

Incremental and radical open service innovation

Purpose Open service innovation is an emergent new service development practice, where knowledge on how to organize development work is scarce. The purpose of the present research is to identify and describe relevant archetypes of open service innovation. We view an archetype as an organizing template that includes the competence of participants, organizing co-creation among participants, and ties between participants. In particular, we are interested in how open service innovation archetypes are used for incremental and radical service innovation.

Methodology We performed a nested case study, in which we identified an industrial firm with nine open service innovation groups and performed 45 interviews with participants. For each case we first performed a within-case analysis and described how open service innovation was performed in practice. We then performed a cross-case analysis identifying similarities and differences between the open service innovation groups. Based on the cross-case analysis, we identified three archetypes for open service innovation.

Findings The nested case study identified three archetypes for open service innovation: (1) Internal Group Development; (2) Satellite Team Development, and (3) Rocket Team Development. We show that different archetypes are used for incremental and radical service innovation and that a firm can have multiple open service innovation groups using different archetypes.

Practical implications This study provides suggestions on how firms can organize for open service innovation. The identified archetypes can guide managers to set up, develop, or be part of open service innovation groups.

Originality/value This article uses open service innovation as a mid-range theory to extend existing research on new service development in networks or service ecosystems. In particular, it shows how open service innovation can be organized to develop both incremental and radical service innovations.

Paper type Research paper

Keywords: incremental innovation, new service development, nested case study, open innovation, radical innovation, service innovation

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Introduction

New service development (NSD) is a key process in service firms (Edvardsson et al., 2013; Johnes and Storey, 1998). It is often based on co-creating new knowledge with customers through involving them in the NSD process (Magnusson et al., 2003; Melton and Hartline, 2015). Especially in the business-to-business (B2B) market, research suggests involving other actors such as suppliers, partners, and even competitors (Syson and Perks, 2004; Lusch and Nambisan, 2015). Beyond existing models based on high-profile cases such as Google and IBM, there is scarce knowledge on how to organize open service innovation. Mina et al. (2014) argue that open innovation for services is different from products, but research provides no knowledge on taking this difference into account to organize open service innovation, which is especially relevant for industrial firms in a B2B market using open innovation for both products and services (Visnjic et al., 2016).

Open innovation takes advantage of external knowledge and access to new market channels for developing products and services. Chesbrough and Bogers (2014) viewed open innovation as an innovation process based on knowledge flows across organizational boundaries that transforms a closed development process into an open development process (Elmqvist et al., 2009). Although ample research exists on open innovation for products, open service innovation has not yet been researched to the same extent (Mina et al., 2014; Randhawa et al., 2016). In a recent literature review on open innovation, Randhawa et al. (2016) argue that the service aspects of open innovation have received limited research attention, and that the conceptualization and theorization of open service innovation need to be couched in service marketing theories. In the NSD literature, concepts such as NSD in networks (Syson and Perks, 2004; Lee et al., 2009; Gottfridsson, 2014) and service innovation in ecosystems (Mele et al., 2014) have been used to describe innovation processes where

several actors are involved and benefit from the process. These studies have made important contributions to service research by showing that NSD often take place in networks outside the traditional NSD process. Recently, Snyder et al. (2016) pointed out a major research gap concerning how firms should work with NSD to succeed with both incremental and radical service innovation. The literature on NSD in networks suggests that the network would look different, depending on if the service being developed were incremental or radical. However, present research provides no knowledge on what types of resources to use and how to organize for open service innovation; research is especially scant on how it differs between incremental and radical service innovation (Witell et al., 2016).

The purpose of the present research is to identify and describe relevant archetypes of open service innovation. Following Greenwood and Hinings (1996), we view an archetype as an organizing template including the competence of participants, organizing co-creation among participants, and ties between participants. In particular, we are interested in whether or not different archetypes for open service innovation are used for incremental and radical service innovation. In our nested case study (different case studies in one organization) of an industrial firm in a B2B market, we identified nine open service innovation groups and performed 45 interviews with the participants. Among the nine groups, we identified three archetypes for organizing open service innovation. The contributions of our research are threefold. First, we use open service innovation as a mid-range theory (Brodie and Gustafsson, 2016) to provide insight into how to organize open service innovation, thereby extending existing research on NSD in networks and service ecosystems. Second, we identify several archetypes for open service innovation. These archetypes are (1) Internal Group Development, (2) Satellite Team Development, and (3) Rocket Team Development. Thereby, we extend existing research on NSD in networks that mainly provide conceptual contributions (Mele et al., 2014) or case descriptions (Syson and Perks, 2004). Third, research on open

service innovation has extensively been promoted as a strategy for radical service innovation (Mina et al., 2014). Our research clearly shows that it can be used for developing both incremental and radical service innovation, but that different archetypes are needed. For managers, the research shows relevance in how to put the three archetypes for open service innovation into practice.

The remainder of the manuscript is organized as follows. First, the theoretical background is presented based on the concepts of service innovation and open service innovation. Second, the method is presented and the nested case study is introduced with details on the cases and an explanation of the analysis. Third, the findings are presented with a focus on the three identified archetypes of open service innovation. Quotes and details from the nine open service innovation groups are presented to describe and explain how open service innovation is organized in practice. The manuscript ends with a discussion of the findings providing both theoretical and managerial implications.

Theoretical Background

Service innovation

Innovations consist of new combinations of existing resources, while innovating refers to the process of developing a new service (Witell et al., 2016). Arthur (2009) emphasize that innovating often concerns finding cheaper and more efficient ways or borrowing ideas from other markets and applying them in new ways (Arthur, 2009). Following this line of reasoning, Lusch and Nambisan (2015 p. 161) considered service innovation as “the rebundling of diverse resources that create novel resources that are beneficial ... to some actors in a given context.” Skålen et al. (2015) view resource integration as the core of service innovation, emphasizing both the resources and the practices through which the resources are integrated. Service innovation uses opportunities to create new combinations of resources derived from established knowledge and existing technology, taking place between multiple

actors and networks of actors (Ballantyne et al., 2011). From a customer perspective, how the new combinations of resources are developed is not important; the key is the value co-created through the new service (Snyder et al., 2016).

Ordanini and Parasuraman (2011, p. 10) view service innovation “as the extent to which a firm’s new services differ drastically from current offerings and require major changes in the application of competences.” The novelty of a radical service innovation could include a new policy, a transformed process, a new service, or a new configuration of an existing service and it can stand out through the newness of the offering or the market (Harris, McAdam, McCausland, and Reid, 2013). Based on a literature review, Snyder et al. (2016) concluded that incremental and radical are the most common categories of service innovation. However, the difference between the two is not clearly defined (Gustafsson et al., 2012). One exception is Gallouj and Weinstein (1997), who suggest that incremental service innovation means adding to or improving performance of existing characteristics of the service, while radical service innovation means introducing a new set of characteristics not related to existing ones. Based on the theoretical background, we view service innovation as recombinative, and new combinations of resources can be either incremental or radical. With incremental service innovation, we mean combinations of resources that improve performance along existing characteristics, while radical service innovation concerns combinations of resources that improve performance through a new set of characteristics.

A NSD perspective on open service innovation

Open service innovation extends existing models of NSD (Chesbrough et al., 2006). It suggests an open development process (West et al., 2014) in which exchange of technologies, ideas, and information allows competing firms to develop new services together (Wallin and Von Krogh, 2010; Elmquist et al., 2009). This strategy is used by firms such as Microsoft, GE and Google as a way to develop services together with young entrepreneurial firms. In

literature, open innovation is still often viewed as an internal development process where external knowledge acquisition is an important activity (Elmquist et al, 2009). For open service innovation to enrich research on service innovation, we need to adopt a combination of outside-in and inside-out open service innovation.

To manage open service innovation, firms need to cooperate in strategic networks characterized by profound interactions among partners over a longer period. Piller and West (2014) stressed that firms engaged in open service innovation need to identify the right external partners with which to cooperate. In addition, they emphasized that an organizing template, i.e., how to design the relationship and the bidirectional process of innovation with external actors, needs to be in place. In open service innovation, the innovation process occurs during interactive collaboration through which knowledge creation occurs outside a particular firm in collaborative activities (Piller and West, 2014; Randhawa et al., 2016).

Piller and West (2014 p. 39) used co-creation as their theoretical foundation of open service innovation and viewed it as “an active, creative, and collaborative process between a firm and individuals during a new product/service development process in which participants contribute to a task initiated and facilitated by the firm.” In service research, co-creation has traditionally focused on the supplier–customer dyad but has expanded to incorporate co-creation among multiple actors (Vargo and Lusch, 2008). To use co-created knowledge and comprehend important external trends, a firm requires absorptive competence (Lusch et al., 2007), which is central to service innovation and the process of developing existing value propositions or creating new ones (Michel et al., 2008; Skålen et al., 2014).

If we view service innovation as a recombination of resources, open innovation should address both incremental and radical service innovation. However, present research on open service innovation emphasizes it mainly as a strategy for developing radical service innovation. Open service innovation concerns working more closely with customers to

develop new services (Chesbrough, 2011), focusing on value rather than the product (Grönroos, 1997), and becoming embedded in the customer's organization (Oliva and Kallenberg, 2003), where customer involvement has a positive influence on the innovativeness of new services (Melton and Hartline, 2015). Higher project complexity and novelty demand greater knowledge sharing and communication intensity (Mina et al., 2014; Hsieh and Tidd, 2012). Firms that adopt open innovation reduce their boundaries with the surrounding environment, enabling innovations to move more easily among them (Elmquist et al., 2009).

We operationalize archetypes, i.e., organizing templates, of open service innovation (Piller and West, 2014) through three dimensions: competence of participants (homogeneous or heterogeneous), organizing co-creation among participants (open service innovation group or integrated development team), and ties between participants (formal or informal and deep or wide). We describe the three dimensions in detail as follows.

Competence of participants

For open service innovation projects, a key is to identify and recruit internal and external participants, focusing on individuals with relevant skills and an interest in participating (Piller and West, 2014). External participants refer to suppliers, customers, and competitors, and may also include nonprofit organizations such as universities, research labs, and citizens. A participant's profession, knowledge, creativity, and experience influence his or her ability and willingness to participate in open innovation projects (Füller et al., 2009; Piller and West, 2014). If the participants' competencies are homogeneous, it means that they have common educational background and knowledge. A multidisciplinary, cross-functional approach to open service innovation uses diversity as an intellectual resource to facilitate sharing ideas and knowledge across participants (Melton and Hartline, 2013). In other words, the team

captures participants' capabilities and consists of individuals with a diverse set of knowledge and skills (Edvardsson et al., 2013), i.e., with heterogeneous competences.

Organizing co-creation among participants

A firm adopting open service innovation assumes that the NSD process will be redesigned (Giannopolou et al., 2011). Research on NSD suggests alternative development processes based on stage-gate processes, using between three to 15 phases (Edvardsson et al., 2013; Johne and Storey, 1998). The process often starts with an idea and ends in market launch and implementation. In the present research, we view the NSD process through four stages: market sensing, development, sales, and delivery (Kindström and Kowalkowski, 2009). This process covers a broader range of activities compared with traditional NSD processes, emphasizing that later NSD stages (such as sales and delivery) must be given greater importance to successfully develop services.

We differentiate between open innovation groups and integrated development teams. It is essential that an open innovation group cooperates across organizational boundaries and disciplines (Lin and Hsieh, 2014), such as that external actors in the value network or the service ecosystem are involved in the development work. An open innovation group has participants from different organizations that meet during a longer period, whereas an integrated development team is a group that performs the operational work of developing a new service. Melton and Hartline (2015) argue that the greater the use of integrated development teams across the stages of the NSD process, the greater the use of their diverse skills and perspectives, and this the easier to draw on organizational and external resources. One particular characteristic of an open service innovation group is that it does not replace integrated development teams (Edvardsson et al., 2013; Melton and Hartline, 2015), but complements the process, building on newly created knowledge, used later by integrated development teams (Hsieh and Tidd, 2012). An open innovation group and an integrated

development team can include the same participants or consist of different ones. The intensity and the richness of the interactions between participants determine how much open service innovation groups or integrated development teams can recombine resources to find solutions to problems and, finally, create new services (Paulraj et al., 2008).

Ties between participants

Frequently, service innovation results from repeated interactions between the firms and participants involved (Simard and West, 2006), making trust an important coordination mechanism (Powell, 1990). To gain knowledge from external cooperations, a firm forms different types of ties with participants (Powell et al., 1999; Baum et al., 2000). The ties are formal or informal (Vanhaverbeke, 2006), and deep or wide (Simard and West, 2006); different types of ties provide different types of knowledge (Powell et al., 1999; Baum et al., 2000). Formal ties are planned channels of knowledge transfer between organizations, often ruled by agreements or contracts, enabling firms to fill internal knowledge gaps. Typically, formal ties are incorporated in open innovation strategies (Simard and West, 2006). Informal ties involve unplanned or unforeseen actions, such as labor movements, between firms and organizational affiliations, which can lead to unexpected knowledge spillovers (Simard and West, 2006). Because service businesses are highly interactive and relational, they favor informal rather than formal ties (Mina et al., 2014).

When firms embed themselves in open service innovation groups and establish trust in one another, the ties deepen. Deeper ties enable valuable information and knowledge exchange, positively affecting the outcome (Hsueh et al., 2010; Uzzi, 1996, 1997). However, there can be a threshold created when deepened ties enhance the risks of over-embeddedness such that the open service innovation group becomes closed to external information (Simard and West, 2006; Uzzi, 1997). Open service innovation groups with deep ties are characterized by redundant information that overlaps with existing knowledge bases, leading to incremental

innovations (Vanhaverbeke, 2006). To overcome the shortcomings of over-embeddedness, open service innovation groups can form wide ties, or arm's-length ties, based on sporadic rather than frequent interactions between participants (Granovetter, 1973; Simard and West, 2006). Open service innovation groups with wide ties give participating firms access to non-redundant information, increasing innovation potential (Granovetter, 1973; Vanhaverbeke, 2006).

Method

A nested case study

To identify and describe archetypes of open service innovation, we employed a nested case study approach (Yin, 2014; Gibbert and Ruigrok, 2010). Case study research is beneficial to develop theory by observing actual practice (Meredith, 1998). In addition, cases can be used as illustrations or to further develop existing theory by pointing to and exploring research gaps (Siggelkow, 2007). A single firm may involve a number of different cases that enable comparisons that clarify whether an emergent result can be consistently replicated (Eisenhardt and Graebner, 2007; Voss et al., 2002). We performed an in-depth study of multiple open service innovation groups in a case firm. The choice to perform a nested case study in a single firm was based on that: (1) the case firm has been able to grow their business during the last 17 years, with the new services behind this growth all developed through open service innovation; (2) the research team was promised full access to the open service innovation groups, including interviews, observations, and internal documentation. The choice of a nested case study allowed us to do cross-case comparisons, where the external environment was the same or similar across the cases. As a consequence, the similarities and differences across the cases should be attributed to the internal environment in the open service innovation groups. After getting access, we identified nine open service innovation groups in the case firm.

Study object

The case firm (called innovator firm) is owned jointly by six Swedish multinational pulp and paper companies. It has formed nine open service innovation groups: delivery contracts, inventory database, structural engineering, mechanical engineering, electrical engineering, instrumental engineering, pipe engineering, surface protection, and safety. All groups are long-lived and consist of a project manager and participants from the six owner companies, with participants from other industries, such as automotive, mining, steel, and paint/surface protection.

The Swedish innovator firm further develops the concepts from these nine open service innovation groups and introduces services to the market. The open service innovation groups perform the first two stages (market sensing and development), and the innovator firm performs the last two stages (sales and delivery) (Kowalkowski and Kindström, 2009). The project manager has a crucial role as an innovation intermediary (Howells, 2006), i.e., as a link between the open service innovation groups and the marketing and scaling up activities performed by the innovator firm. The developed services can be described as services for the B2B market for industrial services, including education services, provision of standards, database services, and certification services.

Data collection

In data collection, we used triangulation through multiple methods (Voss et al., 2002). First, we performed seven in-depth interviews with project managers at the innovator firm responsible for the open service innovation groups. The interviews were conducted with the guidance of a semi-structured interview guide designed to gain a better understanding of the open service innovation groups, the participants, and development practices. In addition, the project managers were interviewed about the roles of the participants and the project manager.

Second, during 20 site visits, we performed 38 in-depth interviews with participants of the open service innovation groups (33 participants from the pulp and paper industry, one participant from the steel industry, one paint manufacturer, one surface protection inspector, and two technical consultants). The in-depth interviews were preceded by a purposive nested sampling (Miles et al., 2014) of participants with good knowledge of the development work. The interviews followed a semi-structured interview guide to reveal participants' views of the development work and the three dimensions of the archetypes of open service innovation (competence of participants, organizing co-creation among participants, and ties between participants). Altogether, we performed 45 in-depth interviews with participants in nine different open service innovation groups. The interviews were 50 to 90 minutes long and were audio recorded. All interviews were transcribed verbatim, resulting in 689 pages of written text. See Table 1 for details on the different open service innovation groups, participants, and interviews conducted.

Third, one of the authors visited six meetings in the open service innovation groups. Secondary sources were also used, such as historical documentation on the development of the open service innovation groups, strategy documents of the innovator firm and the open service innovation groups, and online information (Visconti, 2010). The publicly accessible information and internal documents, combined with the data gathered through the interviews, created opportunities for data source triangulation (Miles et al., 2014; Yin, 2014; Visconti, 2010).

- Insert Table 1 about here -

Data analysis

Data analysis was divided in two parts, a within-case analysis followed by a cross-case analysis. First, the transcribed interviews were imported into QSR NVivo and inductively coded, categorized, and analyzed using a within-case approach. For each case, we created a

description of the open service innovation group based on the three dimensions derived in the theoretical framework. We used both text and visual displays to get an understanding of how open service innovation appeared in practice. To search for data patterns, we also used memos, notes from the interviews, observations from the meetings, information from secondary sources, and tables. For transparency of how the archetypes were derived, the appendix includes quotes for each open innovation group on the investigated dimensions.

Second, the data analysis continued with a cross-case analysis. The researchers matched, contrasted, and sorted different descriptions of the open service innovation groups, resulting in a set of tables and templates on how to organize open service innovation (Yin, 2014; Miles et al., 2014). We followed an iterative process, where the graphical displays were sorted into archetypes based on their distinguishing features. The suggested archetypes were analyzed based on the case descriptions, and re-sorting of the cases was performed until an agreement on the archetypes could be reached. We identified the purpose of the group, competence of participants, organizing co-creation among participants, and ties between participants. This iterative process among the members of the research team tested the credibility of the findings (Hirschman, 1986). We revisited the innovator firm's project managers several times during the research process to confirm our findings and increase the external validity of the research.

Findings

The innovator firm organizes the open service innovation groups, turning their ideas and concepts into commercial services. Each of the open service innovation groups is organized as a team of participants facilitated by a project manager from the innovator firm.

When analyzing the nine open service innovation groups, we identified three archetypes of open service innovation: (1) Internal Group Development, (2) Satellite Team Development, and (3) Rocket Team Development. Of the nine open innovation groups, at

least two innovation groups used each archetype. There are some general traits across the three archetypes of open service innovation: (a) it is the participants in the groups who make decisions about the innovations to pursue, not the project manager; (b) the participants are not allowed to interfere with the innovator firm's business model; and finally (c) open service innovation group participants were not paid (Boudreau and Lakhani, 2009). In the following, we will discuss the three archetypes in more detail, see Figure 1.

- Insert Figure 1 about here -

Archetype 1: Internal Group Development

The first archetype, "Internal Group Development," is used by three open service innovation groups to perform incremental service innovation. Three groups work with delivery contract (DC), inventory database (ID), and structural engineering (SE), mainly to improve existing services. For each open service innovation group, participant competences are homogeneous; in other words, participants have common educational backgrounds and knowledge. The concepts used have the same meaning for all participants, and the discussion can be very detailed. In the DC group, all participants are purchase managers or business lawyers. A participant described the group: "We need people with profound experience of procurement work and often it is purchase managers, and normally two to three business lawyers." The ID group members were purchasing managers or logistics managers, and in the SE group the members were structural engineers or technical consultants.

The development work is performed within the open service innovation groups and concerns improvement of existing characteristics. In the DC group, development work concerns maintenance and improvements of delivery contracts. One member described the situation as, "I rather say we work together but sometimes we also work in sub-groups [within the innovation group] if certain competence is needed." The ID group's objective is to maintain and improve a database, and most of the development occurs within the open service

innovation group. When new functionality is required, it occasionally forms development teams with super-users. Due to resource scarcity, development is often performed within the open service innovation groups. One participant in the structural engineering (SD) group stated, “We don’t have the time or energy to engage in finding solutions, making calculations and blueprints so we have invited two technical consultants to the group.”

In this archetype, ties among participants can be characterized as formal and deep. Both the DC and ID groups have narrow objectives to improve a specific service with defined roles and shared competences among participants. Repeated interactions over several years create trust among the participants. One participant in the open service innovation group for delivery contracts described the situation as, “When you sit there [in the open service innovation group], it almost feels like you are one company, then it’s the open service innovation group that matters, then you sort of represent the innovator firm.”

Archetype 2: Satellite Team Development

The second archetype, “Satellite Team Development,” is used by four of the open service innovation groups for incremental service innovation. The four groups are mechanical engineering (ME), instrument engineering (IE), electrical engineering (EE), and pipe engineering (PE); they are dedicated to improving existing services with a focus on technical standards and guidelines. The participants worked in the pulp and paper industry and had homogeneous competences.

Development work follows a standardized process for incremental service innovation; work starts with a suggestion from the open service innovation groups, which then set up projects, and form integrated development teams. One participant from the ME group explains, “We have something we call ‘A standard for a standard’ and that’s a structured way how to produce technical standards.” The integrated development teams consist of the project manager and a member from the open service innovation group, and also technical specialists

included to perform service improvements. When the project is completed, the integrated development teams present the results to the open service innovation groups for approval.

In this archetype, the open service innovation groups rely on the deep trust developed through many years of cooperation. One participant described the situation as “I’ve never noticed that we’re supposed to keep information for yourself, if you have experienced anything advantageous you rather want to share that to others to make their work easier.” As a consequence, the ties for Satellite Team Development are less formal than for Internal Group Development.

Archetype 3: Rocket Team Development

Two open service innovation groups, surface protection (SP) and safety (S), use the third archetype, “Rocket Team Development,” to perform radical service innovation. The SP group has adopted a lifecycle perspective on surface protection and formed a mission to develop methods for creating a safe, efficient, and economically justifiable work environment. The competences of the participants are heterogeneous; one participant explains it as follows: “It’s the broadest set of competences there is to get in the surface protection group. That result in standards highly respected among all stakeholders in the [surface protection] society.”

In the SP group, senior participants initiate radical service innovation projects through putting together an integrated development team. When there is a solution, it is presented to the rest of the SP group. Integrated development teams in the S group perform the development work to find new services regarding safety. Results of a pre-study determine whether to start a development project or not. Compared with the other archetypes, the Rocket Team Development’s ties are wider and less formal. On a formal–informal continuum, both the SP and the S open service innovation groups are informal.

Discussion and implications

In the following section, we elaborate on the similarities and differences between the identified archetypes for open service innovation. In particular, we discuss how open service innovation can be used for both incremental and radical service innovation. We end by summarizing the theoretical and managerial implications, as well as limitations and suggestions for further research.

Three archetypes for organizing open service innovation were identified with distinguishing characteristics on the dimensions of the organizing template, such as competence of participants, organizing co-creation among participants, and ties between participants (see Table 2). Two of the archetypes, Internal Group Development and Satellite Group Development, fit incremental service innovation, while Rocket Group Development fits radical service innovation. Previous research has emphasized radical service innovation and used cases such as Xerox and IBM for theory development (Chesbrough, 2013). In contrast, the present research identifies open service innovation as a relevant strategy for incremental service innovation. However, it cannot be organized as described in previous research, since existing organizing templates are based on radical service innovation.

A key for open service innovation is to identify participants with the right competencies (Piller and West, 2014). The typical participant is an expert in, and has a high degree of, use knowledge (Piller and West, 2014). This study identifies two different competence setups, homogenous versus heterogeneous. In open service innovation groups that focus on incremental service innovation, homogenous competence and educational background are preferred because in-depth discussions are required for service improvements (Internal Group Development and Satellite Team Development). If open service innovation groups focus on radical service innovation, heterogeneous competences and educational background are superior (Rocket Team Development). This is consistent with previous research on NSD in a

network perspective, suggesting that radical innovation may require access to different types of resources (Syson and Perks, 2004).

In open service innovation, the development team must be organized differently, dependent on the degree of novelty (see Froehle et al., 2000; Edvardsson et al., 2013). In general, the use of integrated development teams contributes to the effectiveness of NSD (Froehle et al., 2009). Radical service innovation requires a higher intensity of interactions among participants compared to incremental service innovation (Hsieh and Tidd, 2012). We argue for the use of development within open service innovation groups when: (1) the focus is on incremental service innovation; (2) there is scarcity in specific competences; or (3) all competences exist within the group. We argue for the use of integrated development teams: (1) to decrease development time through performing several incremental service innovation projects in parallel; or (2) when the tasks concern radical service innovation and require heterogeneous competences.

In addition to influencing what and how, project novelty also influences how participants interact in an open service innovation project. In particular, projects focusing on incremental service innovation should involve participants with formal and deep ties (Simard and West, 2006). First, the roles in the development process rely on each participant's knowledge and skills. Second, participants must reveal what they know and share it with the rest of the group. Because each development team participant knows his or her role, one advantage is reduced development time. In situations in which an open service innovation group works on radical service innovation, a wider setup of ties enables knowledge spillover (Granovetter, 1973). Some participants are permanent members, and some are recruited specifically for a particular project. These wider ties are favorable for identifying the different layers of knowledge needed to develop radical service innovation.

- Insert Table 2 about here -

Theoretical implications

Our research makes several important contributions to extend research on service innovation. Recent conceptualizations of service innovation as recombination of resources (Lusch and Nambisan, 2015) fit well with theories on open service innovation. However, open service innovation is not well conceptualized, and theories on service marketing should enrich theory development (Randhawa et al., 2016). However, open service innovation has not been extensively used as a concept or scrutinized in service research. This study addresses the research gap on how to organize open service innovation (or service innovation in networks) (Syson and Perks, 2004), and how open service innovation differs between incremental and radical service innovation (Snyder et al., 2016). The present research provides an empirical investigation, and develops terminology to enrich the discussion and theory development on open service innovation. In particular, the present research makes three important theoretical contributions.

First, recent theoretical contributions on service innovation (such as Lusch and Nambisan (2015) and Mele et al. (2014)) on a general level suggest that service innovation takes place in a service ecosystem, often through processes similar to open innovation. In contrast, the present research uses open service innovation as a mid-range theory (Brodie and Gustafsson, 2016) to bridge theoretical rigor and managerial relevance (Gustafsson et al., 2015). Revisiting research agendas from 1990, Gustafsson and Bowen (2017) suggest that service research still needs more contingency theories to move away from global assertions to understand what kind of organization, under what conditions are needed (see also Voss et al. (2016)). In this tradition, the present research can provide insights into how to organize development work on service innovation within service ecosystems, and how ways of organizing might differ between incremental and radical service innovation.

Second, this study shows that open service innovation is not built on one archetype but that there is a range of organizing templates that fit different types of development work. This extends previous research on open service innovation that thus far has focused on differences in open innovation for products and services (Mina et al., 2014). The nested case study identifies three conceptually and empirically different archetypes for open service innovation. These archetypes are “Internal Group Development,” “Satellite Team Development,” and “Rocket Team Development” that differ in the dimensions of the organizing template. This contribution answers the call for service marketing to enrich theory development on open service innovation (Randhawa et al., 2016) and it complements existing models of NSD that often strictly follows a stage-gate approach (Edvardsson et al., 2013).

Third, previous research on open service innovation has focused on radical service innovation (Chesbrough, 2011; Mina et al., 2014). However, the present research suggests that open service innovation can be a strategy for incremental service innovation. In fact, two of the identified archetypes are used for incremental service innovation. In addition to previous research in NSD showing that different sets of resources are needed for incremental and radical service innovation (Syson and Perks, 2004), the present research shows that there are additional differences on how to organize the development work and how to enable interaction between participants. Especially in the era of platforms (Lusch and Nambisan, 2015), open service innovation can become a strategy of cooperation to create a sustainable service business (Visnjic et al., 2016). Open service innovation reduces boundaries between firms, enabling innovations to move easily among them. This is beneficial for both incremental and radical service innovation, because both must be further improved after market introduction to build a sustainable service business and uphold a competitive advantage.

Managerial implications

This study provides guidance on how firms can organize for open service innovation. The identified archetypes can guide managers who plan to set up, develop, and be part of open service innovation. Organizations can run parallel open innovation groups, where some archetypes are suited for incremental service innovation and others for radical service innovation. Over time, open service innovation groups should switch between different archetypes, dependent on the development project, i.e., suggesting a modular model for open service innovation; see, e.g., Jaakola et al. (2017).

The Internal Group Development archetype is designed for incremental service innovation. One formula is to gather senior participants within the area of interest, obtain agreement on what needs to be done, and run all development work within the group. The Satellite Team Development archetype suits a narrow objective focusing on standardized incremental service innovation. Due to a larger number of tasks, more participants need to be involved using less formal ties than for Internal Group Development. The development work occurs in integrated development teams of specialists and, consequently, greater coordination between the open service innovation group and the integrated development teams is required. The Rocket Team Development archetype concerns projects for radical service innovation. A cross-functional team of senior participants with heterogeneous competences should be put together. This type of open service innovation group should have informal and wide ties among participants. The development work can occur within the group or be outsourced to an integrated development team.

Limitations and further research

There are several limitations to this research. First, a study of the nine open service innovation groups was performed in a single firm working in a B2B context. Although a nested case study approach produces benefits from a research design perspective, we acknowledge the

limited generalizability of our results based on nine cases. In addition, we have been cautious not to over-interpret the meaning of individual events. We do not claim to have identified all existing archetypes for open service innovation, and we hope that further research in additional empirical contexts can enrich the identified set of archetypes. Further, we have focused on three dimensions of the organizational template, and further research could enrich our archetypes through analyzing their differences and similarities in additional dimensions. Following this line of reasoning, enriching research on open service innovation using service dominant logic could be beneficial, especially to couch archetypes within the role of institutions for service innovation (Vargo et al., 2015).

Second, the study concerned recent open service innovation projects. We did not investigate if a service innovation group could switch between different archetypes of open service innovation or if groups were limited to using a specific archetype as their organizational template. In addition, although we used observations at group meetings in the different open service innovation groups, a study performed in real time, longitudinally, rather than relying on retrospectives, could have provided additional insights.

Further large-scale research studies on open service innovation would be beneficial to identify additional contingencies beyond incremental and radical open service innovation. Are there differences between cultures, industries and firms, and are there differences between successful and non-successful open service innovation projects?

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Table 1: An overview of the studied open service innovation groups.

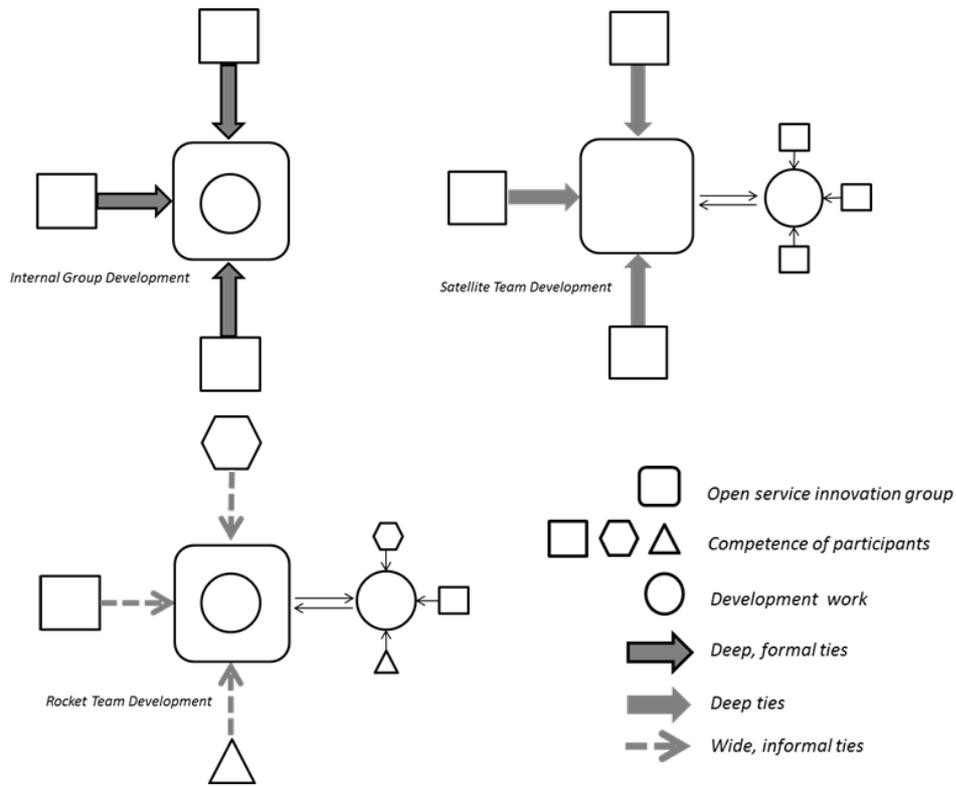
Innovation group	The Service	Tasks	Types of participants	Participants	Interviews
Delivery contract (DC)	Contracts	Maintain, improve existing service	Senior	11	5
Inventory database (IB)	Database	Maintain, improve existing service	Senior, specialist	10	5
Structural engineering (SE)	Standards, guidelines and blueprints	Maintain, improve existing and develop new services	Senior, specialist, consultant	9	5*
Mechanical engineering (ME)	Standards, guidelines and blueprints	Maintain, improve existing and develop new services	Senior, specialist	9	5
Instrument engineering (IE)	Standards, guidelines and blueprints	Maintain, improve existing and develop new services	Senior, specialist	7	5**
Electrical engineering (EE)	Standards, guidelines and blueprints	Maintain, improve existing and develop new services	Senior, specialist	10	5**
Pipe engineering (PE)	Standards, guidelines and blueprints	Maintain, improve existing and develop new services	Senior, specialist, consultant	12	5
Surface protection (SP)	Standards and investigations	Maintain, improve existing and develop new services with a lifecycle-perspective on surface protection	Senior, specialist, expert, manufacturer, entrepreneur	14	6*
Safety (S)	Educations and guidelines	Develop methods how to create a safe work environment	Senior (internal), senior (external), specialist	11	5

* One interview with project manager for SE and SP (same person on both teams). **One interview with project manager for IE and EE (same person on both teams).

Table 2: Overview of the open service innovation archetypes.

	Internal Group Development	Satellite Team Development	Rocket Team Development
Purpose of the group	Incremental service innovation	Incremental service innovation	Radical service innovation
Description	Maintenance and improvements of existing offerings	Maintenance and improvements of existing offerings	Development of new offerings
Organizing co-creation among participants	Homogeneous competences	Homogeneous competences	Heterogeneous competences
Organizing development work	Development within the open service innovation group. Senior participants perform the development work. Innovator firm finish and “package” service for market.	Development in integrated development teams. Senior participants from open service innovation group in charge involving specialists in development work. Open service innovation group makes decisions and innovator firm finishes and “packages” service for the market.	Development in integrated development teams. Senior participants from open service innovation groups or external experts in charge. Open service innovation group makes decisions and the innovator firm finishes and “packages” services for the market.
Ties between participants	Deep and formal	Deep	Wide and informal
Examples of open innovation groups	Delivery contract, Inventory database, Structural engineering	Mechanical engineering, Instrument engineering, Electrical engineering, Pipe engineering	Surface protection, Safety

Figure 1: Archetypes of open service innovation.



Appendix: Quotes from the investigated open service innovation groups.

Innovation group	Purpose of the group	Role of participants	Role of project manager (PM)	Development work
Delivery contract	It's a standardization how to carry through procurements. The contract is a collection of experience during many, many years of procurements.	We need people with profound experience of procurement work, such as purchase managers, and business lawyers	You send all information to the PM, because she is like the spider in the web.	I rather say we work together plenary but sometimes we also work in sub-groups if certain competence is needed.
Inventory database	Our objective is to help the industry to earn money, increase availability and to reduce costs.	In our group there is a spread from purchase managers to store house managers.	To a high extent it's the PM who collects information and reports during the meetings	Normally, but not always, there are members from the innovation group in the development teams.
Structural engineering	I have not been part of the development of a new standard rather we update existing standards	We don't have the time to engage in finding solutions, making calculations and blueprints so we have two technical consultants in the group.	We tell the PM what to write in the documents [what to become updated standards] and then she takes care of that.	A few members are selected for a development team, normally two from the industry and one technical consultant.
Mechanical engineering	We work with standards and guidelines for the pulp and paper industry, during my ten years it's very few new standards we have developed.	In this group we have mostly managers or engineers from the mechanical projection department or one to two maintenance managers	The PM is very dedicated and have a positive view, lots of things are happening all the time	Then we go to our firms and look for suitable persons to join the development team. We [the innovation group members] are never part of the development teams.
Instrument engineering	We are a group with participants from the owner companies with the objectives to update standards.	We are, engineers on pulp and paper plants working with instrument and automation issues, We are "automation-people"	I guess the PM] is part of all development teams, because he takes notes and keep track of the agenda and so forth.	Normally there is a member from the innovation group who is in charge for the work to be done.
Electrical engineering	The majority of the job is to update the standards and guidelines I would say.	It's all electrical engineers with responsibility for the power supply to the pulp and paper plants, most of us work with both projecting and maintenance, we are "electrician-people"	The PM don't need to be part of all development teams.	For this we need a development team and then we select a person in charge. It's in the development teams the real work takes place.
Pipe engineering	It's an existing standard we need to	It's a mix of people, skilled and competent engineers, project	The PM is part of every development team. The PM put	We form a development team and they work hard to get it

	update or maybe a complete new one.	managers, maintenance managers and consultants.	a price on the offering and release it on the market.	done as fast as they can. It's there where the actual work is done. During the development work we sometimes ask external experts for advice.
Surface protection	The purpose is to have a broad innovation group to be able to create complete standards to support procurements of surface protection	Half of the members are from the pulp and paper industry, and then there is a surface protection inspector, several paint manufacturers and a paint entrepreneur	She is part of many of the development teams as a secretary. She is like a spider in the web, make sure the development teams are formed, and keep them going.	The development team is kept within the innovation group. It's not the development group but the innovation group who make decisions.
Safety	It's a multi-technical innovation group with representation from other innovation groups who deals with workplace safety-related questions.	You need to have the right composition of knowledge and competence. Most of the members work with work environment and work safety-related issues.	The PM keeps track on the development teams since they are engaged full time.	If there is an idea that has potential we first conduct a pre-study. We want the person in charge of the development group to be a member of the innovation group.

APPENDIX:

Innovation group	Objectives	Role of participants	Role of project manager (PM)	Development work
Delivery Contract (DC)	It's a standardization how to carry through procurements. The contract is a collection of experience during many, many years of procurements.	We need people with profound experience of procurement work and often it is purchase managers, and normally 2-3 business lawyers	You send all information to the PM, because she is like the spider in the web.	I rather say we work together plenary but sometimes we also work in sub-groups if certain competence is needed.
Inventory Database (ID)	Our objective is to help the industry to earn money, increase availability and to reduce costs.	In our group there is a spread from purchase managers to store house managers.	To a high extent it's the PM who collects information and reports during the meetings	Normally I would say there are members from the innovation group in the development teams. Occasionally we have development teams without the PM or members from the innovation group.
Structural Engineering (SE)	I have not been part of the development of a new standard rather we update existing standards	We don't have the time or energy to engage in finding solutions, making calculations and blueprints so we have invited two technical consultants to the group.	We tell the PM what to write in the documents [what to become updated standards] and then she takes care of that.	A few members are selected for a development team, normally two from the industry and one technical consultant.
Mechanical Engineering (ME)	We work with standards and guidelines for the pulp and paper industry, during my ten years it's very few new standards we have developed.	In this group we have mostly managers or engineers from the mechanical projection department or one to two maintenance managers	The PM is very dedicated and have a positive view, lots of things are happening all the time	Then we go to our firms and look for suitable persons to join the development team. We [the innovation group members] are never part of the development teams.
Instrument Engineering (IE)	We are a group with participants from the owner companies with the objectives to update standards.	We are, engineers on pulp and paper plants working with instrument and automation issues, We are "automation-people"	I guess the PM] is part of all development teams, because he takes notes and keep track of the agenda and so forth.	Normally there is a member from the innovation group who is in charge for the work to be done.
Electrical Engineering (EE)	The majority of the job is to update the standards and guidelines I would say.	It's all electrical engineers with responsibility for the power supply to the pulp and paper plants, most of us work with	The PM don't need to be part of all development teams.	For this we need a development team and then we select a person in charge. It's in the development teams the real

		both projecting and maintenance, we are "electrician-people"		work takes place.
Pipe Engineering (PE)	It's an existing standard we need to update or maybe a complete new one.	It's a mix of people, skilled and competent engineers, project managers, maintenance managers and consultants.	The PM is part of every development team. The PM put a price on the offering and release it on the market.	We form a development team and they work hard to get it done as fast as they can. It's there where the actual work is done. During the development work we sometimes ask external experts for advice.
Surface Protection (SP)	The purpose is to have a broad innovation group to be able to create complete standards to support procurements of surface protection	Half of the members are from the pulp and paper industry, and then there is a surface protection inspector, several paint manufacturers and a paint entrepreneur	She is part of many of the development teams as a secretary. She is like a spider in the web, make sure the development teams are formed, and keep them going.	The development team is kept within the innovation group. It's not the development group but the innovation group who make decisions.
Safety (S)	It's a multi-technical innovation group with representation from other innovation groups who deals with workplace safety-related questions.	You need to have the right composition of knowledges and competences, sometimes you need the width and sometimes you need a narrow focus. Most of the members work with work environment and work safety-related issues.	The PM keeps track on the development teams since they are engaged full time.	If there is an idea that has potential we first conduct a pre-study to find out if it still is interesting to continue further. We want the person in charge of the development group to be a member of the innovation group.
