

Co-creation with customers and suppliers: an exploratory study

Debora Bettiga and Federica Ciccullo

Department of Management, Economics and Industrial Engineering, Politecnico di Milano, Milano, Italy

Abstract

Purpose

Co-creation along the New Product Development (NPD) seems the winning approach in nowadays market. This work explores the collaboration and interaction flows between suppliers and customers in co-creation initiatives devoted to new product development.

Design/Methodology/Approach

After developing a classification of demand-side and supply-side involvement in co-creation along the NPD process, 13 cases of co-creation in the consumer goods industry, within the Italian context, have been analysed.

Findings

Three patterns of co-creation have been identified: (i) supplier-driven approach: companies co-creating with suppliers in multiple NPD phases, while involving customers only in one (ii) customer-driven approach: companies involving customers in multiple phases, while engaging suppliers only in one and (iii) firm-driven approach: companies involving both customers and suppliers in one single phase. Further, the locus of relevant knowledge drives to different co-creation approaches.

Research Implications

The work contributes to extant literature by: (i) providing a classification of demand-side and supply-side involvement in NPD (ii) empirically investigating the interaction flows between customers and suppliers in co-creation initiatives along the NPD (iii) highlighting the factors potentially affecting a concurrent involvement of customers and suppliers in NPD

Practical Implications

Our findings can help to efficiently and effectively design and manage the relation with both suppliers and customers in co-creation projects devoted to new product development.

Originality/Value

The involvement of suppliers and customers in co-creation initiatives has been so far analysed only separately in literature. This study opens a new stream of research, stressing how the evolution of the market, toward a more participative one, spurs the need to investigate the collaboration and interaction flows between the two actors.

1. Introduction

New Product Development (NPD) process has become more and more participative. According to the Service-Dominant logic (SDL, Lusch & Vargo, 2006), customers and suppliers are both resource integrators and both are involved in the co-creation of value (Cova and Salle, 2008), through joint, interactive, collaborative and reciprocal roles in a relationship (Vargo, 2009). All actors co-create value through resource integration, in an actor-to actor fashion (Vargo and Lusch, 2011). The locus of value creation and value extraction for a company lies in the interaction between networked, empowered and active customers (Prahalad and Ramaswamy, 2004) as well as in the integration of capabilities that suppliers can put in new product development (NPD) projects (Cadden and Downes, 2013). A collaboration between all stakeholders can not only create value, but also expand and enlarge it for all participating individuals (employees, customers, suppliers) in a more win-win fashion (Ramaswamy and Ozcan, 2014). The Process of Co-creation, as defined by Ramaswamy & Ozcan (2014) is “*the practice of developing offerings through ongoing collaborations with customers, employees, managers, and other stakeholders*”. This process implies a collaboration among all stakeholders, through engagement platforms, what has been recently defined as “*The co-creation paradigm*” (Ramaswamy and Ozcan, 2014). This new view of the value creation process implies a passage from a resource-based view of the organization to a co-creation based view, where resources are shared among multiple stakeholders, and from resource allocation to resource leverage, including suppliers and customers resources, to create an extended enterprise (Ramaswamy and Ozcan, 2014). The Dialogue-Access-Risk-Transparency (DART) model (Prahalad and Ramaswamy, 2004) depicts the elements companies should develop for a successful integration, and thus co-creation, with stakeholders. For

an efficient and efficacy development of a shared solution, all participants must become equal and joint problem solvers. Dialog should be centred on issues of interest to both and should be made possible through transparency and access to information. Reflexivity of information is crucial as it enables feedback, hence dialogue, between stakeholders while access is essential to gain information about others experiences, needs, and thoughts.

Despite the potential benefits deriving from the joint involvement of all stakeholders, even a cursory review of literature (e.g. Hoyer et al., 2010; Lusch, 2011; Sunil Kumar and Routroy, 2016) would highlight that customer involvement and suppliers' involvement in NPD have been generally analysed separately, while much lower emphasis has been put so far in the reciprocal role of these two processes, their possible interaction and consequences. This is a severe limit to literature for a twofold reason: on the one hand, it is reasonable to assume that customer co-creation implies severe challenges to supply chains, in terms of personalization required by final customers, sometimes proposing unfeasible or complex concepts. This, of course, could be extended to the case in which co-creation is on the supply-side and generates opportunity for demand-side co-creation. Research has not provided reliable managerial guidelines to manage such a situation. On the other hand, the Service Dominant Logic suggests that co-creation depicts networked innovation, and that the outcome of a networked process is different from the sum of the outcomes of single processes (such as supply-side and demand-side involvement in NPD).

For this reason, in this paper, we aim to explore the mode of involvement of customers and suppliers and their mutual effect on NPD projects. More specifically, we would like to contribute to extant literature by: (i) developing a classification of demand-side and supply-side involvement in NPD (ii) empirically investigating the interaction flows between customers and suppliers in co-creation of the offer (iii) analysing the factors potentially affecting a concurrent involvement of customers and suppliers in NPD. We will perform it by analysing 13 cases of co-creation, within the Italian context.

2. Literature Review

2.1 Co-creation with customers in the NPD

In the co-creation paradigm the 'single-inventor perspective' is replaced by a knowledge flow (inflow and outflow) among stakeholders (Bogers and West, 2012). Products,

services and experiences are developed jointly by Companies and their customers (Ramaswamy, 2009) through collaboration that extends beyond organizational boundaries and integrates entities external to the firm (Sawhney et al., 2005).

Co-creation can happen at different stages of the NPD process, from need analysis and idea generation to product test and launch. In the first case, companies collect information from the customers to better understand their needs. Here the customer can play the role of both voluntary or involuntary source of feedbacks and ideas for the firm, generating a reciprocal learning process (Hoyer et al., 2010; Prahalad and Ramaswamy, 2004). Companies can take advantage of this interaction to generate new offers or to modify an existing product using inputs from customers. Further, customers may be involved in the evaluation and selection of ideas among multiple alternatives; in this way, the company gives the customer decision-making power on the output of the NPD and therefore more control over the process (Hunton and Price, 1997; Ogawa and Piller, 2006). In a third stage, the customer can be an active part in product design and development integrating its resources, in terms of time, effort, skills and knowledge in business processes (Auh et al., 2007; Larsson and Bowen, 1989; Moeller, 2008). He can be finally included in the product test and in the launch of the offer to the market. In this way the customer assumes the role of "partial employee" and works for the company, providing a contribution to the improvement of business performance (Lengnick-Hall et al., 2000; Macdonald et al., 2011).

The availability of resources and time and the opportunity given by a win-win collaboration are important factors determining customers' involvement. Above that, technical knowledge of the customer may have a great impact on the propensity to participate in these business processes (Etgar, 2008; Shin, 2007). Above the benefits of such involvement, co-creation initiatives may be also risky for firms: customer participation may increase employees' job stress and hamper their job satisfaction (Chan et al., 2010). Alignment of cultural values between customers and firm employees could facilitate such creation of value (Chan et al., 2010). Further, co-creation may evoke negative reactions and opposition from the customers to firm proposals and initiatives and the risk of public attacks, detrimental for the company image (Gebauer et al., 2013).

2.2 Co-creation with suppliers in the NPD

In different industries, customers are not the sole co-creator of value. In industries like

textiles or equipment for example, suppliers are considered the main sources of innovation and market knowledge (Kim and Wilemon, 2002). Under other conditions, suppliers are involved early in the NPD process in order to anticipate potential problems, such as unfeasible design and contradictory specifications (Mishra and Shah, 2009). Overall, the importance of supplier integration and collaboration along the NPD process has been acknowledged in research (Cadden & Downes 2013; Kumar & Routroy 2016). The answers to questions about the best timing and mode to involve suppliers during the NPD process is not necessary “early” and “intensively”, it can most of all be contingent upon supplier - customer relationship (Le Dain et al., 2010). In a broader view, indeed, suppliers can bring key resources as capabilities, investments, information or ideas (Le Dain et al., 2010; Echtelet et al., 2007).

The timing and the scope to involve suppliers in a NPD process may vary. Suppliers might incorporate their know-how from the “fuzzy front end” of the process (Kim and Wilemon, 2002) by proposing technologically advanced and technically feasible ideas, so that their capabilities are incorporated from the very beginning of the project. Suppliers can then be involved in the next phases of the NPD process (i.e. product design and development) to take decisions regarding product architecture which are connected with sourcing decisions and constraints (Le Dain et al., 2010). Moreover, in case for example of highly innovative products, supplier involvement can be crucial also during the production of the first item (i.e. product launch phase) to support with expertise the supervision of the first product launch embedding new ideas and expediting the process by preventing problems (Song et al., 2011). The level of design responsibility (i.e. involvement intensity) assigned to suppliers can be informal (i.e. white box involvement), formalised with a joint development (i.e. grey box involvement) or shifted to suppliers with buyers providing performance specifications (i.e. black box involvement) (Petersen et al., 2005).

Beyond the benefits of an involvement of suppliers in co-creation of the offer, it should be highlighted that several constraints and risks exist as well. A relevant constraint may be the ability to transfer knowledge between the supplier and the customer and to convert them into terms and concepts that are meaningful for the other (Cavusgil et al., 2003). The risk of knowledge spillover or losing core competencies are other inevitable consequences of transfer (Squire et al., 2008) and require a certain level of trust between the supplier and the company to enable information exchange (Inkpen, 2000). Diverse languages, cultures and coding schemes between suppliers and business customers might

act as constraints (Gemünden et al., 1996), as well as the risk to become overly dependent on customers and to face higher development costs (LaBahn and Krapfel, 2000; Walter, 2003).

2.3 Joint co-creation with customers and suppliers

In both supply chain management (SCM) and marketing literature very few are the empirical contributions on the joint involvement of customers and suppliers and on a more co-creative view of the NPD process. Researches on co-creation with customer and supplier involvement in the NPD process appear to have grown apart (Ylimäki, 2014). Most of the literature on co-creation incorporates the supplier point of view, identified with the provider of goods who are co-designed or co-produced with customers (Payne et al., 2009; O’Cass and Viet Ngo, 2012). Thus, extant research focuses on the direct interface between the offer provider and the customers (i.e. a dyadic perspective), not considering instead the upstream level (i.e. suppliers of the company having the direct interface with final customers and proposing the product development) (Ylimäki, 2014).

On the SCM side, the area of partial overlap with the topic of co-creation with customers is represented by supply chain strategy segmentation (Godsell et al., 2011). The research stream developed around this topic does not refer specifically to strategy for supplier involvement, but to the broader definition of supply chain strategy. Supply chain strategy segmentation refers indeed to a differentiation of the supply chain strategy conceptualization and developed as a result of the understanding of different customers’ expectations on the required service level (Godsell et al., 2011) and therefore of different customers’ buying behaviors (Christopher et al., 2005). Juttner et al. (2010), for example, claim that the role of companies should be to direct the unique characteristics and capabilities of suppliers towards the target customer segments, consistently with a company value proposition. A branch of this literature (e.g. Kalaignanam & Varadarajan, 2006) boosts the customer’s centric perspective even further, claiming that a supply chain strategy segmentation should be carried out on the basis of the intensity of customer involvement in the co-creation process.

Looking more specifically on supplier involvement, the focus in the literature has been on the mode, intensity and timing of integration of capabilities that suppliers can put in NPD projects (Johnsen, 2009). In particular, when it comes to the “mode” of involvement, contributions in the literature discuss the importance of the organisational solutions to

facilitate it (e.g. Twigg, 1998). In defining cross-functional teams for example authors refer to team comprising members of internal functions as well as external actors as suppliers and customers (Boyle et al. 2014; Koufteros et al. 2005). Nevertheless, collaboration during NPD process has been investigated separately looking at supplier involvement, customer involvement and cross-functional involvement as three separated organizational practices (Mishra and Shah, 2009). Studies on cross-functional teams grouping different functions inside the same organisation focus very much on the study of the barriers to be overcome, as for example the silos view of internal departments (Boyle et al., 2014). Supplier and customer involvement are studied as two different determinants of good NPD performance (e.g. Mishra & Shah 2009) and, to the best of our knowledge, just in rare cases (Koufteros et al. 2005) scholars look at possible interactions between the two. Hybrid approaches are also possible, as the alignment between “boundaries spanning” functions as purchasing and marketing and customers and suppliers respectively (Piercy, 2009). This means involving the purchasing point of view in the customer relationship management processes led by the marketing function, as well as to involve the voice of the customers into the supplier relationship management processes led by the purchasing function (Piercy, 2009). However, despite the co-creation paradigm conceives co-creation as a mutual dependence relationship among all stakeholders, the company, customers and suppliers, a comprehensive and truly participative approach of this whole set of actors is still under-investigated.

2.4 Influencing factors for joint customers and suppliers involvement

In order to ensure so-called “seamless” activities among suppliers and customers (Juttner et al, 2010) and a joint problem solving focus (Prahalad and Ramaswamy, 2004), the Service-Dominant logic literature (Lusch, 2011), the participative innovation literature (Chesbrough, 2006) and the classic literature on decision making related to innovation (Von Hippel, 1994), claim the importance to bring to a single “locus” (physically or virtually) all the needed information and capabilities by the different parties. Moreover, Von Hippel (1994) argues that this joint decision making is influenced by the extent to which an actor has relevant information and capabilities and by the extent to which there are difficulties in transferring those information and competences, constituting key operant resources (Lusch and Vargo, 2006), to other parties involved in the decision

making process¹. This point acquires even more relevance when this knowledge is put at stake for a “super co-creation entity”.

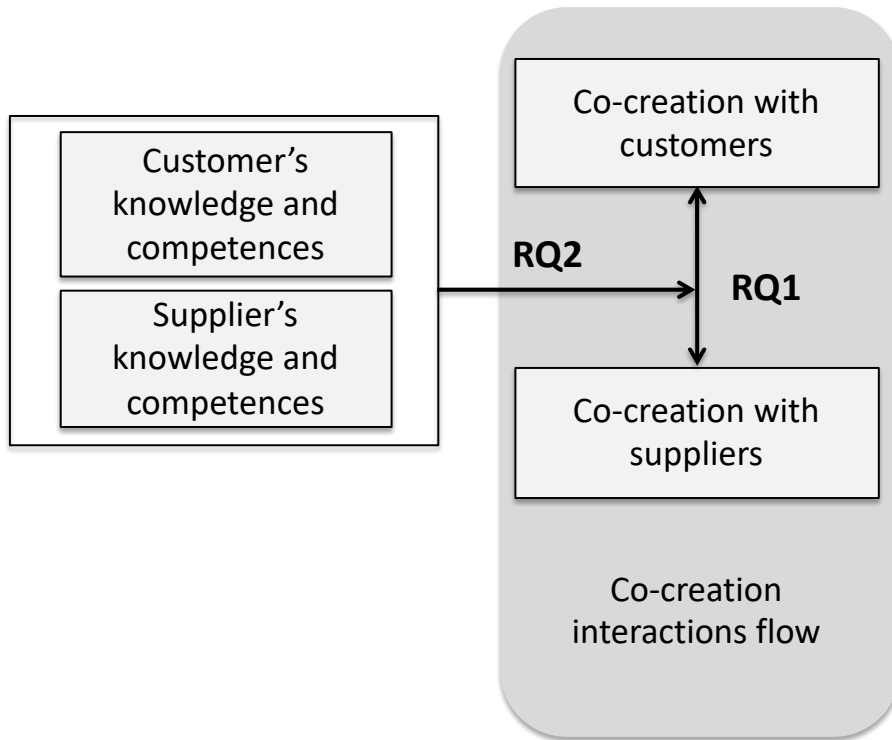
3. Research Framework

In this work, by disentangling the concept of co-creation with both customers and suppliers, we aim to investigate how companies and their supply chain partners manage this activity in the NPD process. More specifically, we believe that enabling co-creation with customers can affect the modes and the timing of co-creation with suppliers during the NPD process, and thus should be properly designed. We also assume that knowledge and competences of suppliers and customers, should be considered as a moderator factor in this relationship. We define knowledge and competences as both abstract information and techniques in the hand of the individual, according to Mokyr (2002). Looking at two different streams of literature, marketing and operation management, we derive an integrated research framework (Figure 1) to guide our exploratory analysis of the subject. In particular, as outlined in Figure 1, we concentrate our attention on the interactions flow between customers, firm and the firm’s suppliers involved in the NPD process. We posit that in order to fully exploit co-creation benefits, firms should enable a continue interaction and dialogue with both suppliers and customers along the NPD process through engagement platforms. Thus, in order to explore how co-creation processes actually take place and are interrelated we outline as a first research question: (RQ1) How does the integration between customer co-creation and supplier co-creation takes place along the NPD process? The interaction flows among suppliers and customers encompass not only when and what is the contribution of suppliers or customer to the co-creation process, but also the role of the firm, the development choices made and consequent constraints imposed ahead in the NPD process and on other actors during the co-creation process. Furthermore, when problem solving related to a NPD project requires access to “sticky information” that reside in customers and/or suppliers (Von Hippel, 1994), different iterations and information flows may be needed along the co-creation process, to extract value from the diverse knowledge resources. Therefore, both customers and suppliers knowledge and competences seem relevant moderators when studying

¹ Knowledge are composed by two parts (Mokyr, 2002): propositional knowledge, theoretical and abstract, and prescriptive knowledge, that are techniques constituting the skill and competence companies can use to gain competitive advantage.

involvement of external actors into the NPD process. Hence, we are interested in studying (RQ2): Are suppliers and customers knowledge affecting the co-creation interaction flow among customers and suppliers? And how they do so?

Figure 1- Conceptual Framework



4. Methodology

4.1 Selection of the methodology and boundaries setting

The research framework presented in the previous section outlines the main aim of our research: disentangling the concept of co-creation with multiple stakeholders, such as customers and suppliers. We aim therefore at providing answer to RQ1, RQ2 and refining the research framework presented above getting details on the definition and operationalization of the variables involved (i.e. co-creation with suppliers and customers) and to provide external validity of this and future related studies investigating the role of contingent factors in place. We performed exploratory multiple case studies research (Yin, 2009) in a cross-industry context (i.e. food, home appliances, fashion accessories, car products) considering both B2C and B2B context. We adopted as unit of analysis a single project of a product recently launched in the market. We decided to focus on cases within the Italian market. All the products we analyzed were incremental innovations in the market, were developed during the same time period and the NPD

project (i.e. our units of analysis) have akin durations, to enable comparability of results. We indeed considered consumer goods, home appliances and a medical devices as product categories, which all share a NPD process with a duration that ranges from six months to two years.

4.2 Creating a sample frame

Our sample is composed by 11 companies that resulted in 13 embedded units of analysis (case studies). We employed a multiple case study approach to perform both an in-depth examination of each case and a cross-case comparison (Eisenhardt and Graebner, 2007) and in order to add confidence to the findings (Miles & Huberman 1994, p.29). Case studies have been selected adopting an intensity type of sampling (Miles & Huberman, 1994, p. 28). In particular, we used intensity sampling, because this allowed us to select information-rich cases where we could find clear evidences about co-creation initiative with both customers and suppliers along a structured NPD process. The information to understand the case eligibility in the sample have been collected through an extensive secondary sources analysis by looking for specific co-creation initiatives. Table 1 reports general information about the sample.

Table 1 - General Information about the sample

Companies	Turnover 2015 (M EUR)	Num. of employees	Unit of analysis (co-creation initiative)
Case 1	85-86	320	Leather bag and accessories
Case 2	31	65	Car scent
Case 3	4	10	Interbody cage
Case 4	52	283	Zipper
Case 5	2.000	3.993	Gluten free pasta
Case 6			Nuts biscuits
Case 7	5.600	24.000	Fridge
Case 8	1.136	3.201	Frozen pizza
Case 9			Brick of tea

Case 10	366	152	Vacuum drawer
Case 11	356	717	Homogenized meat
Case 12	31	208	Professional vacuum cleaner
Case 13	834	970	Customised bottle of beer

4.3 Instruments adopted and steps undertaken in the data collection

Information about the NPD project have been collected thanks to at least two semi-structured interviews. The choice of adopting a semi-structured interview protocol is explained by both the possibility to focus on the specific and unique aspects of each initiative and the possibility to ask more specific questions related to the theoretical constructs underpinning the variables chosen in our research framework. The questionnaire adopted is structured as follows: a first part is devoted to general information about the company, then the focus is moved on a specific NPD project during which there are co-creation initiatives, which had been identified. The questionnaire develops around one NPD project by asking for the different stages and milestones of the project, actors involved and coordination mechanisms adopted throughout the process. Afterwards, more in depth questions are devoted to understand the contribution of suppliers and/or customers in the different stages, asking about modes of involvement and suppliers-company, customers-company and direct suppliers-customers interactions.

Interviews had durations ranging from a minimum of 1,5 hours to a maximum of 2 hours with, for most of the cases, product managers. These roles have been identified as our target interviewees, given the “end to end” perspective he or she has on the project. For other cases our informants (e.g. in Case 2) were instead marketing or brand managers, which were interviewed on the part of the questionnaire related to customers’ involvement, while, where possible, the part concerning supplier involvement was investigated in-directly involving purchasing managers as well. For one case (Case 3) we had the chance to get in contact with the Head of purchasing department, who was directly involved in the co-creation project, thus sharing with us all the needed information. Interviews have been tape recorded, transcribed and coded. The transcription of the case has been sent back to our respondents in the different companies to get a validation. Some follow-up meetings and phone calls were scheduled in order to get clarifications or

complete some missing parts. We triangulated data with publicly available information on the different projects under investigation, as well as through (when available) presentations on projects' reports which were shared during some of the interviews.

5. Findings

5.1 Descriptive case analysis: co-creation initiatives by companies in the sample

Case 1 (Leather bag)

Case 1 is an Italian company, producing and selling collectibles and adornments with an internationally recognised brand. In the past the company core business was restricted to ceramic products with an aesthetic function at home. Recently the company has started to develop new product lines, such as soft toys for children and different type of accessorise made with fabrics (e.g. bags, wallets, pencil cases) and wood. Given the novelty represented by these businesses, both market and technical expertise of the company are limited and, therefore, an important role is played by suppliers.

The aim of the co-creation initiative under investigation lies in collecting new ideas about a product that has not been historically the core of the offering of the company (i.e. a leather bag), together with the preservation of brand value associated with the above-mentioned pillars of elegance and style. For this initiative, the company addressed only a restricted group of consumers (i.e. the company Club), which was considered representative of the target market and of the main values on which the company stands. The members of the company Club were therefore involved starting from the needs analysis and idea generation phase. The ideas were mainly collected through the website and in particular in a “virtual area” dedicated to members of the company Club. The ideas collected in this process had then to undergo an evaluation by a wider spectrum of customers, always through the web site. Customers voted the idea that best reflects their needs. The ideas generated were not all immediately feasible, the company decided the ones that were most reflecting the brand values and then asked for a technical feasibility assessment to suppliers to carry out the detailed design (i.e. technical drawings of the bags).

Case 2 (Car scent)

The company is an important player in the production and distribution of car care, home care and personal care products. The NPD project under investigation regards a special type of car scent, with a distinguishing design. The key feature of this design is

represented by the shape of the car scent, which has an intrinsic iconic value. The co – creation initiative launched by the company indeed does not regard the shape of the car scent, but colours, style and the perfuming. The project originated from the desire of the company to consolidate its positioning in the market, in particular among younger customers. For this initiative, through a contest launched on the website of the company, customers were asked to propose new “themes” (i.e. colours and perfume) for a car scent, according to their own style and upload it on the website, where customers can also rate the different proposals posted by others to elect a short list of winners. At the end of the competition a special jury of ten people (internal and external to the company), elect the top three proposals. A key role is then played by the relationship with the subcontractor who is manufacturing the scent (the production is fully outsourced). The head of production at the subcontractor site, indeed, brings a decisive contribution to the product development process, bringing into the process the technical constraints related to the realisation of new weaves or colours on the production line.

Case 3 (Interbody cage)

The Company is a global medical device player which designs and commercialises industry leading products for complex spinal disorders. The main customers of the Company are represented by surgeons, who either order a personalised device or provide the necessary technical competence to initiate the development of a new product that will be then inserted in the company products catalogue. Surgeons collaborate with the Company for different reasons: to answer to patients’ needs, to receive recognition if the invention turns out to be successful and for business reasons. Other key actors in the NPD process are the engineers, employed by the company and responsible for the realisation of prototypes and feasibility studies, based on the proposals coming from surgeons. Suppliers provide components and raw materials (i.e. steel, plastic, titanium) and they have therefor a marginal involvement in the NPD process.

The specific co-creation initiative investigated is about an interbody cage, an implant inserted in patients to treat degenerative disc disease. The idea generation phase was fully developed by a surgeon (external to the firm). Following, the surgeon and company engineers worked on the scheme of the project, developed feasibility studies and conducted an evaluation of plastic and metal prototypes developed internally by the engineers. Finally, the product was tested by the surgeon himself and by other hospitals

and specialized centers interested in the purchase of the cage that provided further feedbacks. Suppliers were involved in the definition of the specific material of the cage (steel, plastic, titanium) according to company's specific requirements.

Case 4 (Zipper)

The company is the leading Italian manufacturer of zippers. The company manufactures all semi-finished products (tapes, sliders, etc.). In 2013, the company has embarked in different initiatives connected to the environmental dimension of sustainability (i.e.: production of zipper made from 100% organic cotton, zippers made from cotton derived from a milk protein, zippers made with recycled polyester). In line with these trends and after some explicit requests coming from some environmentally conscious costumers, the company launched a co-creation initiative aiming at finding new "green version" of its core product line. Thanks to this initiative, the company moved from selling undyed zippers to products realised with a natural dying process that is not performed in house but from an external specialised supplier. The new supplier was chosen thanks to the suggestion of one of the client of the company that directed the company towards one of its supplier. The benefit is twofold: clients are the one expressing the need on which the idea originated and they are the ones identifying suppliers matching their tastes and technical requirements, being already tested and proved to be trustful.

Cases 5 (gluten free pasta) and 6 (nuts biscuits)

The company is one of the world's leader in food industry, grounded on Italian tradition. The offer is oriented toward nutritionally balanced products intended for daily use, produced mainly in Italy and exported to more than 100 countries. The new product development process is based on the interaction between different professionals both inside and outside the company, from nutrition experts to marketing managers. The development phase has a quite high level of complexity due to the identification of the right recipe while satisfying the technical requirements for the ingredients.

In 2013, the company decided to include in its offering the gluten-free pasta (Case 5), due to the growing Italian population affected by the celiac disease (estimated in 1% of the whole population) and the increasing offering, by competing brands, of gluten-free pasta, not only in pharmacies and specialized shops but also in supermarket (where the company is competing). The aim was not just to solve a medical problem but to offer a pasta that was satisfying the need of consumers and with close performance to the traditional one.

Thus, the co-creation initiative had the aim to uncover the expectations and meet the taste requirement of both the celiac consumers and the not celiac ones, offering product with high quality that even individuals who do not suffer of this disease can eat with pleasure. In the first phase of the project, the company interviewed customers about their desires and expectations on gluten free pasta, explored their need by analyzing blog discussions and conducted focus groups. The interaction with the consumers provided insights about the texture, the taste and the color of the pasta. In a second phase, internal R&D run the product development on small scale (lab/pilot plant). More than one supplier, most of them already part of the long-term network, were involved in this phase, to offer alternatives for the production of the gluten-free pasta. Following, consumers were involved again in the tasting of some pasta prototypes and provision of feedbacks. The process was iterative, by coming back to the product development in small scale and by involving again suppliers when new ingredients were needed.

In 2012 the Company developed a co-creation project on nuts biscuits (Case 6). Here the aim was to produce a new taste of biscuit to extend the existing range of offer. In the first stage, the Company engaged its fans through the Company Facebook page, by asking for new biscuits recipes. Customers were called to vote the biscuit recipe they prefer, among a pool of choices, but also had the possibility to propose new flavors. Once the preferred flavor was chosen by the consumers, R&D and marketing departments worked together to define the shape, the dimension, the texture and the color of the cookie. During the prototyping phase, suppliers were involved to provide support in the definition of the ingredients combination to achieve the desired taste. Finally, consumers were invited to taste the product and provide feedbacks.

Case 7 (Fridge)

The company is a multinational home appliances company. The company markets different brand and different types of home appliances (e.g.: dishwashers, washing machines, fridges). Recently, an innovative type of refrigerator has been launched with the main features being the touch screen display and a particular type of handle, which aim at positioning the product close to a design object rather than a functional type of item. The technical complexity of the refrigerator is high, given the criticality of parts and materials as the electronic boards and steel, making the involvement of specialised suppliers a keystone for the success of the project. The suppliers are indeed involved

immediately after the conceptualization stage. The procurement function contact suppliers (minimum three); with them the company shares the design, performs feasibility technical analysis and analyses the timing of the project. Based on these aspects, the company select a single supplier and involves him for the detailed design of the fridge. A selected group of customers are then involved to test the product in real operative condition, providing structured feedbacks.

Cases 8 (Brick of tea) and 9 (Frozen pizza)

The Company is a multinational group leader in nutrition, health and wellness. The company has more than 2000 brands world-wide and operates in more than 180 countries. Main businesses are: water, coffee, cereals, health products (including skin health), pet care and other professional offering. Case 8 refers to the tea brand of the company, whereas Case 9 refers to the brand offering bakery products. Overall, the company has a dynamic global network of R&D centers, focusing on both base and applied research. The company has developed over time different types of technologies in a variety of fields from food processing technology to packaging and equipment.

As for the frozen pizza (Case 8), in 2013 the company decided to leverage on the success of one of its core product with a type of dough highly appreciated by customers to provide customers with new variants (i.e. new toppings).

The co-creation project included an initial screening of different concepts through information derived from social network channels through which the company collects insights in an unstructured way (i.e. without launching specific challenges). Chefs and suppliers are then involved to translate these insights into actual variants of toppings for frozen pizzas. Suppliers in this case are not limited to provide the raw materials on the basis of specifications provided by the purchases, but proposes and presents the company alternative raw materials that can improve the product quality. Suppliers are also involved whether a pitfall arises during the beginning of the industrialization stage. Finally, the newly developed toppings are tested by a selected group of customers.

Regarding case 9, the specific project analyzed is the development of a new tea brick launched in 2014. The Company needed a new idea, in order to differentiate its offer from competitors and face the decreasing profits in the tea brick business. The aim was to avoid price competition with private labels tea bricks, which did not have a peculiar brick shape. In the first phase the Company involved its supplier asking for ideas. Following,

consumers were involved through focus groups with kids (4-12 years old), as they represent influencers in the purchase process, and mothers, as they are the final deciders. During focus groups, consumers were firstly stimulated in providing ideas without any link with the Company. Then, they were asked to judge different tea pack options (both new packages proposed by the Company suppliers and competitors' packages). From the focus groups a new type of brick was chosen, the color was re-designed and the outer pack was changed.

Case 10 (Vacuum drawer)

The Company is a global leader in household appliances and appliances for professional use, selling around 50 million products to customers in more than 150 markets every year. The Company operates in two businesses: major home appliances like washing machines, refrigerators and ovens and small appliances, usually sold to other companies and for which customization plays an important role. It is leader in kitchen appliances including food preparation, storage and dishwashing and is the only manufacturer in the world to offer complete solutions for both consumers and professionals. The Company uses a consumer – driven NPD in order to meet consumers' need in shorter lead time. The NPD process sees the collaboration of Marketing, R&D, Design and external actors.

The co-creation project born around 2010 from the evolution in consumer lifestyle and the increasing demand for products that make life easier, make cooking healthier and food storage safer. The Company uncovered the increasing need, among consumers, to cook food without losing nutritive characteristics, thanks to the observation of consumers during the cooking process. Seen the unanswered problem in the market, the firm decided to involve its chefs to find a solution: the idea was a vacuum drawer addressed to final consumers (the offer available at that time was addressed only to professionals). Hence, the Company involved its chefs and organized courses with other chefs to understand how they use the vacuum drawer. Based on such results, a supplier (vacuum expert) was involved in the joint design of the product.

Case 11 (Homogenized meat)

The Company operates internationally in the food industry with a wide brand portfolio. Worldwide, the Company operates in three main areas: sauces & ketchup, ready meals & snacks and baby foods. It has a significant presence in Italy since 1960, after the acquisition of a Company operating in infant and medical nutrition. The NPD Company

objectives include developing new healthy products involving in-house professionals from nutritionists and food scientists to quality engineers and chefs. The Company opened several quality innovation centers in a number of European countries.

The idea to launch a new type of homogenized meat came from the market analysis that underline a trend among mothers who prefer for their children healthy food, hence with lower quantity of salt. In the first phase, in-house R&D developed the new recipe, analyzing the right balance of the ingredients. Following, direct clients' analysis in the point of sales were organized. The Company conducted 2-days trials of both the old and the new product in 200 supermarkets, to collect feedbacks and opinions about it. Suppliers were included only to change the label printed on the package.

Case 12 (Vacuum cleaner)

The Company is a leading manufacturer of wet and dry vacuum cleaners and carpet washers. It has an extensive presence in Italy and in more than 70 countries throughout the world. The leadership position has been confirmed along time thanks also to the introduction of radical innovations in the vacuum cleaner and carpet cleaning washer field. The extended product line is complemented by a series of accessories, providing solutions for a wide range of cleaning problems. The Company produces the majority of component internally and personalization is a key success factor in the value offer to its customers.

The Company developed a specific co-creation initiative for the development of a professional vacuum cleaner targeted to cleaning companies. The objective was to launch an incremental innovation in their dry vacuum cleaner line. The idea generation phase was entirely developed inside the Company. Suppliers were contacted afterwards to provide some prototypes of the component required and to suggest ideas. Customers (cleaning companies) were involved before the launch and the commercialization, to provide feedbacks. The Company had also in loco contacts with its clients to understand how they use the machine and the problems they may get in touch with. The involvement process was iterative as suppliers were contacted again in case there was the need to modify the product according to customers' feedbacks.

Case 13 (Bottle of beer)

Case 13 is the European leader in the production of beer, which is exported to over 170 countries world-wide. The Company has a very wide production network, made up by

more than 130 plants world-wide. The Company uses a structured innovation process, based on tried and tested best practices in order to complete the process effectively and efficiently. The project under investigation consists in a co-creation initiative launched in 2013, which allows anyone to propose a customisation of a bottle of beer, modifying the basic sleeve by inserting a photo and / or a message. The final reward for customers is not only personal (drinking with friends from a personalised bottle of beer), but the Company also decided to launch three selected sleeves at a large scale. Suppliers are involved to undertake feasibility analysis to figure out which part of the product can be modified by the consumer, limiting the impact on development time and cost. Suppliers are therefore involved in all phases of the development cycle. In the testing phase, suppliers carry out tests to evaluate the dimensional aspects and those aspects related to performance such as resistance, thickness and other physical characteristics of the product.

5.2 Answer to RQ1 and RQ2

To perform the case analysis and to display systematically (Miles and Huberman, 1994, p. 91) information about the involvement of actors in the new product development process, we divided the process in four main stages (e.g. Griffin, 1997; Crippa and Pero, 2009; Krishnan and Ulrich, 2001): (1) needs analysis and idea generation, (2) idea assessment, (3) product design and development, (4) test and product launch. Following, the definition of each stage is provided. Table 2 shows the results of this analysis.

- (1) Needs analysis and idea generation: the Company collects information from the customer to better understand the needs of the market. Further, it gathers ideas that will enable the generation of new products or the improvement of the existing offer.
- (2) Idea assessment: in this phase, actors involved in the NPD process can evaluate and select the best ideas among multiple alternatives. In this way, the Company gives decision-making power to external stakeholders on the output of the NPD and therefore more control over the process.
- (3) Product design and development: decisions taken in this stage regard product specifications and the product's basic configuration. A product concept generally envisions the physical form and appearance of the product. It includes the

definition of technical specification, the determination of precedence relations in the assembly, the choice of the materials that will be used and the necessary production processes.

- (4) Test and product launch: it includes performance testing and validation. The product needs to be tested to validate the functions and evaluate if the product meets customer expectations. Further, decisions related to the market launch of the new product and to communication and promotion should be implemented.

Grounding on this classification, we explored the modes and timing of the co-creative process with customers and suppliers in the cases presented. Further, we analysed whether and how supplier and customer knowledge and competences (both technical and about the final market) drive to different co-creation approaches. Table 2 summarises the main points of the analysis.

Table 2 – Approaches adopted to manage interaction flows among customers and suppliers

Approach	Company	Co-creation initiative	Description	Co-creation mode with suppliers	Timing	Co-creation mode with customers	Timing	Actor owning more relevant knowledge and competences T=technical M=market
(i) Supplier-driven	Case 2	Car scent	New variants of car scent (same shape but different style and colour) in order to be close to a younger target.	Adaptations of the product design to make it “producible” with not excessive cost. The manufacturing division of the external production plant takes also part in the evaluation of ideas to be released into the market.	(2) (3)	Customers are asked to draw their car scent design according to their own style and upload it on the website. Customers can also rate different design posted by other customers. A committee composed by managers and some external actors chooses the winners.	(1) (2)	Supplier - T

	Case 9	<i>Brick of tea</i>	New solution for bricks of tea for kids with an innovative packaging in order to differentiate the offering from private labels.	Two packaging options coming from proposals of two major suppliers.	(1) (3)	Customers (kids and their mothers) are involved through a focus group and are asked to choose among a pre-defined list of packaging options. Customers also suggested a change in the colour variants proposed.	(2)	Supplier –T-M
	Case 13	<i>Customised bottle of beer</i>	Customisation of specific parts of the sleeve of the bottles in order to provide customers a personalised offer.	Suppliers heavily involved from the beginning of the NPD process, suggesting the idea of the initiative, performing ideas selection, feasibility assessment and testing of resistance, thickness and other physical characteristics of the product.	(1) (2) (3) (4)	Customers involved for the detail design of the sleeve of the bottle through the website. They choose pre-defined sleeve and they can customise them further (e.g. inserting a picture).	(3)	Supplier - T
(ii) Customer-driven	Case 3	<i>Interbody cage</i>	Evolution of a typical cage to treat degenerative disc diseases.	Suppliers propose the material (steel, plastic, titanium) according to the company's specific requirements.	(3)	The trigger of the NPD process is an intuition of a surgeon (owner of the idea) put then in direct contact with the company's engineers and suppliers	(1) (2) (3) (4)	Customer – T and M
	Case 4	<i>Zipper</i>	New “green product”, with organic cotton and recycled polyester to meet the expectations of more green customers.	Zipper fabrics suppliers involved to change the pigments used to paint the fabrics. Choice of a supplier of natural pigments. Fabrics supplier involved again during the testing of product performance.	(3) (4)	Informal meeting with costumers to collect ideas and trends. Final test of the product performance with customers.	(1) (4)	Customer - M
	Case 5	<i>Gluten free pasta</i>	Gluten free pasta to answer to the need of celiac people and meet the expectations of not celiac individuals.	Suppliers offer to the company some alternatives concerning the recipe.	(3)	Initial focus group to collect feedback on customers' expectations for: texture, taste and colour. Customers are then involved in the testing.	(1) (4)	Customer - M

	Case 6	<i>Nuts biscuits</i>	New recipes for a new type of cookie, extension of the existing range.	Chocolate suppliers are involved and decide to adopt milk chocolate rather than the usual dark chocolate	(3)	Customers, represented by fans of the Company Facebook page are asked to rate the recipes proposed and to come out with new ones.	(1) (2) (4)	Supplier - T
	Case 8	<i>Frozen pizza</i>	New variants of frozen pizza leveraging on the success of one of the key product for the company.	Suppliers are involved to propose new toppings (e.g. special type of eggplant). Also involved at the beginning of the industrialisation in case of some pitfalls.	(3) (4)	Customers are involved in a first concept screening phase and then during the testing to taste the new variants of pizza. Distributors are instead involved to provide suggestions about the products chosen by the final customers during the customer tests.	(1) (3)	Supplier - T
(iii) Firm-driven	Case 1	<i>Leather bag and accessories</i>	New product line: leather bags and accessories in order to develop a line extension.	Suppliers involved for the technical drawings of the bag.	(3)	Members of the Company club are involved to provide new ideas through the website.	(1)	Customer - M
	Case 7	<i>Fridge</i>	Fridge with touch screen display and a particular type of handle to position the product close to a design object.	Suppliers involved for technical advice during the detailed design of the product.	(3)	Selected groups of customers involved in the testing phase.	(4)	Supplier - T
	Case 10	<i>Vacuum drawer</i>	New technology to cook in vacuum by removing 99% of the oxygen in order to provide customers with a professional technology not yet available on the final market.	Best class supplier to adapt an existing technology in the professional business unit for the domestic market.	(3)	Professional customers involved in order to give feedbacks about benefits and weaknesses of the product to be launched in the domestic business unit.	(2)	Customer - T

	Case 11	<i>Homogenized meat</i>	An incremental change in the existing recipe of homogenized meat with no salt in order to meet customers' needs of healthy food.	Printing agency involvement for changing the label according to the new recipe.	(3)	Customers involved in the point of sales to taste the product and to evaluate the differences with the traditional salted variant.	(4)	Supplier - T
	Case 12	<i>Professional vacuum cleaner</i>	An incremental change in a dry vacuum cleaner targeting cleaning companies.	Components suppliers involved actively in the decisional process, proposing alternatives, giving to the company some prototypes based on the technical specification decided.	(3)	Customers (cleaning companies) involved in the testing phase to help detecting and solving pitfalls when using the product.	(4)	Supplier - T

(1)= Needs analysis and idea generation, (2)= Ideas assessment, (3)= Product design and development, (4)= Test and product launch

Results show different co-creation patterns, both supplier and customer triggered, enlarging the concept of co-creation not only to the customer, but to the supplier as well (Figure 2 and Figure 3). Figure 2 outlines a “zoom” on what is represented in each matrix in Figure 3. The colored quadrants represent those phases during the NPD process in which suppliers and customers are involved. For example, in Case 1, customers are involved in the needs analysis and ideas generation phase, while suppliers are involved later on in the product design and development phase. When colored quadrants are along the diagonal of the matrix (e.g. Case 3, Case 5, Case 15 depicted in Figure 3) suppliers and customers are involved in the same phase of the NPD process. As reported in Table 2, three are the main approaches emerged:

(i) Supplier-driven approach, where suppliers are usually involved in multiple stages along the NPD process and especially in the early stages. The reason resides in the co-creation activity configuration, that involves product features demanded at suppliers (development of the tea brick in Case 9, car scent in Case 2 and bottle sleeve in Case 13), in which they traditionally possess technical competences and knowledge but also knowledge of the final market, being themselves a competitor in the market (as in Case 9). For these products, the customer is included as well in the early stages only when she/he plays an “inventor role” (Case 2 and Case 9 initiatives), while in cases approaching

mass customization, the customers do not provide the initial product idea, and thus is engaged only in later stages (Case 13). In Case 9, for instance, suppliers are firstly involved in the proposition of an innovative packaging (a new brick of tea), customers are then asked to select the preferred package design and to propose changes according to their likings and needs. Finally, suppliers are involved again for the detailed design of the brick, including potential changes in the color and shape proposed by the customers.

(ii) Customer-driven approach, where customers are engaged in multiple stages of the NPD, developing broad joint co-creation processes. Here customers initiate the process, being involved in the early stages. In these cases, we can easily observe how the relevant knowledge is embedded in customers that propose ideas, suggestions and participate in the development and test of the product (In Case 5 and Case 6 customers suggest recipes and rate them, in Case 4 customers suggest new ideas for the zippers). In these cases suppliers are involved in later stages, for the detailed design of the product (i.e. product design and development phase), introducing some technical constraints and therefore suggesting changes to translate not fully feasible proposals into implementable solutions. After changes are applied to the original ideas, products are tested again from customers in the last phase of the NPD process. A particular type of multi-stage involvement of customers is represented by Case 3, which shows a direct interaction between customers and suppliers with no needs of mediation by the company. This is indeed a case in which the knowledge embedded in the customer is highly technical and really “stick” on the customer (a surgeon). She/he is the owner not only of the idea, but she/he has also the ability to translate it into technical requirements to be communicated to the suppliers. It should be noticed that here suppliers involved are mainly providing commodities, with very little knowledge about the specific product and the final market. Their role is indeed marginal and limited to the sole product development phase.

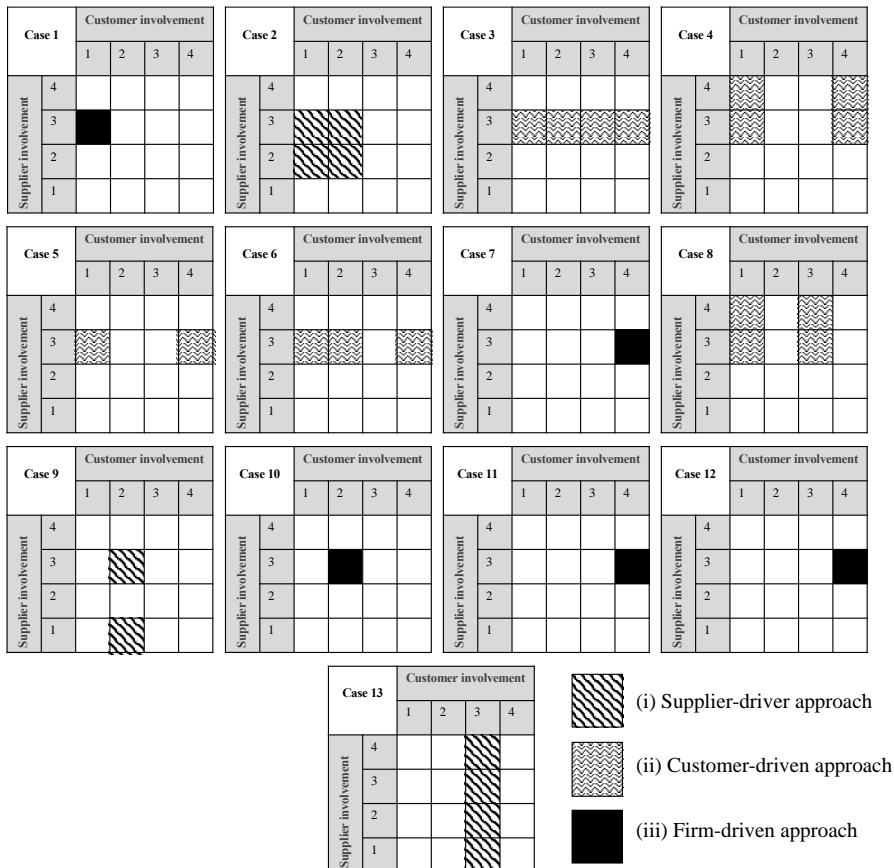
(iii) Firm-driven approach, in which customers and suppliers are involved in one sole stage of the NPD. In such approach, the Company manages the conversation between suppliers and customers, not allowing direct information exchange and integration (Cases 1,7,10,11,12). For instance, in Case 7, the firm involves suppliers for the development of the refrigerator specifics, while customers only test the final product. No interaction or exchange of feedbacks, even with the firm mediation, is allowed between customers and supplier during the product development. We observe that for these initiatives, firms seem to possess the knowledge and competences to interact with the market. Thus, they engage

stakeholders only in traditional activities, mostly product development for suppliers and market test for customers.

Figure 2 - Results: zoom on Figure 3 view

Case 1		Customer involvement			
		1 Needs analysis and idea generation	2 Ideas assessment	3 Product design and development	4 Test and product launch
Supplier involvement	4 Test and product launch				
	3 Product design and development				
	2 Ideas assessment				
	1 Needs analysis and idea generation				

Figure 3 – Approaches for customer and supplier involvement by companies in the sample



6. Discussion

This work aims to explore the mode and the timing of involvement of customers and suppliers along NPD projects, by (i) developing a classification of demand-side and supply-side involvement in NPD (ii) empirically investigating the interaction flows between customers and suppliers (iii) analyzing the elements affecting a concurrent involvement of customers and suppliers in NPD. Results reveal that the integration of co-creation activities with the customer in the NPD process affects the way the firm itself co-creates with its suppliers, in terms of both information and communication flow. Firstly, our findings suggest (RQ1) that firms work as mediators between customers and suppliers, managing the relationship with these partners in a separate fashion. This mediation operates for different reasons: in some cases represents a way to bridge a gap in competences or a physical geographic gap between suppliers and customers (Case 5, 6, 7). In other circumstances, it is related to confidentiality of information (Case 10) or to the difficulties the company foresees in managing it (Case 8, 11). On almost all cases analyzed, the mediation is needed due to the presence of organizational silos: marketing function, managing the co-creation with consumers, and purchasing/procurement department, managing the involvement of suppliers, do not communicate to each other. Main reasons behind this lack of communication and collaboration are the time and complexity required to integrate these functions, which are characterized by different competences and background. Hence, it is the company culture and internal organization itself that creates a barrier to the growth of a co-creation entity, a common foundation or platform for the development of joint co-creation activities. These organizational silos constraint the development of a direct relationship between the marketing and the buyer functions inside the company, and in its turn between customers and suppliers. Above hindering the development of a full collaboration between the two sides, these barriers may obstacle the anticipation of constraints, not enabling suppliers to intervene in the idea development to anticipate potential barriers in the prototype development or production. The misalignment of cultural values may emerge also between final customers and the firm itself, making even more difficult a proper communication and information exchange (Chan et al. 2010).

As depicted in Figure 3, firms tend to concentrate their effort on the development of co-creation activities on the customers' side, engaging them broadly in NPD process stages (i.e. in Case 3 and Case 6). Suppliers, instead, show to be still lightly involved in such

activities, particularly in the early stages and, when involved in later stages of the NPD process, they usually participate in the development of the idea proposed by customers (e.g. in Case 5 and Case 6). Such result may be a consequence of the constraints and risks deriving from the knowledge exchange between firms and suppliers, as the ability to transfer knowledge and extract value from it (Cavusgil et al. 2003), but also the risk of knowledge spillover (Squire et al. 2008). Indeed, our findings show that supplier involvement takes place when suppliers have long-term established relationships with the firm, thus there is trust that the information shared will not be used in opportunistic ways (Inkpen 2000).

Overall, companies analyzed do not co-create with customers and suppliers in all NPD stages. Nevertheless, there are examples of companies involving customers and suppliers in the same NPD phase, even if not interacting directly (i.e. Case 3 and Case 13) and therefore with an iterative involvement process inside a single NPD phase. Further, our findings show that the relationship between the two sides is moderated by suppliers and customers knowledge (RQ2), suggesting that the actors owning the relevant information and knowledge about the product and final market (Von Hippel, 1994) define the interchange between actors in the NPD.

7. Conclusions, implications and limitations

Co-creation is emerging as a desirable approach to product innovation. This study investigates the ways firms involve customers and suppliers in initiatives of co-creation along the NPD process. After developing a classification of demand-side and supply-side involvement in NPD we empirically investigated the typology of relationships between customers and suppliers in co-creation of the offer through 13 case studies, in both B2C and B2B markets. Further, we explored the factors potentially affecting a concurrent involvement of the two actors, namely the typology of relevant knowledge and the way such knowledge is distributed among the actors. Results suggest that when co-creation with customers takes place, also the mode of suppliers' involvement changes in terms of information and communication flows with the company. However, despite the intense dialogue and interaction between the company and customers and/or suppliers, companies tend not to let customers and suppliers communicate directly, but act as mediators between supply-side and customer-side contributions. Based on the cross-case analysis, three main approaches have been outlined: (i) supplier-driven approach: companies co-creating with suppliers for multiple NPD phases, while involving

customers only in one (ii) customer-driven approach: companies co-creating with customers in multiple NPD phases, while involving suppliers only in one, and (iii) firm-driven approach: companies involving customer and suppliers only in one NPD phase. Remarkably, no companies analyzed co-create with customers and suppliers in all NPD stages.

Further, our findings suggest that the approach adopted is dependent on the *locus* of the relevant knowledge (i.e. market or technology), where the actor owning the relevant information and knowledge about the product and final market defines the interchange between actors in the NPD. When relevant knowledge is detained by the suppliers, the co-creation interaction is unbalanced towards the supply-side, meaning that suppliers are involved in multiple stages, usually in earlier ones, but customers only in one (supplier-driven approach). The opposite happens when the relevant knowledge resides in the customers. In such cases, customers are involved in multiple stages and suppliers in one phase only (customer-driven approach). When the firm itself possesses the relevant knowledge to interact with the market, no collaboration or exchange of feedbacks, even with the firm mediation, is allowed between consumers and suppliers during the product development (firm-driven approach).

This study opens a new stream of research, stressing how the evolution of the market, toward a more participative one, spurs the needs to investigate the collaboration and interaction approaches among the different actors. Customer and supplier involvement have been so far studied separately in literature. Despite the fact that the two actors have been listed as relevant members of a cross-functional inter-firms team for NPD (e.g. Boyle et al., 2011) and that their involvement in the NPD process has been studied separately (e.g. Koufteros et al., 2005), none has investigated in empirical terms the role customers and suppliers assume in cross-functional teams and their cross interactions. We believe this study represents a relevant step to overcome this silos-centric view.

From a managerial point of view, we believe our results can help to efficiently and effectively design and manage the relation with suppliers (i.e. when and how to involve them) in co-creation along the NPD process. The same holds true for the demand-side, where marketing managers are provided with guidelines to understand which modes of customer involvement are most suitable, depending on the nature of the relationships in place or to be established with a supplier and the locus of relevant knowledge. Further,

we suggest that more attention should be placed on the collaboration between marketing and buyer departments inside the Company itself: one of the barrier toward a direct interaction between customers and suppliers seems, indeed, due to the presence of organizational silos where marketing function and buyer department do not communicate to each other. Hence, companies will need to incentivize a direct collaboration and information exchange between these departments, to improve the whole co-creation process (above potential other benefits of such integration). For instance, cross-functional teams or task forces dedicated to the management of co-creation projects can be a valid solution. Alternatively, unified virtual communication platforms or dedicated communication apps (such as Slack or MicrosoftLync), blending video, phone, instant messaging, task and project management tools, may prove successful in building collaboration between marketing and buyer departments. Additionally, barriers to knowledge exchange may occur, and prevent the development of co-creation initiatives, in the supplier-firm and firm-customers relations as well. From the demand-side, improving communication between firm employees and customers, through the share and reinforcement of common values, may help in the development of successful initiatives. From the supply-side, companies may establish the figure of relationship promoter, to enable the transfer of knowledge between the two sides and the share of value. Companies should try to establish long-term relationships with suppliers, based on trust, to lower the perceived risk of knowledge spillover. This can be done, for instance, by showing support to supplier needs or commitment through the implementation of supplier-specific adaptations.

Finally, the present work does contain some limitations that lie in part in the context adopted for the study. On the one hand, the cross-sectorial sample was ideal for our exploratory intent and helped us in finding evidences of different types of co-creation initiatives. On the other hand, there are contextual or product related factors in different industries that can influence customer / suppliers involvement. Our focus on the patterns of interaction rather than the type of interaction allows us to limit the impact of contextual variables as for instance the complexity of the bill of materials of the product considered and the distance from the final market (i.e. B2B and B2C contexts). We therefor suggest as a further avenue for future researches, an industry and final market - specific study, explanatory in nature, to validate the findings we obtained from this exploratory phase.

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