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SECTION 3. General issues in management

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A macro-perspective on co-creation processes on the Internet

Abstract

Companies increasingly use open innovation and co-creation processes on the Internet. Despite this rising trend in management, the different forms of open innovation on the Internet have only scarcely been investigated from a macro-perspective that systematically categorizes customer-supplier interactions based on a conceptual framework. Using a cross-case study design, we characterize and differentiate six types of customer-supplier processes on the Internet regarding underlying value propositions, value network configurations, and modes of interaction. These co-creation processes can be categorized according to their value propositions that follow different stages of the consumption circle. Each value proposition, as a cohesive element, determines a different value network configuration. We examine how network leaders create different modes of interactions in these value networks that we analyze regarding power, relationship, and coordination mechanisms. Across cases, open innovation on the Internet changes the architecture of the value chain from a single-directed stream to a loop of knowledge exchange that includes almost every vertical stage. Companies therefore cannot assign customer input to a certain functionality but rather must decipher it through interdisciplinary approaches that involve the cooperation of multiple areas. The macro-perspective framework can help companies to identify in which areas they can use open innovation and how to establish co-creation processes in the newly evolving value networks.

Keywords: co-creation, open innovation, e-commerce, e-business, knowledge management, value networks.

JEL Classification: M31, L81, O30.

Introduction

Open innovation and co-creation have become one of the major paradigms in management that were induced by the advent of the Internet (Chesbrough, 2003; Gassmann, 2006). Open innovation involves new actors into innovation and exploitation processes; those actors often are not employees of the company but are customers, competitors or third-party providers that collaborate on the Internet (Gassmann and Enkel, 2004; Zwass, 2010). Along with open innovation, new theories of customer-supplier interaction evolved including the service-dominant logic (Vargo and Lusch, 2004) and the relational view of the firm (Dyer and Sing, 1998). Research has achieved important insights into open innovation and co-creation regarding antecedents (e.g., Frey et al., 2011; Füller et al., 2010), processes (e.g., Chiaroni et al., 2010; Payne et al., 2008), and outcomes (e.g., Chesbrough, 2003). While the relevance of these insights for management rapidly increases, many companies still struggle to understand how co-creation processes can contribute value to their business model (Zwass, 2010). Co-creation and open innovation are often mainly associated with product development tasks in literature; however, service aspects of open innovation also have evolved which still need to be investigated (Payne et al., 2008). In particular, we will categorize the value that co-creation processes on the Internet generate from both the customer and supplier perspective. Managers often have still the conception of a value chain when collaborating with partners in

open innovation which requires a reassessment (Ramirez, 1999; Zwass, 2010). In this article, we will therefore assess for different types of co-creation processes how functional entities collaborate within and across companies.

Open innovation and co-creation can be differentiated based on outside-in, inside-out, and coupled processes (Chesbrough, 2003; Gassmann and Enkel, 2004). Outside-in processes define innovation tasks for external contributors that are performed outside the company until the resulting knowledge gains are integrated into the overall exploitation process by the company (von Hippel and von Krogh, 2006). Inside-out processes incite external actors to turn company-internal knowledge into innovations (Jeppesen and Molin, 2003; Gassmann and Enkel, 2004). Coupled processes are interlinked innovation and exploitation tasks between network partners that increasingly are facilitated by Internet technologies (Gassmann and Enkel, 2004). Especially coupled processes are still underrepresented in research (Payne et al., 2008). This article tries to foster a deeper understanding of the role of the Internet in coupled processes of open innovation that result in new forms of co-creation between customers and suppliers.

This article contributes to open innovation and co-creation literature by providing a macro-perspective model of coupled customer-supplier interactions on the Internet. This macro-perspective may help companies to better understand and assess opportunities and challenges for implementing open innovation and co-creation processes. Using a cross-case study, we examine how open innovation on the Internet can be

characterized according to underlying value propositions, value network configurations, and modes of interaction.

Value proposition. The Internet medium offers companies broad technological opportunities for listening to and integrating the active participation of customers into a systematic approach to both value and exchange (Payne et al., 2008). One of the most influential paradigms in marketing, the service-dominant logic (SDL) analyzes the role of the customer as a co-creator of value (Vargo and Lusch, 2004). In contrast with a goods-dominant view, the SDL imagines that value is incorporated in the different phases of an ongoing dialogue between suppliers and customers (Vargo and Lusch, 2004). Previous literature has identified a research gap regarding the important questions of how companies create value propositions based on these capabilities and how a customer's activities correspond to technologies (Kumar et al., 2006). In the cross-case study, we will therefore investigate the different value propositions that underlie Internet-enabled co-creation between customers and suppliers.

Value network configuration. The relational view of the firm in coupled processes does not imply merely a value chain in a linear sequence (Dyer and Singh, 1998; Normann and Ramírez, 1993), but emphasizes opportunities for network collaboration along all functional entities of the company (Lusch, Vargo and Tanniru, 2010). This complexity demands an explicit analysis of the roles and relationships of network partners during value-creating interactions (Ramírez, 1999; Dyer and Singh, 1998). Instead of single-directed value activities of consecutive companies, the virtual value chain opens up to various "co-creation constellations" between customers and suppliers, which largely have not been explored yet and demand further insights (Payne et al., 2008).

Modes of interaction. Structures in the value networks evolving around value propositions further demand competences, relationships, and information that are shared between the network leader and the collaborating partners (Lusch, Vargo and Tanniru, 2010). The newly arising forms of open innovation on the Internet have changed the modes of interaction between customers and suppliers; the successful management of co-creation processes therefore still requires a better understanding of how network leaders can collaborate with the partners in the value network.

In the following, we will first introduce the method of cross-case analysis centering six network leaders of open innovation and their value network. Then, we will analyze each case regarding company context,

value propositions, and collaborating partners. In the cross-case analysis, we will propose a macro-perspective model that categorizes the differences and characteristics of the six cases regarding value propositions, value network configurations, and modes of interaction. Finally, we will highlight problems and perspectives of our proposed framework that may incite future research and provide guidelines for companies.

1. Method

To structure a complex field of research, cross-case studies are an adequate method to characterize market phenomena and derive conceptual frameworks due to their rich insights (Eisenhardt, 1989; Yin, 2003). We followed four steps for analysis, thereby providing for validity and reliability in design, case selection, data gathering and data analysis (Reuter et al., 2010). In an iterative process, we developed a questionnaire with open questions pertaining to different aspects of collaboration in electronic networks. We specified it during the process as we identified key insights for co-creation processes and used it to provide a guideline for the interviews (Eisenhardt, 1989). For the case selection, we started by collecting examples of customer-supplier interactions on the Internet, either cited by existing literature or discovered during our field-based research. To investigate the central constellations and corresponding activities in value creation, we employ a cross-case study design, such that six chosen cases exemplify coupled processes in open innovation, as we discuss further. The six cases were theoretically sampled to represent the different forms of coupled co-creation processes that we had identified in the extensive pre-selection phase (Eisenhardt, 1989).

Concerning data gathering, we progressively assessed the different roles of the Internet for value creation in face-to-face interviews as well as telephone interviews. For each case, we gathered information from at least two managers in separate in-depth interviews, resulting in interviews with 15 managers from different functional teams that have key responsibilities in the co-creation process (see Table 1). In the interviews, we explicitly asked the key managers to delineate the interaction process from the customers' view and describe their internal processes and collaborative processes with agents from other companies. In an iterative development process, we characterized six different modes of interaction during data analysis. The analysis encompassed value propositions of collaborations, the value network configuration, and the modes of interactions. Through online activities, companies often pursue different objectives, so there may be partial overlap, but the analysis emphasizes the different concepts of customer interaction as core processes. Hence, the six

case studies represent different types of open innovation that we refer to as “Interest Channels,” “Information Agents,” “Idea Platforms,” “Cross-linked Activities,” “Customer Clubs,” and “Recommendation Networks.”

2. Cross-case analysis

We will next present a framework to capture different types of co-creation interactions that will be first separately investigated for each type and then analyzed regarding central differences and consequences for the

management of customer-supplier interactions. The framework can be understood as a consumption circle, in the sense of MacMillan and McGrath (1997), in which temporal sequences of customer-supplier interactions determine different value propositions. Figure 1 (see Appendix) displays a macro-perspective of open innovation encounters on the Internet and describes how the different interaction phases virtually open the traditional, single-directed logic of value creation to create a mutual exchange between supplier and customer.

Table 1. Overview of cases

Cases	Industry	Number of interviews positions of interviewees		Value propositions	Value network configurations	Modes of interaction
Interest channels (company A)	Computer	2	Global group manager Senior manager	<ul style="list-style-type: none"> ◆ Identity creation ◆ Problem identification 	<i>Network leader:</i> Marketing and sales departments	<ul style="list-style-type: none"> ◆ Informal ties within the extended buying centers ◆ Experiential exchange across multiple customers
Information agents (company B)	Sports and retail	3	Director Manager Gear expert	<ul style="list-style-type: none"> ◆ Reduce complexity of information search ◆ Provide personalized information in a fast and convenient way 	<i>Network leader:</i> Service departments	<ul style="list-style-type: none"> ◆ Active, bi-directional communication based on informational exchange ◆ Customer data is used to personalize the service
Idea platforms (company C)	Chemicals	3	Senior manager Information manager Developer	<ul style="list-style-type: none"> ◆ Detection of prospective customer demands ◆ Creation of new industry solutions 	<i>Network leader:</i> Research and development departments	<ul style="list-style-type: none"> ◆ Opportunity-driven project management across multiple channels, involving different intensities of collaboration
Cross-linked activities (company D)	Automotive	3	Director Senior manager Product manager	<ul style="list-style-type: none"> ◆ Enable higher variety for customer demands ◆ Reduce complexity ◆ Increase pace and quality 	<i>Network leader:</i> Engineering departments	<ul style="list-style-type: none"> ◆ Formalized ties with defined legal properties ◆ Synchronized transactional exchange across multiple suppliers with different access rights
Customer clubs (company E)	Electronics	2	Manager Consultant	<ul style="list-style-type: none"> ◆ Reinforce the usage experience ◆ Teach customers to exploit the full range of product usage potential 	<i>Network leader:</i> Marketing and service departments	<ul style="list-style-type: none"> ◆ Personal, informal ties established between customers and experts from the company ◆ Online interaction is accompanied by personal phone calls by local dealers
Recommendation networks (company F)	IT and retail	2	CEO Manager	<ul style="list-style-type: none"> ◆ Enhance information sharing ◆ Interconnect the online and offline shopping experience 	<i>Network leader:</i> Marketing departments	<ul style="list-style-type: none"> ◆ Spreading informal ties from retailers to customers' social network through online word-of-mouth

With the value propositions as a central and cohesive element of analysis, we will first describe the cases and then discuss consequences for the value network configurations and modes of interaction. The antipodal directions of the bright and dark semicircles in Figure 1 (see Appendix) mark the encounter of the customer's predisposition and supplier-sided value proposition for every phase, which translate into value only when they are congruent. The bright semicircles denominate the perspective of the customer, whose situational requisites follow a six-step, sequential buying process. The dark semicircles illustrate activities and goals of suppliers which then determine different configurations of the

value network. Next, we will analyze each type regarding company context, value propositions, and collaborating partners.

2.1. Interest channels. Company A, a firm in the computer industry, initiated an Internet community to boost sales of its new series of IT servers, designed for small and medium enterprises. Because company A faced significant problems finding access to small and medium business customers, it established an interactive web site, targeted at system administrators, who represent members of the extended buying centers but rarely have decision authority, even though they strongly influence buying decisions. The site contains interactive

contents, including user blogs, games, comics, and animation, that center around the main interests of the target group.

During social interactions through such interest channels, users identify their needs for a particular issue, such as a brand or specific interest, and share them with other community members. A common theme among members whom the managers call “working class in the data center” concentrates on often frustrating workdays. Marketing managers and an advertising agency therefore highlighted the problem system administrators have gaining recognition at work and used it in the overall communication strategy. Central to the value proposition was a specific sense of humor, expressed in low-budget video spots that promoted the Internet community on “below the line” channels, such as video portals or affiliate web sites. A year after beginning the advertisements, the video spots had been viewed approximately 150,000 times and the Internet community counted more than 100,000 visits. Rather than featuring the brand on the web site, company A promoted 350 registered users as “heroes of the day”, giving an overview of their leisure activities and the most stupid task they had ever experienced. Through storytelling, the user projects his or her wishes onto the subtly communicated brand (Muniz and O’Guinn, 2001). Features such as “school for heroes” with printable material for the workplace are designed explicitly to trigger the need to express an identity at work and thereby create word-of-mouth effects. As the system administrator gains recognition as an active member of the community, he or she finally identifies the need to shape the work environment with systems and symbols that support him or her.

Though customer-supplier encounters first create value in experiential dimensions, the informational component becomes more central as the customer participates in discussions with other system administrators or offers in new topics. Sales managers frankly introduce themselves as such on the web site and contribute personal opinions about “off-topics”, yet 72% of the discussions are technology-oriented, and 23% relate to server systems. Casually, sales managers offer new products in blogs or support the discussions with product details when expert knowledge is needed.

Marketing and sales departments, in cooperation with an external advertising agency, work closely to establish relationships with the customers. Coupled with the exploitation process, the relationship therefore also provides innovation potential. By screening the interactions between customers, marketing managers systematically update their

knowledge and forward it throughout the company. Using customer input, they detect problems and situations in which product and service offerings might be successful, then disseminate this input to the sales staff. During the interactive process, sales managers also create sales arguments based on community discussions, which they integrate into their current negotiations offline and that also shape the communication strategy on the web site.

2.2. Information agents. Company B, a global online sports retailer, offers tailored services according to its customer segmentation into interests: ski, snowboard, hiking, outdoor, camping. On five different web sites, the retailer provides detailed product descriptions with accompanying pictures, customer reviews, and other interactive tools that respond to the unique attitudes of each target group. Instant chat connections on each of the websites generated approximately 742 customer requests per day on average, which the site matched to the individual expertise of more than 75 experts.

The complexity of available information prompted company B to institutionalize a direct line to customer search activities. The target groups consist of enthusiasts with a high degree of product involvement and who link sport activities to certain lifestyles. Because purchases in these product categories involve a variety of decision parameters, 75% of requests relate to certain product characteristics. Customers face an increasing amount of information on the Internet, which can easily confuse them. Therefore, experts appear after two minutes of user inactivity in a chat window, unless the customer already has asked for expert advice.

Service managers constantly look for improvements by analyzing the documented chats and surfing behavior in the central IT system. Feedback gets distributed to web designers, who optimize the product presentations, procurement, and marketing departments, as well as the gear manufacturers. In a circular process, the supply departments attempt to implement the suggestions gleaned from customer knowledge and promote employees involved in service provision. In regular expert workshops, manufacturers’ sales staff instructs the chat experts about their products. Accordingly, incentive system designs derive from customer behavior, too. Company B tracks customers during their web site search activities, as well as previous and subsequent web sites. Because all marketing campaigns include an online component, customer clicks on links in newsletters, online articles, banners, and affiliated websites – and thus the turnover generated – determine the premiums paid to the responsible marketing teams. Although the payment depends

partly on turnover, to avoid urging employees to push customers into hasty buying decisions, the electronic system identifies customers by name and assigns premiums to every employee involved in a customer contact, even if the customer only buys a product later. By directing staff efforts according to the way customers search for information, company B enables the collaborating employees to personalize their informational resources, which reduces complexity in line with customer preferences and helps customers find the resources they need to make a decision.

2.3. Idea platforms. Company C, a firm in the chemical industry, uses various channels strategically and in parallel to capture broad innovation ideas and then condenses these insights through internal channels.

Companies have greater opportunities to meet lead users online, and these customers often have focused requirements that cannot be fulfilled by current market solutions (von Hippel, 1986). Trend setting requirements enable companies to allocate their research and development activities more effectively (von Hippel, 1986). Furthermore, because of highly specialized interests and heterogeneous knowledge, members of lead user groups also might provide the missing links for open research tasks (Payne et al., 2008). To expand its idea pool, company C regularly arranges idea competitions on an open innovation platform, on which participants with specialized knowledge try to contribute to various innovation projects. Even though the open tenders are anonymous, a constant risk exists that customers or competitors will recognize the innovation potential of the tasks and apply it to their own research issues and patents (Enkel et al., 2005). In this context, company C shares a network, which also is used by other chemical companies. Therefore, company C additionally tries to establish relational-based interactions on the Internet. More exclusively, company C invites users to contact innovation scouts through a direct line on its own web site, which can be used for any kind of collaboration suggestion. Nevertheless, to achieve more coupled processes, the strategically focused research projects remain embedded in a more defined online environment that features protected interactive channels between participating partners, who include customers, suppliers, and universities. The collaborative efforts not only focus on innovation issues but also jointly bring new products to the market and label the innovations using co-brands. When a research project has been established, the electronic network contributes to structured idea development and, despite their different role assignments, keeps research actors connected, which intensifies their communication. Very fast exchange

channels, such as instant messaging, chats, or virtual worlds for complex visual representations, have not yet been used, though IT managers expect such an integration when the technologies securing online environments become sufficiently well established.

Idea platforms entail a constant trade-off between openness, to reach a critical mass of lead users, and exclusivity, to protect core idea material. Beyond the explicit knowledge they gain through customer integration, researchers also connect more strongly to the competences and visions of users in distant markets through these channels. The experiences and insights from different external market encounters, collected by researchers in various departments, get condensed in an internal knowledge platform. On electronic discussion boards, the company's employees project important future trends and developments. Although incomplete and composed solely of verbal formulations, virtual idea platforms provide an emerging forum for external and internal impulses that pushes them to the stages of the value chain that know best how to capitalize on their market value.

2.4. Cross-linked activities. Company D, a manufacturer in the automotive industry, creates customized purchase opportunities using an electronic network infrastructure that connects more than 1,000 suppliers. Because the automotive sector represents one of the most progressive high-tech industries, according to the interviewed managers, it provides an arena for initial testing of network innovations and therefore an instructive example for cross-linked activities.

The integration of chains of customers, or even individual consumers, into the production process requires suppliers to translate customer input into task-related innovations. Company D faces growing information and data streams in its electronic networks. In particular, the highly complex supplier relationships challenge managers and IT specialists to minimize the interpretational spaces for participating network actors. Consumer input from a car configurator, in the form of requested modules of trims, engines, and aesthetical design options, flows into digital manufacturing, which enables the increasingly faster realizations of such choices through synchronized production and the design of fragmented modular entities. Company D can foresee only 30-40% of automotive production taking place in internal IT systems due to outsourcing; it must manage the innovation process with a network of four categories of interlinked suppliers. At the highest collaboration stage, suppliers operate in the virtual engineering environment with the same rights as the

constructors. The second stage provides the same virtual platform but delays the integration of the supplier developments into the production process. In the third stage, suppliers may access only defined spaces of web portals, and while the fourth stage does not provide elaborated structures but simply allows manual data exchange.

From the suppliers' perspective, innovating in the supply chain implies a relational basis, which Company D grants to only 1% of its suppliers. At this stage, the collaboration is not limited to task definitions, which the supplier contractually fulfills. In contrast, the implicit knowledge of the supplier and customers combines to create innovation synergies in different areas of the supply chain, which in turn result in sustainable competitive advantages for the value network.

Company D also differentiates the degrees of interaction depending on the distribution of intellectual property. Knowledge exchanges therefore relate strongly to contract designs. Suppliers receive requests to collaborate in this system, but collaborators at the highest level can anticipate customer intentions, understand them and their consequences for the production process, and apply intellectual property to develop innovative solutions that enrich the supply chain. Yet mutual trust develops only if company D provides the developmental perspectives for the network actors and protects knowledge exchange in the collaboration system by differentiating its interaction intensity with its various suppliers.

2.5. Customer clubs. Company E, a manufacturer in the electronics industry, traditionally emphasizes extensive customer care, beyond the purchase situation. Its customer relationship management consists of an advanced six-step-program that commits dealers and licensed shop owners to assist customers after the sale during their usage situation. During the course of the interviews for this research, company E upgraded its web site to reflect the new concept of customer interaction it had developed through its previous experiences.

Customer usage or consumption has become increasingly important for the company's service orientation. Previous members of the web community include mainly long-time brand aficionados, who are very loyal and possess a strong interest in establishing contact with the brand surroundings. These users exchanged experiences over forums without the systematic interaction with company representatives in the past, but today, virtual avatar hosts welcome new users and connect them on the basis of their answers to questions posed by experts from the company. Social interaction among these

brand customers constitutes a significant part of this new web system, which also accentuates the local environment of these users. Through linkages to the internal customer relationship management system, local dealers become more strongly integrated with customer contact points on the web portal. Customers navigate through a three-dimensional web environment and engage in encounters with the firm's implementation knowledge to provide solutions to problems. For example, the user receives messages from the local dealer, invitations to online presentations or local events, and personal user guides, which refer only to that user's individual requirements.

Company E also tries to learn more about this very important, loyal group of customers. Previously, various questionnaires and open question boxes tried to gather information about how users applied products. Although interesting for marketing purposes, this procedure produced no surprising insights for product development. Instead, direct contacts with experts should offer greater understanding about product usage, because the customer service department will answer a variety of queries, then share the knowledge they gain with dealers and different marketing teams. By analyzing such online discussions, the company can also try to filter out information that might be useful for the internal research and development staff. Therefore, in this new iteration, web interaction represents a relational device for keeping in touch with loyal customers and revitalizing the brand experience during product usage.

2.6. Recommendation networks. Company F, a firm in the IT industry, offers a way to connect consumers via mobile phone, both among one another and with retailers and manufacturers. The newly launched platform with companies from consumer electronics, fashion, and grocery retail sectors was in its pilot phase during our interview. Specifically, company F provides an informational infrastructure for special offers, service and brand information, retail prices, and interactive contents, which consumers can access online with their mobile phone cameras.

Consumers who increasingly are faced with multiple options in the urban shopping environment can provide recommendations that help electronic systems build their reputations. Certain user groups thus act as influencers by spreading word of mouth. High-income professionals with a strong technological affinity and young customers value the social dimensions of shopping and use this technology to connect with a consumption network build around their preferred lifestyle-oriented product categories. Company F enables these user groups to share opinions and experiences and

communicate their consumption-related status. The platform also multiplies social exchanges during the buying cycle, such that customers evaluate the relationship experience they had in the service settings during social interactions and thereby ensure better service matches. Companies foster such active recommendations by installing network interfaces, which link to service data. After a consumer has scanned a barcode, he or she can add supplier information to a wish list that is visible to consumers in his or her social network. Company F also connects to other social networks such as Facebook and allows users to list information about products and services in their user profiles. In a further step, customers might use this information in so-called “mash-ups” to combine different applications, such as maps, evaluations, and service-specific data, and thus apply new operant resources. Through this mechanism, service activities occur where value is maximized.

Collaborating suppliers receive rich field mobile data from a group of customers that is strongly involved in reputation building. Marketing departments can assess the contexts that mark when consumers express an interest in brands or services and when they share that interest with others, because company F planned to update the profiles of each involved consumer with his or her requested products of interest, stores, locations, and time. It also can interface with data from loyalty card programs. Virtual maps of stores were planned to depict even the behavior of non-buyers, such as when they might negatively react to marketing campaigns. Mixed teams of customer relationship managers then identify important shopping occasions and try to build deeper service relationships based on context-adequate information and price differentiation, using “cash-back” as incentives for recommendations.

2.7. Cross-case differences in value propositions.

Each case exemplifies a different value proposition which can be categorized according to different stages of the consumption circle. Successful value propositions address goals both from the perspectives of the customer and supplier: (1) Interest channels address customers, such as institutional representatives of companies, who have yet to establish an interest or need for an offer of a supplier; (2) If the customer already has identified his or her need and is in the process of information search, information agents create value by supporting the process through to the decision stage; (3) Idea platforms provide opportunities to integrate different situational requisites across a huge amount of users into problem identification and solution; (4) Cross-linked activities build on the stage of

purchase, such that value arises from the synchronized performance design between network partners through the Internet; (5) Customer clubs create an infrastructure for the exchange of information and experience with implementation opportunities, which then enhances product usage by customers in the after-sales phase; (6) Value arises in recommendation networks if customers evaluate their encounters with suppliers in their social environment after having gained experience from product usage.

As a common characteristic of cases (1)-(3), co-creation supports the attraction of customers in advance of the point of purchase where open innovation relates to early phases of the consumption circle. In contrast, co-creation can also support the retention of customers after the purchase as shown by the open innovation at the end of the consumption circle in cases (3)-(4).

2.8. Cross-case differences in value network configurations.

The different value propositions associated with co-creation determine the different configurations of the value network. As shown by the cross-case analysis, the Internet favors collaboration with different network actors, connected by the common value proposition and directed by a network leader (see Table 1). Outside-in and inside-out perspectives thus are transformed as a result of the exchange mechanism into a coupled process. Idea platforms and cross-linked activities contribute to allocation processes and thereby relate mainly to upstream-processes, involving functional entities such as research, development, procurement, engineering, manufacturing, and operations. In contrast, information agents and customer clubs deal with the pre- and after-sales phases, which Porter (1985) assigns to the service area. Network leaders for these intermediate-processes are service, support and customer relationship management departments. In the downstream direction, interest channels and recommendation networks provide better matching processes in the market, which involves marketing, public relations, promotion, customer relationship management, advertising, and sales departments. As a result of the interconnected activities undertaken between customers and suppliers on the Internet, the architecture of the value chain changes from a single-directed stream directed toward the customer to a loop of value exchange.

In sum, our cross-case analysis demonstrates that the different forms of co-creation require different value network configurations. While based on stages of customer's buying process, each distinctive value proposition, as a cohesive element, coordinates all activities across participating network actors.

2.9. Cross-case differences in modes of interaction. The cross-case analysis reveals also differences in the mode of interaction for open innovation between customers and suppliers. Our macro-perspective framework differentiates the modes of interaction according to the three characteristics power, relationships, and coordination. The cross-case analysis shows that the modes of interaction are determined by the network leader. Based on the three characteristics, the modes of interaction have major consequences for the collaboration among the network partners. Our framework contributes to explaining these differences in modes of interaction based on the value propositions and value network configurations presented in Figure 1 (see Appendix).

2.9.1. Power. Major differences regarding the power constellations occur between “upstream” and “downstream” processes (see Figure 1 in Appendix). Strongly associated with power, reputation turns out to be a central component for open innovation in general. Reputation is a precondition for network leaders to coordinate the upstream-processes in the value network. Network leaders in idea platforms and cross-linked activities therefore possess a power position and exert their influence in the value network to make resources available from their network partners. For open innovation in downstream-processes, reputation is not always a precondition but a goal for network leaders to coordinate a value network. Network leaders in interest channels and recommendation networks try to gain influence by initiating multiple contacts that may contribute to the value network.

2.9.2. Relationships. Our cross-case analysis shows that relationships are characterized by formal ties in upstream-processes and by informal ties in downstream-processes. Network leaders in “downstream” value networks establish informal ties to target customers and build up interfaces in the extended social network. Interest channels and recommendation networks therefore serve as an instrument to open up structures. On the contrary, network leaders in idea platforms and cross-linked activities try to determine structures for better controlling upstream-processes and therefore create a network consisting of formal ties. These formal ties in upstream-processes often have differing degrees of rights and duties that are mostly fixed in legal contracts. Particularly network leaders of intermediate processes such as information agents and customer clubs focus on personal interactions through accompanying phone calls or live-chats to more strongly personalize the customer relationship.

2.9.3. Coordination. The synchronicity of processes depends on the upstream or downstream direction of

coordination. Network leaders of idea platforms and cross-linked activities try to create simultaneous, automatic, and synchronized processes in the value network that they define together with their network partners in advance. In contrast, interest channels and recommendation networks are based on asynchronous, and often random interactions across value network partners. For example, in interest channels, the coordination of network partners is flexible depending on insights into a customer’s extended buying center. In upstream-processes, value network partners are coordinated as loose entities that permanently change the structure of the value network. Network leaders in intermediate-processes such as information agents and customer clubs have balanced power, relationship, and coordination mechanisms that optimally enable a frictionless information exchange.

Discussion

Co-creation encompasses all stages of the value chain. To realize a sustainable competitive advantage, firms must coordinate all activities across participating business units in the arising value network, using a relational view of the firm (Dyer and Sing, 1998). This cross-case study outlined the value propositions, value network configuration, and modes of interaction for coupled open innovation interactions on the Internet. By analyzing different value propositions as cohesive elements, we show that open innovation can change the traditional architecture of the value chain from a single-directed stream to a loop of knowledge exchange that includes almost every vertical stage.

Open innovation on the Internet differs depending on the underlying value propositions which are arranged according to customers’ stages of the consumption circle. To realize successful co-creation in the different stages, companies must involve different functional entities in the value network which were analyzed in this study. We find that our framework explains differences in the modes of interaction between the network leader and partners in the value network regarding power, relationships, and coordination. Based on this framework, companies can identify in which areas they can use open innovation. We provided detailed description of the cases that outline the major challenges and opportunities for implementing co-creation processes.

As the common denominator across all cases, the different forms of customer-supplier co-creation all transfer knowledge into multiple areas of companies and make it perceptible. Our cross-case analysis reveals one major benefit of electronic systems; they

capture insights and knowledge about customers for all functional areas, which otherwise would have been lost or restricted to certain functional departments. The resulting knowledge management challenge therefore is to encode knowledge with interdisciplinary teams and find ways to distribute and internalize that knowledge to different areas of the company (von Krogh and Nonaka, 2000). Challenged by idea platforms and cross-linked activities, engineers developed better understanding about the tasks given to marketing departments and therefore implicitly considered the downstream challenges associated with the product and service solutions they designed. Similarly, interest channels increased the problem-solving capability of a salesperson when that salesperson understood the collaboration process underway in technical departments and the required solutions expected by a relationship approach (Leonard and Sensiper, 1998).

The macro-perspective framework provides new angles to investigate open innovation. The power mechanisms in upstream-processes indicate a problem for small and medium companies that are often not in the position to exert major influence on network partners. Future research should explore how those companies can compensate their lack of power in leading upstream collaborative processes (cp. also Hutter et al., 2013). According to the framework, potential tensions arise between sales or marketing departments that look for open structures with many informal ties and procurement or development departments that determine structures selectively with formal ties. Future research therefore should investigate how companies in value networks balance their often conflicting interests. Additional insight is needed how functional entities can cooperate more closely to allocate the implicit knowledge gained through open innovation. Our framework provides a macro-perspective model that can be used as a vantage point from which to further investigate how knowledge can be more effectively organized and preserved in companies and across partners in the newly evolving value networks.

Conclusion

Companies can use the macro-perspective framework to identify opportunities for open innovation. Managers have to consider at least four different challenges for realizing the co-creation processes in the value network.

Identify where knowledge can contribute most. As co-creation processes are driven based on specific value propositions, managers must identify which form of co-creation can be best aligned with the core value proposition of the company's business

model. Key to such identification is the question where knowledge from coupled processes can be translated into innovations that strengthen the company's competitive advantage. Whereas open innovation is often discussed for upstream-processes such as research and development, intermediate- and downstream processes will also be increasingly based on innovations that result from coupled co-creation. Involved departments of the company must already have a strong culture of knowledge management and the capabilities to translate new insights into innovations.

Select value network partners based on their knowledge potential, not sales contribution. As the mechanisms of co-creation are grounded on a relational view of the firm, companies must consider the future-oriented competitiveness of their value network. To gain insights for innovation, companies should set up the value network based on the knowledge potentials of partners for co-evolving the value network. Thus, the selection of partners in the value network should not be based merely on their current sales contribution, but on the capabilities of partners for complementing the company's core value proposition (Gupta et al., 2004). Importantly, incentives ensure sustainable network participation only if these incentives are integrated into the value proposition as a cohesive element.

Create modes of interaction that enable adaptive structures for learning. Coupled co-creation processes often result in innovations that had not been anticipated by the members of the value network. Open innovation can lead the value network to a path of radical innovations in which an adaptation of goals is needed. Electronic systems can help identify weak signals that have high innovation potential (Ansoff, 1975). The captured knowledge in electronic systems then must be deciphered through collaboration, often across the corporate borders in the value network. To learn more about the weak signals for innovation, the network leader must additionally adapt electronic systems and the modes of interaction. Both the architecture of information technology and the constellation of the value network have to be open for adaptive changes.

Leverage weak signals into innovation by strengthening research capabilities. To exploit the innovation potential, companies must be able to interpret the weak signals captured in electronic systems. This exploitation process often requires complementary research activities that can test competing interpretations against each other. Own research capabilities are therefore not only needed for upstream-processes (such as in the classical research and development), but increasingly also for

intermediate- and downstream-processes (e.g., in service, marketing, and sales departments). To adapt the weak signals to the specific context of the value network, the network leader must consider

additional market and customer characteristics in a structured process that integrates resources from different functional areas within and across the corporate borders.

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Appendix

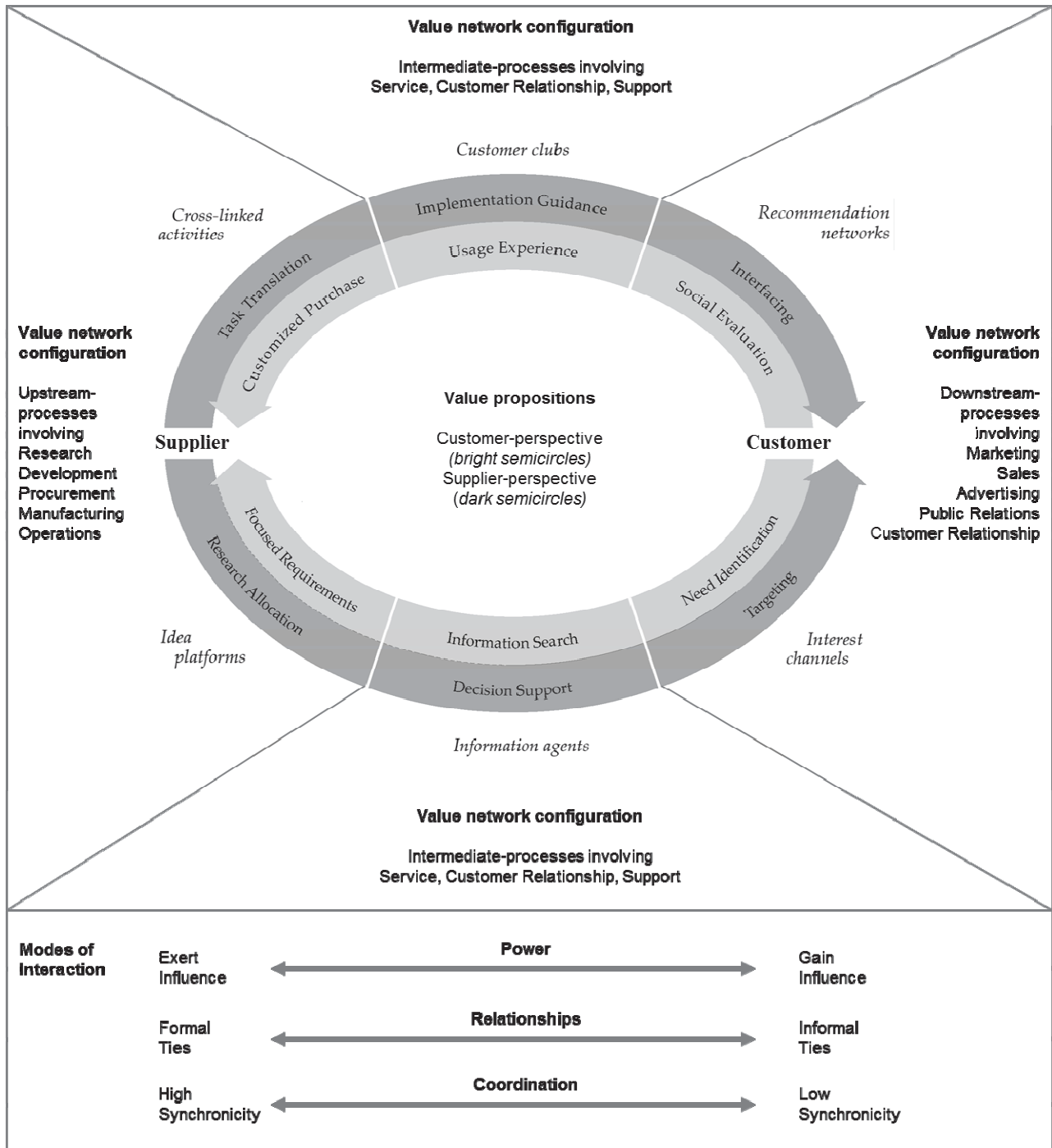


Fig. 1. Macro-perspective framework on customer-supplier interactions