaces” with the general terms “demand” and “supply”. This search returned a very high amount of papers of low relevance. After some preliminary analysis of this search results, we decided to restrict our search to papers that explored the interface between at least one supply- and one demand-related department. Based on the results of these initial searches, we considered that the “Marketing” and “Sales” departments would represent the demand side, and the operations management departments would represent the supply side. This led us to start our search with the terms “interface and marketing and operations”. Then, we carried similar searches with the words “sales” instead of “marketing” and “purchasing”, “manufacturing”, “production”, “logistics” and “supply chain” instead of “operations”. These search terms cover the main departments responsible for demand and supply activities. The search was limited to the title and abstract of the papers. Only full-text papers in English were selected. No time frame restrictions were set to obtain a historic view of the field.

The abstracts of these papers were then carefully examined to identify the articles that were about the interfaces between supply- and demand-oriented departments. When it was not possible to assess if the paper fitted the scope of the study just based on the abstract, the introduction and the literature review were also analysed. At this stage, we counted 106 papers whose references were scanned to identify other relevant references; this snowball procedure was repeated until no more relevant papers were found and led to the selection of 15 additional papers. The amount of papers selected per journal in each of these stages can be found in Table 2.

3.2. Content classification

In QCA, content classification involves the selection of the categories (codes) in which data will be classified and the definition of the coding scheme, which contains instructions on how to classify the text (Abbasi & Nilsson, 2012). We defined two groups of categories to analyse the

data. We created categories aimed at understanding the general characteristics of the papers, such as the year of publication, the type of journal, the main object of the study, the theory of reference (if any), the methodology employed, the industry and country of the empirical analysis (if any). Then, the main set of categories was established based on the research questions. We listed the specific type of interface analysed and the level of analysis employed in the paper, the concepts associated to the notion of “alignment” and the measures adopted to represent these concepts. The drivers, enablers, barriers, effects and moderating variables of the alignment of intra-firm interfaces were also categories analysed.

Based on these categories, a coding scheme was defined, which contained the specification of the codes, the possible variations that could be categorized under the same label and some decision rules on how to code papers (c.f. Wolf, 2008). Subsequently, the two authors used this coding scheme to classify the same ten papers. The results of the analysis were compared and some improvements were made to obtain a final version of the coding scheme, which is presented in Table 3. Once the coding scheme was defined, the 111 remaining papers were divided in two sets and each researcher classified one set of papers. During the coding process, we further eliminated 46 papers. This occurred either because the papers were not specifically about any demand-supply interface or because they did not specifically cover how the two areas were interrelated. The final dataset contained information on 75 papers which covered aspects of at least one demand-supply interface. At the end of the coding process, the researchers compared their results and solved eventual doubts that emerged during the process.

The following aspects of our classification process ensured the quality of the data collected (c.f. Wolf, 2008). We defined clear categories and coding rules, tested the coding scheme with a pilot sample of papers and analysed differences between the coders in order to increase the reliability of the coding process. The following measures were also taken with the objective of increasing the data validity (c.f. Wolf, 2008). We used the research questions to define the categories of analysis, fine-tuned categories during the coding process, and used human-coders instead of computers because our categories were difficult to capture without detailed analysis of the text. At the end, the researchers discussed the classification of each paper together and made eventual alterations. These efforts therefore led to the classification of the different papers in a similar way by both researchers and to the collection of data that represents the predefined categories. In this

Table 2
Papers' origin and stage of collection: papers per journal in each stage of the collection process.

Journals	Selected in key-term search	Selected in snowball process	Selected in total	Excluded	Analysed
Industrial Marketing Management	19	0	19	2	17
Journal of Operations Management	16	0	16	5	11
Journal of Product Innovation Management	10	0	10	0	10
Journal of Marketing	6	0	6	1	5
Journal of Business Logistics	10	0	10	5	5
International Journal of Physical Distribution & Logistics Management	10	0	10	5	5
Journal of the Academy of Marketing Science	4	0	4	0	4
International Journal of Operations and Production Management	4	0	4	0	4
Management Science	3	11	14	11	3
International Journal of Production Economics	2	0	2	0	2
Journal of Management Studies	1	0	1	0	1
OMEGA	1	0	1	0	1
Harvard Business Review	0	2	2	1	1
European Journal of Marketing	1	0	1	0	1
Journal of Services Research	1	0	1	0	1
International Journal of Production Research	2	0	2	1	1
Transportation (Journal)	1	0	1	0	1
Journal of Supply Chain Management	1	0	1	0	1
Organisation Studies	1	0	1	0	1
Other Journals	13	2	15	15	0
Total	106	15	121	46	75

Table 3
Coding scheme: categories used to obtain information from each paper.

Categories	Definition and possible variations	Decision rules
Year of publication	Year of publication	**
Type of journal	Marketing, operations or management perspective	**
Study objective	Aims of the paper and/or research questions	**
Methodology	Conceptual, qualitative, quantitative or mixed methods	**
Theory of reference	Key theory or theories used to explain the idea of interface	List theory (ies), even if only cited in the paper
Industry	Industry(ies) in which the study was carried out	**
Country	Country(ies) in which the study was carried out	**
Type of interface	Type of demand-supply interface studied in the paper, e.g. marketing-manufacturing	List all interfaces explored in the paper
Level of analysis	Interface among internal departments, firms, processes, people	Select any units of analysis used in the paper
Interface definition	How the author(s) have conceptualised the idea of interface and related concepts	Select any definition that is associated with "interface"
Interface measures	Scales used to measure the concept of interface and associated concepts	Select any scale used to measure the interface concept if presented as a cause, classify as motivation; otherwise, classify as enabling factor
Drivers	Factors driving the management of interfaces	**
Limiting factors	Factors making the management of interfaces difficult	**
Enabling factors	Factors facilitating the management of interfaces	**
Effects	Consequences of managing interfaces and/or the relationship between the management of interfaces and performance	**
Moderators	Factors that make the relationship between the management of the interface and its effects stronger or weaker	**

research report, we also tried to be as transparent as possible about our content selection and coding process, so that our efforts could be replicated (Cullinane & Toy, 2000).

3.3. Data analysis

The files with the content created by both researchers were then merged and four analyses were conducted. The first one studied the main features of the sample of papers collected in order to get an overview of the literature on demand-supply interfaces and associated concepts. Graphs and tables were created to identify the amount of papers published on the subject per time period, to discover the different methodological perspectives adopted in the literature, to uncover the main interfaces studied and to explore in which settings research on interfaces has been conducted (e.g. country, industry). The second analysis focused on the different dimensions of the notion of "alignment". Afterward, we explored the factors that enabled or hindered the interactions between the departments working together at the interface and the contextual factors, e.g. cultural or environmental issues that influenced the interaction between the parties. The final analysis consisted of evaluating the possible performance outcomes of the interactive efforts at the interfaces and the factors that moderated these relationships. In the four analyses, we compared results across the different interfaces mapped to understand how, if at all, our results changed depending on the interface being analysed. Combined, these four analyses led to the results presented next.

4. Data analysis outcomes

We start this section with an overview of the literature on interfaces between supply- and demand-related departments. Then, the main concepts associated with the idea of interface between these departments are presented. Last, the key issues involved in managing these interfaces are described.

4.1. A first look at the literature

The historical distribution of articles in the last forty years shows an increasing interest on intra-firm demand-supply "interfaces" in the literature, especially since the new millennium (see Fig. 1). This growth in number of publications is also due to the fact that two special issues have been devoted to the theme since then (Journal of Operations Management, n. 20, 2002; Industrial Marketing Management, n. 38, 2009).

The papers selected came mainly from the marketing and operations management fields, but 20% of studies analysed belonged to other areas of the management field. Although the focus on intra-firm "interfaces" is equally distributed since the beginning across Marketing, Operations and other Management journals, each stream of literature has privileged the exploration of specific interfaces: in the managerial studies the "Marketing-Manufacturing" interface is mainly focused on

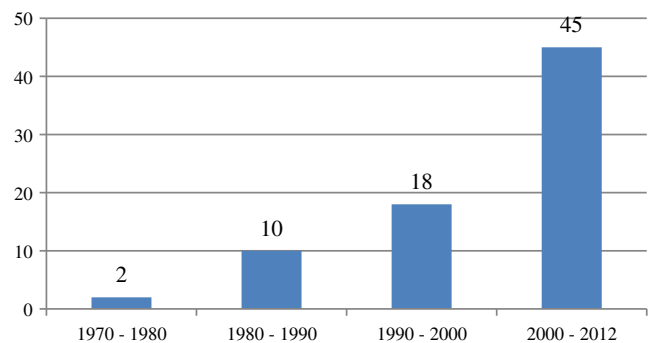


Fig. 1. Evolution of publications: articles by decades.

(Balasubramanian & Bhardwaj, 2004; Chen, Calantone, & Chung, 1992; De Ruyter & Wetzels, 2000; Eliashberg & Steinberg, 1987; Shapiro, 1977); studies published in operations journals similarly concern the “Marketing–Manufacturing” interface, but also examine the “Marketing–Logistics” (Ellinger, 2000; Gimenez & Ventura, 2005; Langley & Holcomb, 1992; Lynagh & Poist, 1984; Mollenkopf, Gibson, & Ozanne, 2000; Murphy & Poist, 1996) and the more general “Marketing–Operations” interface (Boyer & Hult, 2005; Sawhney & Piper, 2002). In marketing journals, the demand–supply interfaces most debated are “Marketing–R&D” (Dunn & Harnden, 1975; Gupta, Raj, & Wilemon, 1985a,b, 1986; Song & Thieme, 2006; Souder, 1981), “Marketing–Supply Chain” (Jüttner et al., 2007) and “Marketing–Purchasing” (Bals, Hartmann, & Ritter, 2009; Guercini & Runfola, 2011; Ivens, Pardo, & Tunisini, 2009; Sheth, Sharma, & Iyer, 2009; Smirnova, Henneberg, Ashnai, Naudé, & Mouzas, 2011). Despite these differences, a common trend is a department-level analysis, internal to a single company, and an examination of a dyadic interface, one marketing-based and one operations-based. Only seven articles in the 75 analysed adopt a triadic perspective and only six articles also involve players external to the focal company (see Fig. 2).

Regarding the objective of the paper, all studies refer to the same general problem of alignment between the supply and demand departments, which is then viewed from different angles and contextualised in many diverse situations. Souder (1981), for instance, provides a set of possible managerial solutions to reduce R&D/Marketing disharmony. Calantone, Dröge, and Vickery (2002), investigating the marketing–manufacturing interface, revealed that marketing knowledge of manufacturing and its credible communication will result in better individual relationships and functional relationships. In the same vein, Song, Kawakami, and Stringfellow (2010) examine the effects of senior management policies on the effectiveness of the marketing–manufacturing interface. Other papers link the discourse on demand–supply interface to a more strategic necessity for integration required to face present competitive contexts and increase firm performance (Hausman, Montgomery, & Roth, 2002; Piercy, 2009; Sheth et al., 2009). In many studies, interface management is invoked in the context of its beneficial effects to specific areas, especially for the success of New Product Development (NPD) projects (Brettel, Heinemann, Engelen, & Neubauer, 2011; Dunn & Harnden, 1975; Song et al., 2010; Zhang, Hu, & Kotabe, 2011), the improvement of distribution processes and supply chain management (Gimenez, 2006; Min & Mentzer, 2000), and the increase in customer value (Jüttner et al., 2007; Mollenkopf, Frankel, & Russo, 2011).

An additional feature associated to the set of articles is the prevalence of empirical and quantitative studies (see Fig. 3). When indicated, the field of empirical studies concerns almost exclusively manufacturing industries involving industrial equipment manufacturing (e.g. machinery and electronics, aerospace, chemicals and energy) and consumer packaged goods manufacturing (food and beverages, footwear and apparel,

tobacco, and cleaning products) with many studies providing diverse compositions from both fields. Only a couple of studies explore service providers.

Regarding the theoretical frameworks, a clear reference to a sound theoretical framework is missing in almost half of the contributions considered in this review. The ones that do use a theoretical framework draw on Contingency Theory (e.g. Lawrence & Lorsch, 1967; Thompson, 1967) or on its subsequent developments, such as the Configuration Theory (Mintzberg, 1979) and the Resource Dependency Theory (Pfeffer & Salancik, 1978). Other theories are only occasionally used, as in the case of the Cumulative Capability Theory (Ferdows & De Meyer, 1990), the Resource Based View (Penrose, 1959) or Slater's (1997) Customer Value-Based theory. Last, most of the empirical studies have been conducted in the United States and European countries (see Fig. 4) and little attention is dedicated to the emergent economies.

4.2. Alignment and related concepts: the dimensions of integration

The raison d'être for approaching the study of demand–supply interfaces is taken for granted in most of the research reviewed. In line with the theories employed, a main concern is related to the changes occurring in the environment external to the company, which require a corresponding change and adaptation inside the organisation (Piercy, 2009; Sheth et al., 2009). The imperatives for organisations of being increasingly innovative, traceable, adaptive and faster to respond are anchored in dramatic market changes. Technology and reverse marketing have led to shorter than ever life-cycles, and uncertainty is extremely higher due to the global dimension of competition, sourcing and demand (Park, Lee, Zhou, & Kim, 2011). Against this scenario, integration between functional areas is invoked as a solution, not only for manufacturing activities (that are helped by automation), but also for “solution-oriented” and “built-to-order” productive processes.

In this literature, the concept of integration is commonly used to represent the idea that the different departments need to work together to achieve better outcomes. Different terms and concepts are used in the literature to signify and objectify what integration is. Alignment seems to be just one aspect of integration. Going through these definitions, we identified five main constituent concepts: Interaction, Exchange, Alignment, Mutuality, and Cooperation.

A first necessary condition to the existence of an integrated interface is the presence of interaction between the parts. With the term “interaction”, we refer here to the opportunities of simple encounter between the two parties. Maltz and Kohli (2000), for instance, refer to physical proximity as one of the possible integrating mechanisms to reduce conflict between work teams and departments, emphasising also that the likelihood of being in contact with the counterpart is a prerequisite for integration. Similarly, Menon, Jaworski, and Kohli (1997) indicate connectedness (i.e. “the extent of interaction between individuals”, p. 188) as positively affecting interdepartmental interactions. In the same vein,

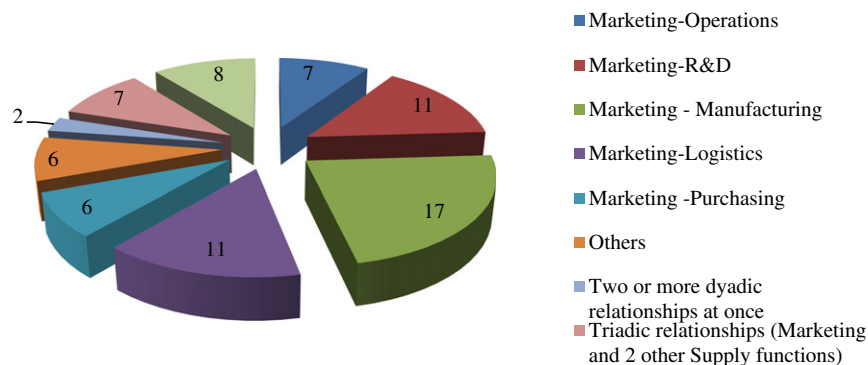


Fig. 2. Interfaces explored: distribution of articles by type of interface focused.

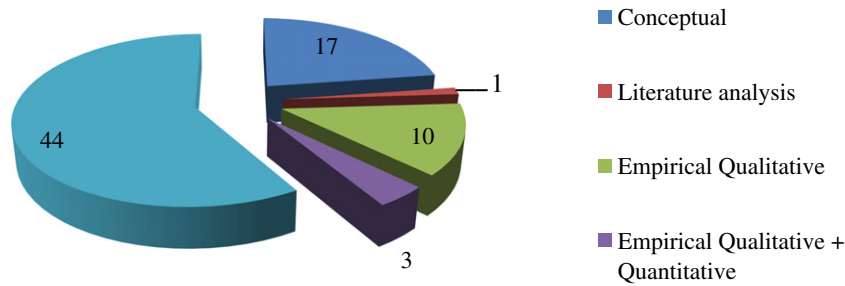


Fig. 3. Research orientation: distribution of articles by type of research.

Bals et al. (2009) include in the concept of interaction many examples of contact and conversations (e.g. committees, e-mails, meetings, phone conversations). All these practices are not considered for the quality or the content of the communication established, but just as clues signaling “moments of touch”. Measures of the integration, such as the frequency of communications (Brettel et al., 2011; Hutt, 1995) or the absence of noise and obstacles in information transference (De Ruyter & Wetzels, 2000) also refer to this aspect. In summary, according to the literature, the more likely, frequent and numerous the contacts, the higher the possibility of integrating the demand-supply interface.

Establishing a contact, however, represents only a first step toward integration; a second dimension that we found among the different meanings attributed to the concept of an “integrated interface” is exchange, which can deal with the interchange of resources (Hutt, 1995; Park et al., 2011; Ruekert & Walker, 1987) and/or information (Brettel et al., 2011; Ellinger, Daugherty, & Scott, 2000; Guercini & Runfola, 2011; Hutt, 1995; Park et al., 2011). Another aspect that associates diverse definitions of integration is alignment, which relates to the exigency of reducing dependencies or differences especially between the diverse processes involving the interface (Cooper & Budd, 2007; Gattiker, 2007; Gupta et al., 1986).

Two other concepts emerged from the analysis of the interpretations given to an integrated interface: mutuality and collaboration. We found the importance of bi-directional attitudes and behaviours to increase the integration of the interface in many studies. According to Fisher, Maltz, and Jaworski (1997), the reciprocity of communication for mutual adjustments increases the integration between marketing and engineering departments. Finally, collaboration emerges as another possible characteristic of an integrated interface. By collaboration, scholars generally mean putting together efforts, building mutual understanding, and sharing visions and goals (Kahn, 1996). Teamwork is generally presented as the main route to collaboration (Ellinger et al., 2000; Maltz & Kohli, 2000; Shaw, Shaw, & Enke, 2003).

The five concepts depicted are reported in Table 4 and follow a sequence: in the first situation, the interface is coincident with the mere encounter between the parts; in the second case, there is an exchange of information or resources; in the third concept, because of interdependences and differences, the two entities line up; in the fourth

case, a bi-directional (mutual) engagement is established. In the final situation, the parts build together their opinions, share decisions, elaborate projects, and work together with reciprocal respect and positive attitude. These five concepts seem to refer to two more general dimensions: one of coordination and another of cooperation. In the first three cases, which are more closely associated with the idea of coordination, the efforts made to meet, to exchange and to line up are merely process-based and focused on the achievement of particular aims. In the last two concepts, we identified the notion of “mutuality” and the idea of a common space, which encloses common information, representations, tools, objectives, and strategies. They represent the idea of cooperation. These two dimensions combined represent the broader idea of integration.

4.3. Implementing integration at the interfaces

The integration effort, concretised in the five aspects and two dimensions identified, was a recurrent topic in the papers analysed and represented the main challenge pinpointed by authors in any kind of demand-supply interface investigated. Independent of the type of interface and the reason of its existence, the work teams operating at the interface need to integrate their efforts to achieve the desired outcomes (Lawrence & Lorsch, 1967), i.e. they need to coordinate their activities and cooperate. Authors have explored the drivers and modes of integration as well as the factors that enable integration (i.e. cooperation and coordination) between work teams and the relationship between integration and performance outcomes. These issues are summarized in Table 5 and then further explored.

4.3.1. The drivers of integration

In reviewing the papers, it was possible to classify the drivers of integration in three classes: process uncertainty, environmental uncertainty and inter-departmental differences. A closer look at these factors indicated that they are the issues that lead people at interfaces to work together. The first two categories refer to issues that render processes more difficult to manage and, therefore, people of different departments cannot easily control them without coordination. The last one refers to intrinsic differences between functional departments, which make the

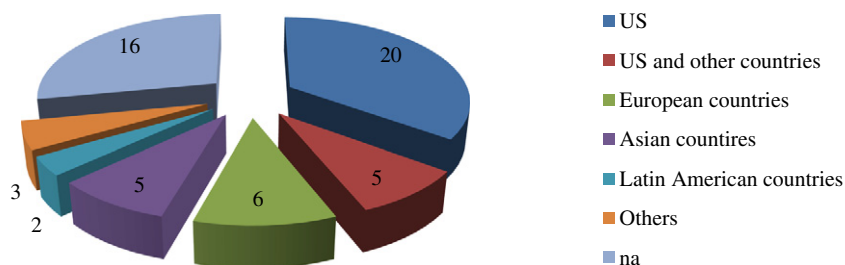


Fig. 4. Countries of study: distribution of empirical articles by countries.

Table 4

The five concepts and two dimensions related to integrated interfaces.

Coordination			Cooperation	
Interaction	Exchange	Alignment (line up because of)	Mutuality	Collaboration (parties' shared aspects)
<i>Communication practices</i> → frequency, formalization, challenges (Brettel et al., 2011; De Ruyter & Wetzels, 2000; Hutt, 1995)	<i>Exchange of information</i> (Brettel et al., 2011; Ellinger et al., 2000; Guercini & Runfola, 2011; Hutt, 1995; Park et al., 2011)	<i>Interdependency</i> → processes dependency on other processes' tangibles, decisions and information, & simultaneity of projects and interests	<i>Reciprocity</i> → bidirectional communication, mutual adjustment and commitment, perception of the other party's sophistication and capabilities	<i>Resources</i> → information, tangibles (e.g. technological platform, people), and intangibles (e.g. knowledge, effort)
<i>Structural elements</i> → physical proximity (Maltz & Kohli, 2000; Menon et al., 1997)	<i>Exchange of resources</i> Exchange of resources exchange frequency, exchange volume, resources quality (Hutt, 1995; Park et al., 2011; Ruekert & Walker, 1987)	<i>Differences</i> → in processes, practices, representations, and aims (Cooper & Budd, 2007; Gattiker, 2007; Gupta et al., 1986)	<i>Bi-directional relationship quality</i> → relationship strength, parties' coerciveness, parties' satisfaction level (Fisher et al., 1997; Kahn, 1996)	<i>Representations and values</i> → mutual understanding, consensus on decisions and problems, culture
<i>Physical encounters</i> → frequency of meetings (Bals et al., 2009)				<i>Representations of the future</i> → goals, visions, programmes
				<i>Responsibility</i> → decisions, tasks, actions, implementations, outputs
				<i>Attitudes</i> → respect, trust, appreciation, stress on informal aspects
				<i>Behaviours</i> → Conflicts (Ellinger et al., 2000; Maltz & Kohli, 2000; Shaw et al., 2003)

cooperation between them necessary. Many authors used contingency theory (e.g. Lawrence & Lorsch, 1967; Thompson, 1967) as the main theoretical background, and this is probably the reason for the identification of these three categories.

Certain process characteristics create the need for integration across interfaces. Based in many instances on the work of Thompson (1967), some authors have proposed that the interdependency between departments, i.e. the extent to which one work team depends on the other to execute its tasks (Thompson, 1967), is a key driver of the need for coordination between the parties (Menon et al., 1997; Oliva & Watson, 2011; Ruekert & Walker, 1987). The need for coordination also increases when the activities executed require the exchange of knowledge, are more variable and uncertain and have outcomes difficult to predict (Griffin & Hauser, 1996; Ruekert & Walker, 1987). Authors also mentioned that environmental uncertainty, resultant of demand uncertainty, capacity constraints and market turbulence, increases the need for departments to work together (Calantone et al., 2002; Cooper & Budd, 2007; Gupta et al., 1986; Mollenkopf et al., 2011; O'Leary-Kelly & Flores, 2002). Process and environmental uncertainty thus require firms' employees to face challenges together.

The third driver is based on the work of Lawrence and Lorsch (1967), because it refers mainly to the differences between departments that hinder their interaction. Authors mention many differences between departments, such as work orientations (structured as in manufacturing or flexible, as in new product development), cultures, priorities, languages, goals, norms, reward systems, thoughts of the world and structures (Fisher et al., 1997; Gimenez & Ventura, 2005; Griffin & Hauser, 1996; Hutt, 1995; Jüttner et al., 2007; Shapiro, 1977). These differences cause people to think in different ways and value some things over others, leading work teams to isolate themselves, think in terms of "them versus us", and try to maintain their individual power. The communication between the departments can also be difficult if they use different terms, IT systems, and types of information (Ellinger, Keller, & Hansen, 2006). Combined process uncertainty, environmental uncertainty and interdepartmental differences create the need to integrate

the people working at the interfaces and the processes they are in charge of.

4.3.2. Actions to stimulate integration

The data analysis also pointed out that there are many mechanisms to stimulate a close integration between the areas. Their aim is to solve the problems caused by process uncertainty, environmental uncertainty and interdepartmental differences. Some mechanisms are better suited to coordinate the execution of processes. Others are better to make people in different departments collaborate and work together. Again, the comparison of these actions across the interfaces suggests that they can be used to manage any interface.

The actions to stimulate process coordination involve the use of meetings, cross-functional teams, committees and other communication methods, e.g. documents, systems, emails, and phone calls (Bals et al., 2009; Brettel et al., 2011; Ellinger, 2000; Ellinger et al., 2000; Gimenez, 2006; Gimenez & Ventura, 2005; Gupta & Wilemon, 1988; Hutt, 1995; Kahn, 1996). They increase the exchange of information and knowledge between the parties. In this way, both sides can share their needs and explain what they need from each other. There is also the opportunity for mutual adjustment, if any point is not clear, and development of understanding of the other party's limitations (Fisher et al., 1997). In addition, the areas can solve problems and conflicts together and, in this way, reach better solutions than would be possible if they were working separately (Ruekert & Walker, 1987). These actions are taken to guarantee that processes will run as smoothly as possible.

Actions for cooperation, on the other hand, are taken to stimulate the creation of an identity among the people in different work teams. The creation of joint goals and reward systems was widely cited in the papers (Brettel et al., 2011; Hutt, 1995). Authors also suggested the use of socialization programmes and informal encounters in order to stimulate respect, empathy, trust and commitment among employees (De Ruyter & Wetzels, 2000; Shaw et al., 2003; Souder, 1981). The idea is to make individuals become friends and aware that they should work together. In this way, they can also develop a sense of mutual achievement and take mutual responsibility for failure.

Table 5
Integration implementation: drivers, enablers and outcomes.

Constructs	Definition	References
Integration drivers	Process interdependence	Extent to which one work team depends on the other to execute its tasks
	Process uncertainty	Extent to which activities are variable, uncertain, and have unpredictable outcomes
	Environmental uncertainty	Changes in customers' needs; Demand uncertainty; Market turbulence
	Departmental differentiation	Differences in departments' work orientations, cultures, priorities, languages, goals, norms, reward systems, thoughts of the world, structures and IT systems
Integration implementation	Coordination actions	Use of meetings, cross-functional teams, committees and other communication methods, e.g. documents, IT systems, emails, phone calls
	Cooperation actions	Use of joint goals and reward systems, socialization efforts and informal encounters
Implementation enablers	Commitment	Motivation to implement practices and belief that benefits will result from them
	Managerial Support	Top management supporting resource allocation and partnering strategies
	Information and communication technology (ICT)	Use of technology to enable interaction between areas
Integration performance outcomes	Departmental performance	Improved R&D and SCM processes; Reduced innovation time to market, NPD costs, process costs and inventories; Increased new product penetration, accuracy of forecasts, service levels, operations flexibility and speed, customer satisfaction, repurchase intentions
	Interdepartmental performance	Improved relationship between parties; Increased feeling of relationship worthiness; Smooth communication flows
	Firm performance	Increased returns on investments, returns on sales, returns on assets, market share, sales revenues, companies' prosperity, profits; Reduce costs and time to breakeven
Performance moderating factors	of departmental performance	Speed of market changes; Environmental complexity; Dependency on other areas resources
	of interdepartmental performance	Level of functional identification of individuals
	of firm performance	Firm size; Type of strategy adopted; Level of firms' internal conflict

4.3.3. Integration enabling factors

Our analysis also revealed some factors that enable a smoother implementation of actions for coordination and cooperation. For example, departments that have commitment and a cooperative philosophy tend to implement coordination and cooperation actions more easily (Murphy & Poist, 1994). Because the implementation of these actions demands parties to dedicate time and other resources to the interaction and to the coordination of activities, both sides must be committed to the implementation of the practices and believe in the benefits that will result from it. Managerial support is also an important enabler (Mollenkopf et al., 2011; Murphy & Poist, 1994; Song, Montoya-Weiss, & Schmidt, 1997; Song et al., 2010). The support and encouragement from the higher administrative levels are important, because they can guarantee that resources will be allocated to the integration strategies. Authors also suggested that top management should participate in and supervise the implementation of integration strategies. The implementation of coordination and cooperation actions is also facilitated when work teams are co-located, because it is easier for people to hold meetings, engage in informal conversations, socialize and develop an identity with each other. Finally, firms can use information and communication technology to facilitate the communication between the interacting parties (Hutt, 1995).

4.3.4. The relationship to performance

The final stage of the analysis consisted of evaluating the performance implications of the integration between departments. It seems that departmental integration can improve the operational performance of departments, the relationship between them and the performance of the firm. For the three types of performance, authors identified factors that moderate the relationship between the implementation of coordination and cooperation actions and the gains they can yield.

According to some authors, the implementation of the before mentioned actions can improve the performance of R&D processes and the supply chain and, at the same time, bring additional benefits for customers (e.g. Green, Whitten, & Inman, 2012; Griffin & Hauser, 1996; Mollenkopf et al., 2011). Integration can improve the outcomes of the new product and service development process by reducing time to market (Griffin & Hauser, 1996; Swink & Song, 2007), helping items to be developed within budget (Brettel et al., 2011), increasing success rates and product performance (Song et al., 1997, 2010), and expanding products' market penetration (Park et al., 2011). When it comes to the operations side of it, researchers showed that departmental integration can reduce process costs and inventories (Green et al., 2012). It can also increase the flexibility of the operation (Jüttner et al., 2007), the accuracy of forecasts, the service levels offered to customers (Barratt & Barratt,

2011), and the speed of delivery (Sawhney & Piper, 2002). The implementation of coordination and cooperation actions may also increase customers' satisfaction, the value they see in acquiring the offering and their repurchase intentions (Boyer & Hult, 2005; Mollenkopf et al., 2011; Parente, Pegels, & Suresh, 2002). The moderating variables identified for these relationships were: the speed of market changes, the complexity of the environment in which firms operate, firms' culture, and the dependency the departments have on each other's resources (Bals et al., 2009; Chen et al., 1992; Gattiker, 2007; Menon et al., 1997; Ruekert & Walker, 1987; Song et al., 1997, 2010).

Other authors have evaluated how the implementation of integration contributes to a closer relationship among departments. Most of the authors that investigated this issue were able to confirm that actions for coordination and for cooperation yield the benefits expected. Authors identified that these actions improve the relationship between the parties (Ellinger, 2000; Rainbird, 2004), increase the feeling that the relationship is worthy (Ellinger et al., 2000), smooth communication flows (Fisher et al., 1997), and make the parties more responsive to each other's requests and expectations (Hutt, 1995). The only moderating variable identified in these situations was the level of functional identification of individuals with their work team (Fisher et al., 1997).

Last, authors were able to verify a positive relationship between interdepartmental integration and firm performance. Apparently, integration can increase returns on investments (Brettel et al., 2011; O'Leary-Kelly & Flores, 2002; Song et al., 1997, 2010), returns on sales, returns on assets (Song et al., 1997, 2010), market share (Brettel et al., 2011; Lai, Yeung, & Cheng, 2012), sales revenues (Park et al., 2011), companies' prosperity (Shapiro, 1977), and profits (Hausman et al., 2002). It can also reduce costs and time to breakeven (Brettel et al., 2011). The authors that considered the moderating variables of this relationship pointed that the intensity of the relationship can vary depending on the firm size (Paiva, 2010), on the type of strategy adopted (O'Leary-Kelly & Flores, 2002) and on the level of internal conflict the firm needs to manage (Song et al., 1997, 2010).

5. Main contributions

So far, we reviewed the literature on interfaces between supply and demand departments and synthesized the main insights obtained from the literature review and from the qualitative content analysis in Tables 4 and 5). The present section depicts the main contributions of this work. It advances the DCM idea of alignment between the supply and demand chains, proposes possible theoretical angles DCM could adopt, and provides suggestions for managers willing to adopt such a strategy. Similar to any research, this work has its limits. The main one is that restraining our search to certain databases and to peer-reviewed journals with impact factor might have omitted some relevant knowledge. In addition, qualitative content analysis is inductive and depends on researchers' backgrounds and knowledge (Abbasi & Nilsson, 2012) and so our analyses of the papers may have taken particular routes. For these reasons, to contribute to the DCM approach, we draw not only on the main contributions and limits identified in the literature review, but also on the limitations of our own research and on theoretical ideas and points of view developed in related fields of inquiry.

5.1. Theoretical contribution to the DCM conceptualisation: a summary framework

Based on the outcomes of our research, we propose a framework (see Fig. 5) that provides a vivid summary of the main results of our literature review and, at the same time, brings to the table three central ideas to develop and substantiate the concept of DCM and inspire new empirical studies.

First, our framework proposes that integration is the focal concept in making two departments to work together. Moreover, it specifies two dimensions of integration: the coordination of the interfacing processes and the cooperation between the areas responsible for these processes. Departments can implement different actions to coordinate their interfacing processes (e.g. the use of meetings, cross-functional teams,

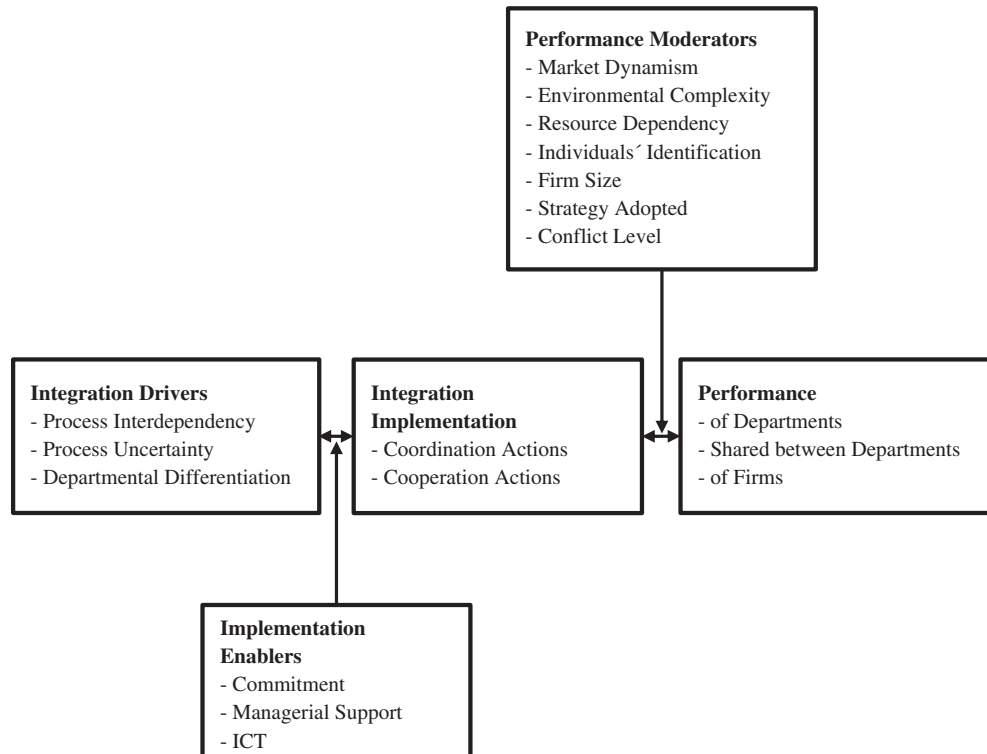


Fig. 5. Integration between interfacing departments: definitions and implementation challenges.

committees and other communication methods) and to enable cooperation among the work-teams responsible for them (e.g. implementation of joint goals, shared reward systems and socialization efforts). The DCM notion of alignment is embedded in and refined by this definition, because coordination and cooperation efforts lead to alignment between the parties. The concept of integration proposed here thus can, and should, be used to reduce the lack of clarity in relation to the multiple and overlapping concepts used in the DCM literature.

Additionally, the framework indicates conditions for integration in intra-organisational and inter-departmental contexts which has been considered the primary condition for sustaining wider demand-supply integration beyond companies' boundaries (c.f. *Rexhausen et al., 2012*). The level of integration between interfacing departments is associated with process uncertainty, environmental uncertainty and differences between the departments executing the activities. If processes are difficult to manage and work teams depend on each other to control the workflow, interfaces should be managed more closely. More integration should also be necessary when departments have different orientations, cultural backgrounds, and working structures and when markets have uncertain demand patterns and are dynamic. Given the need for integration, employees' commitment, top management support and use of ICT can enable a smoother implementation of integration initiatives. The issues just raised suggest that the integration of multiple supply- and demand-oriented departments, as proposed by the DCM literature, is not always warranted. Integration needs are associated with intrinsic features of processes and departments and this aspect needs to be considered in future DCM research.

Finally, the framework offers insights on the impacts of integration on performance. According to the literature, actions to increase interdepartmental cooperation and coordination are associated with better operational outcomes for departments and to increased firm performance, but there are some contextual factors that moderate these relationships. The moderating factors mapped in the literature are listed in the framework, but others might be possible. Such positive outcomes might also result from the implementation of the DCM approach. However, as implementing integration involves several efforts, the DCM literature needs to consider to what extent firms can actually handle the complexity involved in simultaneously integrating multiple internal supply and demand departments and still obtain positive returns.

5.2. Theoretical contribution to the DCM conceptualisation: new theoretical angles

According to our analysis, one of the major elements hampering further developments in the literature on demand-supply interfaces is the weak and limited theoretical field of reference, a part from the Contingency Theory. The DCM literature seems to be going in the same direction. We therefore identify in this section underlying, but unexplored theoretical connections, which can possibly increase our understanding of demand-supply chain interfaces and contribute to the development of the DCM concept.

First, even if not explicitly developed in the literature, we identified some underlying theoretical connections in the interface literature to organisational learning theory. The twofold conceptualisation identified in the literature analysed, differentiating between coordination and cooperation, bonds the theme of integrating interfaces with organisational learning literature, in which the same distinction has been debated (*Dillenbourg, Baker, Blaye, & O'Malley, 1996; Roschelle & Teasley, 1995*). Evidence of this linkage can be found in the words of *Dodgson (1993, p. 378)*: “the need to learn is the requirement for adaptation and improved efficiency in times of change”. The two exigencies, adaptation and efficiency, correspond to the main demand and supply chain objectives and to the contending “market-driven” versus “efficiency-driven” representations of the firm traced in marketing and supply chain management views. Based on organisational learning theory, we could then propose that the companies need to learn how to integrate

the different departments and, as such, the implementation of DCM is path-dependent and based on processes of trial and error. For these reasons, companies with greater stocks of knowledge and experience in integration across departments and the network may find it simpler to adopt the DCM approach.

Another theoretical concept that can be more directly associated with DCM is “market sensing” or “market orientation”. “Market sensing” is the organisational capability to learn about the market and diffuse this knowledge to be acted across spanning processes inside the firm (*Day, 1994*). *Narver and Slater (1990)* defined “market orientation” as a threefold concept composed by the ideas of customer orientation, competitor orientation, and inter-departmental coordination. The inter-departmental dynamic plays “a key role in influencing the dissemination of and responsiveness to market intelligence” (*Kohli & Jaworski, 1990, p. 15*). The market-orientation concept thus seems to inspire the DCM idea of merging the demand and supply chain in a value-catalyst generator (*Rainbird, 2004*). This becomes clear in the words of *Jüttner et al. (2007, p. 387)*, who stated in their DCM study that “more research is needed which looks at how companies can translate their market-sensing skills and the ability to develop new customer value propositions into structural adaptation requirements for the supply chain”.

The same critique applied to the “market sensing-orientation” notion can then be extended to the DCM approach. According to these two perspectives, it is possible to obtain higher value in the market by aligning internal processes and competencies to external customers' needs. However, as emphasised by some scholars, this neat proposition becomes difficult to accept if we consider that markets are not simply static environments external to companies, which can be mapped and learned, but rather dynamic entities actively shaped by firms (*Araujo, 2007; Geiger, Kjellberg, & Spencer, 2012*). Drawing on this idea, it would be possible to challenge the actual DCM concept and interpret it not just as the supply chain alignment to the external context but rather as a dynamic way of positioning firms' activities in the market and manage the continuous interplay between firm's and other actors' activities.

The use of the organisational learning and marketing making perspectives to analyse the DCM concept provides evidence of some of its shortcomings and offers hints on sound theoretical frameworks to draw on in future research. These and other theoretical lens should therefore be used to position the DCM concept into wider academic debates.

5.3. Managerial implications for companies

Our outcomes can also orient managers interested in the DCM approach. More specifically, our research shows that the integration of functional departments involves the coordination of the processes and the cooperation among the departments responsible for these processes. To integrate the two chains, therefore, companies need to synchronize and coordinate simultaneously all processes involved in managing markets, addressing customers' needs and delivering products and services to customers. People in charge of these supply and demand processes need to have continuous interaction and create opportunities for mutual adjustment in order to minimize incoherencies among the interfacing processes. Equally important is the establishment of shared goals, beliefs, cultures and responsibilities among all the work teams responsible for executing these processes. All these departments also have to maintain significant communication, information and resource flows among themselves.

Companies therefore will need to completely eliminate all internal functional silos and work with “boundary-less” processes and a unified vision. This would require a systemic effort from the company. Because interdepartmental integration requires the adoption of different practices, such as the creation of cross-functional teams and committees, the extensive use of meetings, and the development of joint reward systems and socialization programmes, the DCM approach would probably

require firms to implement simultaneously multiple measures to manage the processes and departments associated with all the supply and demand activities. Top management support, commitment among the work teams, and the use of IT systems would probably help, as they do for dyadic integration. However, given the higher complexity levels of multiple departments' integration, firms may need to invest heavily in these enablers, if they want to use DCM.

Furthermore, defenders and adopters of the DCM approach need to consider how the complexity and dynamism of contemporary productive systems influence the integration of the multiple demand and supply departments. As supported by the network approaches to markets, developed by the IMP group, businesses are made up of web of relationships that span across different organisations and involve the interaction of actors, resources and activities (Ford, Gadde, Håkansson, & Snehota, 2006). The notion of formal demand and supply departments that have well-defined activities and interactions between actors, a perspective associated with the idea of "chain", does not always apply to reality. On the contrary, actors have multiple bonds (Håkansson & Snehota, 1995) and the boundaries of supply and demand networks overlap and dynamically change (Hertz, 2006). In this sense, companies strategize "in" and "through" the network in which they are embedded. As such, as actors implementing integration actions interact and exchange resources with external parties, the integration of multiple internal departments should be, and probably is, dependent on and complicated by the ever-changing relationships of companies with network partners. Therefore, managing the network of partner is fundamental to implement DCM.

In addition to being rather complicated, the full integration of multiple internal supply and demand departments may be costly. Individuals have to put their regular activities on hold to engage in meetings, committees and projects and may incur travel expenses. Additionally, although ICT reduces the administrative costs of integration (Mortensen & Lemoine, 2008), there are costs associated with putting systems in place (Humphreys, McIvor, & Cadden, 2006), training employees to use the systems (Skjoett-Larsen, Thernoe, & Andresen, 2003) and integrating new systems with the different software already in use in the firm (Giachetti, 2004). Constant flows of investment are also needed to achieve higher integration levels (Flynn, Huo, & Zhao, 2010; Koufteros, Rawski, & Rupak, 2010; Mishra & Shah, 2009). As such, managers should explore if, and to what extent, their customers value the customization and flexibility that the DCM approach can render.

The "good news" is perhaps that the integration among all supply and demand departments is a matter of degree, rather than always highly warranted or needed, as suggested by the DCM approach. As represented in our conceptual framework, integration is associated with the level of environmental uncertainty, process uncertainty and departmental differentiation. This could also be the case when it comes to the supply and demand chains integration, an issue that needs to be investigated in future research. If so, companies with more horizontal organisational structures and simpler operations trading in relatively stable markets may operate well even if supply and demand departments are not fully integrated. Managers should therefore consider the levels of environmental uncertainty, process uncertainty, and departmental differentiation in order to define the level of demand-supply integration needed.

6. Concluding remarks and future research avenues

Our research outcomes refine and show the complexity of the idea of alignment (integration) between the demand and supply chains proposed by the DCM approach (Esper et al., 2010; Jüttner et al., 2007; Piercy, 2009; Rainbird, 2004). They also indicate that implementing the DCM approach is an arduous task and that high integration levels are not always needed and advisable. Firms can incur positive outcomes if they use integration between demand and supply chains with

discretion. In these ways, our study addresses recent calls for research (see Hilletoft, 2011; Jüttner et al., 2006).

More research is now needed to evaluate the extent to which our inferences apply to the integration of multiple demand- and supply-chain departments and expand our results. Such studies should prioritize empirical research, because to this point, most of the DCM literature remains highly conceptual. Moreover, rich academic debate is necessary to improve the theoretical bases of the DCM approach. Another fruitful avenue for research would be exploring how the activities and resources of actors of the network would influence the adoption of the DCM approach. More research is also needed to identify other drivers of DCM integration. Our framework explored firm-related drivers. Future research could explore how customers' willingness to pay would influence the level of integration chosen by the company and identify in more detail other market-based drivers of integration. In a similar line, research could further understand if DCM is really a matter of degree and, if yes, which are these warranted levels of integration. Such a line of inquiry would create a means for managers to decide how to allocated resources to DCM.

Researchers could also explore situations in which firms would benefit more from using the DCM approach to improve our understanding of the topic. For instance, researchers interested in the sales of "solutions", i.e. customised combinations of products and services that address specific customers' requirements (Nordin & Kowalkowski, 2010), point out that high cross-functional integration within the firm (Storbacka & Nenonen, 2009) and close interaction among the provider, the customer and their network of partners (Cova & Salle, 2008) are necessary conditions for offering successful solutions. Analysing such contexts could provide fruitful insights into how the DCM approach could be implemented and what its outcomes would be. Last, researchers could explore how our results could contribute to other scenarios in which DCM might be interesting. For instance, according to the special issue on "Integrating marketing and operations for business sustainability" recently published in this journal (2014, Volume 43, Issue 1, Pages 1–176), in order to become more involved with issues of sustainability, marketing activities should strongly integrate with operations. In this vein, the insights developed in our study could serve as the starting point for deeper developments on DCM contributions to business sustainability.

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