



INTERNAL AND EXTERNAL PERSPECTIVES ON USER INNOVATION: WHAT WAS LEFT BEHIND? A REVIEW OF CURRENT LITERATURE

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Abstract

This paper carries out a systematic and up-to-date literature review in the domain of user innovation (UI). Unlike previous reviews, this paper scrutinizes the “locus” of UI, meaning it distinguishes between studies focusing on external-to-the-firm conditions of UI (user’s types, users’ roles, enabling platforms, etc.) and papers focusing on internal-to-the-firm conditions of UI, such as strategies, capabilities, and organizational routines that trigger and support UI processes. This review shows that internal-to-the-firm conditions represent a clearly neglected subject in the domain of UI studies. Thus, this paper encourages more research – both theoretical and empirical – to be carried out on the strategic, organizational, and managerial sides of UI.

Keywords: *user innovation, user-driven innovation, user involvement, customer-driven innovation, co-creation, co-development*

1. INTRODUCTION

The theme of user innovation (UI) has gained considerable attention in innovation studies and practices in recent decades (Hyysalo, Repo, Timonen, Hakkarainen, and Heiskanen 2016:18). Users have been renowned for a long time as vital sources to enhance innovation performance and increase competitiveness, regardless of the type and size of the company (Keinz, Hienerth, & Lettl, 2012; von Hippel, 1986). Users’ contributions to develop new products and services result in the enhancement of efficiency and effectiveness of the innovation process (Goduscheit & Jorgensen, 2013). Notably, collaboration with external stakeholders, and more specifically with users, has challenged the so-called “closed innovation” model through which innovation is the result of large laboratories inside firms (Pustovrh & Jaklič, 2018).

This research stream is nowadays characterized by a certain maturity as well as an internal structuring into multiple subtopics, such as the role of communities of users and crowdsourcing (Fuller,

Matzler, & Hoppe, 2008; Poetz & Schreier, 2012), ways and toolkits for involving users (von Hippel, 2001) and enabling them to experiment and innovate (Jeppesen & Frederiksen, 2006), not to mention a copious research stream on the different typologies of users to be involved, such as lead users (Luthje & Herstatt, 2004; von Hippel, 1986). Although an expansion in the number of papers published and an extension in the focus of UI studies is undeniable, the literature by far has paid abundant attention to the preconditions and the consequences of the process of users’ involvement (Bogers, Afuah, & Bastian, 2010; Greer & Lei, 2012). However, the literature has overlooked some aspects of the process itself, mainly planning, organizing, and managing UI processes inside firms.

This review takes a different angle by investigating the locus of UI studies. We aim to understand to what extent the existing literature has been looking at external-to-the-firm conditions of UI – such as the use of platforms, the characteristics of users, the impact of different industries and ecosystems – and internal-to-the-firm conditions. The latter refers to the

strategic, organizational, and managerial conditions that support the deployment of UI-related activities. Therefore, based on the derived concept itself and its existing streams of research as well as the theoretical foundations, a future research agenda in the domain of UI specifically pertinent to internal-to-the-firm conditions is suggested. To derive a better understanding of the phenomenon, this paper is divided into five parts. First, we outline the concept of UI as offered by the literature, followed by a snapshot of the historical evolution of the literature. Section 3 provides the methodological details of our research, and Section 4 presents the descriptive results and examines precisely papers in different streams. Section 5 provides a discussion of theoretical contributions and managerial implications as well as a future agenda.

2. THEORETICAL BACKGROUND

2.1 A snapshot of the evolution of UI literature

It is a common belief that studies of user innovation have their roots in the pioneering work done by von Hippel (1976), who examined the role of manufacturers and users in scientific-instrument innovation and subsequently found that such innovations derived from users' ideas. The results showed that users test and prototype the instruments and innovation does not belong merely to the commercializing firm. Since then, the literature has developed in long waves. Each wave was characterized by a specific research theme becoming prevalent¹. In particular, we identified

- a “*user characteristics*” wave (from 1976 to 1995)
- a “*tools for collaboration*” wave (from 1996 to 2005)
- a “*value co-creation*” wave (from 2006 to 2017)

The main – and somehow only – interest of scholars during this first period (1976–1995) was in the “lead-user” concept and the active role that users started to play in many industries within the processes of new product development (NPD) of firms. Studies of lead users, a category first introduced by von Hippel (1986), started new research

from scratch in this period. von Hippel indicated that lead users are those users who have real-world experience to solve a problem in the market. Subsequently, the success of the method was also put under empirical scrutiny. Urban and von Hippel (1988) characterized the lead-user method in terms of three components: 1) users with higher experience of a need are more capable of giving information, 2) users differ based on the benefit they gain through participating in idea generating, and 3) sometimes users lead regarding the trend of the market.

The lead-user method was introduced as a much faster and less costly way of acquiring new ideas for products and consequently creating promising outcomes for the firms (Herstatt & von Hippel, 1992). Further studies within this wave focused on developing products implementing UI in various firms. The promising examples of industries integrating users in the process of innovation are the computer-related systems industry (Urban & von Hippel, 1988), the low-tech sector (Herstatt & von Hippel, 1992), scientific-instrument factories (von Hippel, 1976), industrial products (von Hippel, 1978), and the electronics sector (von Hippel, 1977). Between 1996 and 2005, the pace of expansion of the literature moderated. Research on UI remained mainly confined to the lead-user research field, and the search for the best methods for fostering collaboration between firms and users became more and more central.

The increase of the heterogeneity of users' needs (Franke & von Hippel, 2003) triggered firms to create new toolkits to fine-tune older ones in order to better and more accurately understand users (von Hippel, 2001) and to allow customers to more effectively create their own designs and products (Franke & von Hippel, 2003; Jeppesen, 2005). Furthermore, the enhancement of the internet and internet-based technologies led to creating new areas of research into open-source software, virtual integration, and deeper ways to involve users. Open-source software gained considerable attention among scholars as a way to reveal and share innovations freely within a community of users (Lakhani & von Hippel, 2003; von Hippel & von Krogh, 2003). In addition, among the topics that started to be investigated by scholars we found an

¹ We used text analysis in VOSviewer software to provide a better view of predominant topics of each wave.

increasing interest in the role of other-than-lead users, such as everyday users (Kristensson, Gustafsson, & Archer, 2004; Magnusson, 2003).

However, in the last decade (2006–2017), the number of studies of UI increased exponentially. Regarding the growing speed of social media and internet-based communication, more studies during the third wave focused on finding newer ways to collaborate with users. Online platforms and contest communities are the most implemented ways through which users can contribute to different innovation processes (Fuller, Hutter, Hautz, & Matzler, 2014; Hienerth, von Hippel, & Jensen, 2014). Simultaneously, more tools for integrating customers' efforts started to emerge, such as living labs (Guzman, del Carpio, Colomo-Palacios, & de Diego, 2013) avatar-based innovation (Kohler, Fulller, Stieger, & Matzler, 2011; Kohler, Matzler, & Fuller, 2009), and brand communities (Brodie, Ilic, Juric, & Hollebeek, 2013; Fuller et al., 2008). Furthermore, several new topics also started to emerge and to be addressed by scholars, such as the theme of co-creation and value-creation in the context of customer involvement, which to a large extent deal with marketing issues. The research started to investigate the involvement process of users and customers in creating new products and most recently in the service sector (Alves, 2013; Gustafsson, Kristensson, & Witell, 2012). A high number of firms integrate users in the process of innovation in order to decrease market risks (Enkel, Perez-Freiye, & Gassmann, 2005).

A review of the co-creation and co-production literature revealed that these processes are considered as value themselves, and are used to attain more efficiency and more customer satisfaction (Voorberg, Bekkers, & Tummers, 2015). Bharti, Agrawal, and Sharma (2015) developed a systematic literature review of value co-creation and stressed that the aforementioned process started to gain attention especially after Prahalad and Ramaswamy (2004) introduced co-creation as a way to satisfy customers' needs. The review showed that co-creation gradually became used as a way to maintain long-term relations, diminish ethical conflicts, create customer loyalty, and build intellectual property rights. In the same line, Gronroos and Voima (2013) specified the roles of customers and firms in the

process of value and co-creation, indicating a joint value sphere of direct interactions between customers. Similar concepts which overlap with co-creation studies are co-creation design (Frow, Nenonen, Payne, & Storbacka, 2015) and co-innovation (Lee, Olson, & Trimi, 2012; Romero & Molina, 2011). Figure 1 shows the graphical maps of the three waves.

2.2 Defining UI

The paradigm of UI was brought to the literature during the 1970s by von Hippel, who, in a pioneering study, introduced the concept of the "customer-active" paradigm (CAP) through which "the would-be customer develops the idea for a new product; selects a supplier capable of making the product; and takes the initiative to send a request to the selected supplier" (von Hippel, 1978: 40). Subsequently, von Hippel (1998) provided a complementary definition of the phenomenon by indicating that users do not manufacture an innovation but integrate it into the assembly of a finished product or process. Hence, in accordance with early definitions, users are the key inputs for the innovation processes and they are also the ones who benefit exclusively from the process by using the innovation and sometimes also trying to commercialize their innovations (de Jong & von Hippel, 2009; Gault & von Hippel, 2009).

More recently, Bogers and West (2012:13) defined user innovation "conditions under which users innovate and how users can be supported to be more innovative" which bring utility for the user rather than any pecuniary benefit for the firm. Although the literature does not provide accurate differences between existing overlapping concepts related to UI, we determined and grouped the already existing concepts in the literature. A body of studies addressed the phenomenon of user-driven innovation (UDI); however, there is no complete convergence in the literature regarding its definitions. Hjalager and Nordin (2011:290) defined UDI as "the phenomenon by which new products, services, concepts, processes, distribution systems, marketing methods, etc. are inspired by or are the results of needs, ideas and opinions derived from external purchasers or users."

Within the same period, Gault (2012) showed that users can act as sources of information for firms, for example, by providing feedback to firms through the use of appropriate platforms and/or social media through user-driven innovation and user-centered innovation (UCI) processes. Gault (2012) differentiated UDI from UI, indicating that in the process of UDI it is the firm that mainly benefits from the innovations produced by users. In other studies, such as a Hyysalo et al. (2016), UDI is a broad concept consisting of various modes including UI, which varies from slight integration of users to deep collaboration. De Moor et al. (2010:53), who investigated the role of UDI in future technology, defined UDI as “the process of collecting a particular type of information about the user: it deals with insights both at an observable and a more latent level that are quite difficult to grasp.”

Affected by the necessity to comprehend the new ways of collaboration between users or customers and firms, most recent definitions focused on the concepts of co-creation and value-creation. Unlike UI studies which highlight the main role of users and their characteristics and motives, these group of studies regard users as collaborators or the inspiration for the innovation process to produce new or meaningfully improved products, services, and processes. Taking a similar point of view, Greer and Lei (2012:64) defined the process of engaging customers as the “process of engaging in the creation of new products or services in collaboration with customers or users.”

Considering the role of users and customers in product development, Hoyer, Chandy, Dorotic, Krafft, and Singh (2010:283) defined the co-creation process as “a collaborative new product development (NPD) activity in which consumers actively contribute and select various elements of a new product offering.” Bogers and West (2012) noted that co-creation is also a means to create value more generally beyond creating product innovation. Value co-creation refers to a joint problem-solving collaborative involving suppliers’ and customers’ resources (Aarikka-Stenroos & Jaakkola, 2012). Further studies expanded the concepts of customer-centered innovation or customer-driven innovation, indicating that “customers may lead to innovations, not only be attracted or retained through innovations” (Öberg, 2010:992).

Desouza et al. (2008) emphasized that in customer-driven innovation processes, customers have the main role in innovation and the involvement of the organization is limited, in contrast to older concepts such as customer-focused innovation in which customers had fringe roles and innovation was done by the organization. Meanwhile, other similar concepts such as “participatory innovation” and in particular “participatory design” gained incredible attention; these are processes through which end-users are invited to contribute and participate in developing products and systems as co-designers (Buur & Matthews, 2008; Sleswijk Visser, Van der Lugt, & Stappers, 2007).

3. METHODOLOGY

We carried out a systematic review of the literature. To do so, we defined a search strategy, set explicit criteria for inclusion and exclusion of papers, and carried out a deep analysis of the results (Crossan & Apaydin, 2010). A systematic literature review provides transparency (Rousseau, Manning, & Denyer, 2008) and yields an accumulated knowledge of various research fields (Tranfield, Denyer, & Smart, 2003). To carry out this review, the Web of Science database was chosen and searched using user innovation, user-innovation, and free innovation as the main keywords, which provided 206 results. Further studies resulted from combinations of 14 different but related keywords. The first step was combining the first group of keywords, namely user driven, user-driven, customer driven, customer-driven, user involvement, and customer involvement, with the second group of keywords, which were innovation and innovate.

Subsequently, a few more keywords were added to a first group, including user collaboration and customer collaboration, and co-creation, co-development, new product development and new service development were added to the second group. Two Boolean search strings were used including all 14 keywords with distinct combinations. For example, (user-driven *AND innovation), (customer driven *OR customer-driven), AND (co-creation *OR co-development) in Web of Science. Only articles published in scientific journals were considered, whereas book chapters and conference papers were not included. The total number of entries using the

keywords was nearly 700. We reviewed titles, journals, and abstracts in order to exclude completely unrelated papers. In the first filtering process, 355 papers were excluded because they were purely in technical (e.g., information and communication technologies) and healthcare areas and were published in journals providing no contribution to the managerial and organizational literature.

We eliminated papers that dealt not with user innovation specifically but with innovation in general. Through this filtering process, we narrowed our database to 345 articles. After retrieving the papers, bibliographic data (title, author, journal, year of publication, and abstract) were exported to an Excel table. In the next step, the whole contents of the remaining articles were scrutinized in terms of their conceptual, theoretical, and empirical development and were graded from 1 to 5 in order to determine how close each article was to the UI topic, where 1 denoted the papers least related to UI and 5 denoted the highest closeness. For this filtering, precise exclusion criteria were applied to isolate just the articles precisely focusing on UI. These criteria were chosen empirically based on an analysis of the papers remaining in the dataset. No prior criteria were applied in this phase.

The most important reasons for excluding further papers were the following: 1) the paper focused on innovation practices not strictly related to UI; 2) the paper was grounded in the open innovation theoretical framework but did not deal specifically with UI; 3) the paper dealt with user experience and not with the direct involvement of the user; 4) the paper was related to the role of users as innovators in computer science and healthcare, but had little contribution to the managerial literature on UI overall; and 5) the paper was about buyer-supplier collaboration in a B2B context and typically during a new product development phase. The articles were graded separately, and the articles not reaching a threshold of 3 out of 5 were excluded from the review. As a result of the second filtering process, the number of articles decreased to 275. All the papers were read in full and sorted out.

In order to identify the main streams of research within the UI literature, papers were coded based on 10 criteria: 1) Article type: The studies were sorted into three main kinds, empirical, con-

ceptual, and review papers. 2) Methodology: Empirical papers were conducted in qualitative and quantitative ways. 3) Method: Various methods were used in sample empirical articles, including case study, survey, interview, ethnography, netnography, experimental design, mixed methods, etc. 4) Innovation type: Because collaborating with users leads to numerous innovations in products, services, and processes, the papers were divided into incremental and radical innovation types. 5) User type: Users who collaborated on innovation activities within these articles were separated into lead users and ordinary or everyday users. 6) Collaboration type: User engagement is possible in two main types, individual engagement and collaborating in the community of users. 7) Industry type: Generally, industries in which UI practices have been conducted include manufacturing and service industries. 8) Industry activity: More specifically, papers were sorted based on activities of each industry type in order to discover in which sectors UI has been carried out. 9) Firms' age: Sample firms comprised startups and established firms. 10) Incentive type: Due to the importance of incentives which motivate users to participate in innovation activities, we classified studies dealing with incentives in terms of extrinsic and intrinsic motivations.

4. RESULTS

4.1 Descriptive results

Notwithstanding its long history, UI is a phenomenon that started collecting considerable attention in the literature only in 2008 (this research analyzed papers to the end of 2017). Descriptive results show that empirical papers represent almost four out of five papers (75%), whereas theoretical papers were fewer (19%). The remainder are reviews of previous literature. Regarding the methodologies used in the (empirical) articles, qualitative research is the most popular (43.9%), and quantitative methods hold the second position. Among the methods of analysis used, case studies (39.1%) and surveys (30.4%) are the most widespread methods. During recent years, the use of mixed methods has grown significantly, and currently accounts for more than 20% of research studies. Other methods of collecting data (such as ethnography, netnography, in-

terview, experimental design, focus group, action research, and secondary data) are used less frequently in the papers analyzed.

For the types of innovations involved in the study, the majority of papers (70%) deal with cases of radical innovation (RI), whereas a smaller percentage focus on both radical and incremental innovation. Lead users are at the center of at least half of all the articles. Not surprisingly, just 22.3% of studies focus on the everyday user as the only sources of innovation. Collaborating with firms and users is done extensively within communities (61.4%), and individual collaboration is less common (25.7%). UI practices have been implemented in different types of industries since their emergence. A large number of studies, especially during the last few years, conducted UI studies in service firms (38.4%). To better understand the implementation of UI, we classified the specific activities of both service and manufacturing firms for all sample articles.

The results showed that most of firms within these industries were incumbent firms (83%) and startups were studied only in few papers (6.4%). When considering incentives of collaboration, a wide variety of studies consider a combination of extrinsic and intrinsic incentives to motivate users (61%), whereas extrinsic incentives alone (26.8%) and intrinsic motives alone (12.2%) are used less frequently. Intrinsic incentives include aspects such as fun, altruism, sense of efficiency, etc., whereas extrinsic incentives refer to monetary rewards, career prospect, using free services and products, etc. Table 1 summarizes the descriptive characteristics of the papers considered in this review, the list of journals with the most published articles, and the distribution of industries with higher repetition among papers.

4.2 UI research streams

On the basis of our literature review and coding procedure, we categorized the existing literature on UI into two general streams of research: (1) papers dealing with external-to-the firm conditions, accounting for 94% (258) of the papers included in this review, and (2) papers dealing with internal-to-the firm conditions, corresponding to the remaining 6% (17).

We further categorized the papers within each stream and identified three categories in each. For the papers dealing with external conditions we distinguished between:

- a) Innovation-related papers. These papers deal mainly with the types of innovation (such as radical or incremental) or the type of products (goods, services, or mixed) involved in the innovation process. We found 93 papers dealing with this topic, corresponding to 34% of the total.
- b) Users-related papers. These papers deal mainly with the different characteristics of users (lead users and everyday users); the role of users in the process of UI, both individually or on web-based platforms facilitating such processes; and incentive systems. In total, we found 158 papers, 57% of the literature.
- c) Context-related papers. These papers deal with the sectoral and the contextual conditions (location or ecosystem) that trigger, support, or hamper the deployment of UI strategies. Only approximately 3% of the papers were in this category.

For the papers dealing with internal conditions, despite their limited number (17 papers), it seemed reasonable to divide them into the following categories:

- d) Strategy-related papers. These papers deal with the strategic aspects of UI, such as business modeling, customer interaction as a strategy, or the relationship between UI and performance. We assigned two papers to this category.
- e) Organization-related papers. We grouped under this category all the papers dealing with organizational aspects (such as routines, organizational structures, and processes) that represent preconditions to the effective deployment of a UI strategy. We attributed eight papers to this category.
- f) Management-related papers. We included in this third group all the papers dealing with the management of the process itself of UI, the resources, and the capabilities needed to manage in an effective way the process of UI. We found seven papers belonging to this third category.

Table 1: Descriptive results of sample articles

Classification variable	Values	N	%
1. Paper type	Empirical	207	75
	Conceptual	51	19
	Review	17	6
2. Methodology	Qualitative	91	43.9
	Quantitative	75	36.2
	Mixed	41	19.8
3. Method (the most common)	Case study	81	39.1
	Survey	63	30.4
	Mixed	47	22.7
	Interview	7	3.4
4. Innovation type	Radical	28	70
	Mixed	12	30
5. User type	Lead user	60	49.6
	Mixed	33	27.3
	Everyday user	27	22.3
6. Collaboration type	Community	86	61.4
	Individual	36	25.7
	Mixed	18	12.9
7. Good type	Service	84	38.4
	Mixed	63	28.8
	Manufacture	55	25.1
8. Industry (most frequent)	Sporting goods	12	5.5
	Telecommunication	10	4.6
	Information technology firms	10	4.6
	Software	9	4.1
	Computer game industry	8	3.7
9. Firm age	Incumbent	78	83
	Mixed	10	10.6
	Start-up	6	6.4
10. Incentive type	Mixed	25	61
	Extrinsic	11	26.8
	Intrinsic	5	12.2
11. Journal (most publications)	Journal of Product Innovation Management	29	10.5
	Research Policy	14	5.1
	Management Science	10	3.6
	Creativity and Innovation Management	9	3.3

4.2.1 External-to-the-firm conditions

Research stream 1: Innovation-related theme

Papers in the first research stream – innovation-related – specifically focus on innovation itself. Thus, the role of users as innovators is mainly related to the type of innovation involved, whether it be radical, incremental, disruptive, or other.

A common theme within this stream is related to innovation type: radical or incremental. There are not many studies in the literature which explore the degree of innovativeness of user-generated innovations. Radicalness of innovations and finding new solutions have always been a critical topic for UI scholars. Various scholars proposed definitions for radical innovation, which in general refers to creating new products that offer long-term sale po-

tential rather than just improving the product (Skiba & Herstatt, 2009). On the other hand, radical innovations are also connected with service innovation in a way that separates previous practices and results in fundamental changes in organizational activities (Perks, Gruber, & Edvardsson, 2012). Incremental innovations alone are not sufficient for firms in developing and quickly changing technology, and one important factor is choosing the right user at the right time and in the best form (Lettl, 2007).

The characteristic of users is a determinant element which contributes to the development of radical innovation (Lettl, Herstatt, & Gemuenden, 2005). Accordingly, due to differences between the profiles of users who contribute to RI and of others involved in conventional marketing research, firms seeking RI need to apply different marketing inquiry approaches. Exploring the techniques of providing radical changes, the lead-user method (von Hippel, 1986) and user toolkits (Herstatt & von Hippel, 1992; Oliveira & von Hippel, 2011) have been proposed as the most widespread techniques. Candi, van den Ende, and Gemser (2016) made a distinction between utilitarian radicalness, which refers to innovation in technology and functionality, and hedonic radicalness, which delivers new meanings and values to products and services. Because radical and incremental innovation are complementary concepts, a high percentage of studies compared the two types of innovation with each other.

The results of a study of a motor insurance company as a financial sector revealed that the sequence of micro-level activities related to incremental innovation in the co-creation process results in radical innovation, which indeed requires more managerial attention (Perks et al., 2012). Online and offline collaboration are two modes of involving users; online collaboration increases the probability of introducing incremental innovations, whereas offline collaboration increases the probability of introducing radical innovations in an ICT sector (Ryzhkova, 2012). Incremental innovation is considered as more frequent and customary innovation, through which both business and individual users develop upon the work of producers and other groups of users (Bogers & West, 2012).

Fuller and Matzler (2007) found that listening to customers closely will end up creating some incremental innovations, but virtual customer integration provides an opportunity to come up with really new products in order to satisfy customer needs. Notably, the type of innovation is a key factor in selecting the co-creation and communication process. Gustafsson et al. (2012) concluded that frequency, direction, and content of co-creation have the same positive effect on the product and market success in incremental innovation, whereas in radical innovation, project frequency has a positive effect and content has a negative significant effect on product success. In a study of the kayak industry, innovation moved from radical to more incremental and customer-oriented innovation by adapting the equipment to general customers and amateurs. As a result, the manufacturer could sell new products and designs to more customers every year and improved the commercialization process (Hienerth, 2006).

Studies of this stream demonstrate that design, products, and product concepts that are created together with users fit user needs' better (Pals, Steen, Langley, & Kort, 2008); these studies also outline the positive effect of UI on service sectors, such as the positive direct effect on technical quality and innovation speed (Carbonell, Rodriguez-Escudero, & Pujari, 2009). Recently, scholars have determined the important role of users in sustainable product and service innovation in addition to radical and incremental attributes (Nielsen, Reisch, & Thøgersen, 2016; Parmentier & Gandia, 2013).

Research stream 2: User-related theme

Papers belonging to the second research stream – users-related papers – are the most consistent in number. Along with this stream, three sub-themes of research were identified. The first sub-theme deals with different types of users: lead users and ordinary or everyday users. Studies dealing with lead-users and their characteristics prevail in absolute terms. A lead user has been defined as a user “(1) who has needs in a particular area before the rest of the market and (2) gain benefits from obtaining a solution and try to innovate” (von Hippel, 1986:796). The primary studies focused on the role of lead users in marketing activities and new prod-

uct development such as testing the impact of lead-user participation in the development of industrial products (Urban & von Hippel, 1988). Similarly, Herstatt and von Hippel (1992) showed that the lead-user method could bring positive results in a low-tech industry despite having users without technical training.

A large body of literature has investigated the lead-user concept within consumer products. As an example, lead users considerably contribute to the innovation process of sport equipment; for example, in the case of kitesurfing equipment, it has been proven that two main characteristics of lead users, being ahead of the trend in the market and having high expectations of benefits, result in appealing commercial innovations (Franke, von Hippel, & Schreier, 2006). The search for antecedents and consequences of consumer lead users explained that antecedents of the process are consumer knowledge, using experience, the locus of control, and innovativeness as requirements to identify users. Investigation of the consequences of the lead-user method revealed that lead users do not only participate in the idea generation process, but they also adopt new products more heavily and more quickly (Schreier & Prugl, 2008). User expertise and motivation, extreme user needs, opinion leadership, and commitment have been proposed as other characteristics of lead users in addition to being ahead of the market and having high expectations of benefits (Brem & Bilgram, 2015).

Moreover, studies indicate that lead users exhibit some new behaviors, such as participating in online communities, according to the cultural changes triggered by social media. Consequently, lead users were assigned to problem-solving stages of developing new products, including three phases of problem detection, analysis, and removal. Inventive users have some common characteristics with lead users but have a definition beyond the traditional lead user. Lettl et al. (2005) characterized inventive users as those who 1) have high motivation for the development of new solutions, and 2) face the need with extremely high precision. Surprisingly, the outcomes of a study of the role of lead users in the different stages of problem-solving of new product development demonstrated that the interference of lead users in each stage of the innovation

problem-solving process decreased productivity in spite of providing desirable products (Colazo, 2014).

On the other hand, some empirical and conceptual articles studied general and everyday users' characteristics and their input in generating new ideas. Ordinary students who were in charge of designing watches using toolkits could bring heterogeneous designs to market and increased significantly user willingness to pay high prices for them (Franke & Piller, 2004). According to Magnusson, Matthing, and Kristensson (2003), ordinary users created more original ideas than did professional users during service innovation development due to a higher level of creativity. Kristensson et al. (2004) claimed that professional developers and advanced users generated more realizable ideas, and ordinary users provided the most valuable ideas. Given the increasing role of users in service development, Magnusson (2003) studied ordinary users and professionals in the service innovation process and showed that ordinary users provided more creative and novel suggestions than did professionals, but professionals made easier ideas to produce. Despite the originality and value of ordinary users' ideas, users could not be expected to come up with ideas that immediately go to the production phase, but basically they are sources of inspiration and information of users' needs (Magnusson, 2009).

The second sub-theme sheds light on the types of collaboration between firms and users and holds a significant position within studies of individual and community-based collaboration. According to Baldwin and von Hippel (2011:9) "a single user innovator is a single firm or individual that creates innovation in order to use it." Individual users have been identified as drivers of many developments in sports products (Hienerth, 2006) and consumer products (Flowers, von Hippel, de Jong, & Sinozic, 2010). In a single case study, Hennala and Melkas (2016) emphasized the importance of formulating a collective voice of individual users and a deeper understanding of users' experiences to foster service innovation. Involving few users mostly has been common in the lead-user method, through extremely advanced users eager to create novel and radical innovations which are quite practical for projects with a limited time domain (Keinz et al., 2012).

Despite the critical role of individual users, it has proven that the group of users can be much more efficient than specialized producer innovators (Hienerth et al., 2014). Communities are no longer a place just for lead-user activities; the presence of potential and the expertise of multiple users also are necessary for the innovation process (van Oost, Verhaegh, & Oudshoorn, 2009). The internet allows less costly collaboration with a large number of customers through virtual customer integration (VCI) and making use of customers' know-how, creativity, and judgment (Bartl, Fuller, Muhlbacher, & Ernst, 2012). Therefore, user communities and platforms (normally online) have been identified as a promising approach that provides the opportunity to exchange ideas among users and generate innovative ideas around a specific theme or topic (Harhoff, Henkel, & von Hippel, 2003; von Hippel, 2007).

Platforms are defined as "the nexus for the aggregation and integration of different members (individuals and companies) in an innovation community, permitting access to a large pool of experts and contributors, benefiting from proximity to customers and user innovations and avoiding a local search bias in innovation" (Battistella & Nonino, 2012:2). Exploring the "propellerhead" community as a case study, Jeppesen and Frederiksen (2006) investigated the motivation and characteristics of users who participate in such communities and found that the motives lie in three groups: 1) being a hobbyist, 2) a response to firm recognition, and 3) trying to be a lead user. Promising examples of such communities include mystarbucksidea.com (Lee & Suh, 2016; Sigala, 2012), the Dell IdeaStorm community (Bayus, 2013), and salesforce.com (Li, Kankanhalli, & Kim, 2016), which aim at improving the effectiveness of new service and product development. Interaction among participants, information exchange, mutual support, community building, and cooperation among users in online contest communities lead to better and more innovations (Fuller et al., 2014).

Another type of such communities is virtual brand communities, in which consumers manifest loyalty, satisfaction, empowerment, connection, emotional bonding, trust, and commitment (Brodie et al., 2013). Furthermore, user toolkits became widespread, which are defined as tools that "allow

manufacturers to actually abandon their attempts to understand user needs in detail in favor of transferring need-related aspects of product and service development to users along with an appropriate toolkit" (von Hippel, 2001:247). Such user-friendly tools let users design their own preferred products and services (von Hippel & Katz, 2002). User toolkits have been applied not only by end users (Jeppesen, 2005; von Hippel, 2001; von Hippel & Katz, 2002); such toolkits are also aimed at various general users (Franke, Keinz, & Schreier, 2008; Franke, Keinz, & Steger, 2009; Goduscheit & Jorgensen, 2013). Toolkits for user innovations are considered also as a powerful marketing tool (Franke & Piller, 2004) to achieve mass customization and, in contrast to the lead-user method and user communities, do not focus only on radical new ideas (Keinz et al., 2012).

One further sub-theme of papers in this stream focuses on the process of stimulating users using different types of incentives. Generally, the literature shows that motivations for participating in the UI process fall into two groups, extrinsic and intrinsic incentives. Fuller (2010) proposed that users' decisions to engage in innovation activities are based on a combination of intrinsic (fun and altruism), internalized extrinsic motives (learning and reputation), and entirely extrinsic motives (payment and career prospects). In a study exploring the motivations to take part in platforms, drivers were categorized as intrinsic-individual motivation, intrinsic-social driven motivation, extrinsic economic motivation, extrinsic professional motivation, and extrinsic social motivation (Battistella & Nonino, 2012).

Nambisan and Baron (2009) further detailed users' incentives and motives by proposing four groups of them: cognitive or learning benefits (product-related learning), social integrative benefits (sense of belongingness and social identity), personal integrative benefits (reputation or status and the sense of self-efficacy), and hedonic benefits (pleasure and enjoyment). In contrast, Luthje (2004) underlined the importance of non-financial rewards. Luthje specified that financial motives cannot distinguish between innovating and non-innovating users, and there are fulfilled needs in the market that stimulate users to innovate. Based on the results of Luthje's research in the case of the outdoor industry, having more fun or being

faster and safer during sports activities are the main motives. Similar results showed that the engagement of customers in virtual product development is not motivated by monetary compensation or reputation. Instead, users participate for the possibilities of product development (Fuller, Faullant, & Matzler, 2010).

Research stream 3: Context-related theme

Studies focusing on the contextual elements of UI are still rare. Research within this stream has focused on the environmental and contextual dimensions covering the conditions of various sectors and industries, technological and scientific changes, marketplace fluctuations, policy making, competitors, etc. These elements are not usually the only effective factors in UI, but provide a complementary role. Context factors impact the roles of users and innovation activities in different direct and indirect ways which mostly are out of control of the firms. Addressing the uncertainty in an environment involving the unavailability of resources, instability, and unpredictability of markets, changing government regulations is of significant importance in user involvement (Gales & Mansour-Cole, 1995).

Carbonell et al. (2009) investigated the impact of technological uncertainty on customer engagement and found that technological novelty and technological turbulence affect the process of involving the customer in a positive way. Different sectors have diverse conditions and prerequisites for UI practices. Specifically, Alves (2013) identified that co-creation of value in the public sector fosters radical and discontinuous innovation through integrating citizen potential and knowledge; however, this specific sector suffers from some weaknesses such as resource limitation and citizen contests that effect the process in a negative way. Correspondingly, some other sectors, such as the electricity sector, are characterized by slow-moving and challenging attributes for UI activities; however, users have inspired innovation even within this sector (Heiskanen & Matschoss, 2016). Heiskanen and Repo (2007) indicated that, in general, micro-sociological processes, market power, and the competitive environment affect user innovations both positively and negatively.

Van Doorn et al. (2010) studied the antecedents and consequences of the customer engagement behavior process, and revealed some interesting results about context-level factors. The most affecting context-level factors include the political and legal environment which encourage or prevent the information flow, natural events, media attention, and competitive marketing atmosphere. UI has been affected by technological improvements in a positive way by, for instance, providing an opportunity for even older people to design new products and services (Ostlund, Olander, Jonsson, & Frennert, 2015). Furthermore, modern technologies such as wikis and the mobile environment let users collaborate with firms easily (Wagner & Majchrzak, 2006; Wong, Peko, Sundaram, & Piramuthu, 2016).

Technologies shift the business process to consumers, who can communicate, collaborate, and make decisions with the help of new technologies such as Web 2.0 (Nambisan & Nambisan, 2009). Most papers (57%) studied the user stream, and papers within the innovation stream held the second position (34%). As mentioned previously, papers dealing with the context level consider contextual factors as complementary conditions to apply UI practices. Papers solely contributing to this stream comprised only 3% of all papers, but in approximately 15% of papers, context-level factors were studied along with other streams. The contributions of the most relevant papers of external-to-the-firm studies are provided in Table 2.

4.2.2 Internal-to-the-firm conditions

Studies focusing on internal-to-the firm conditions are much fewer than studies focusing on external dimensions, and started to gain attention very recently. We divided this stream of studies into three sub-streams.

Research stream 4: Strategy-related theme

Among studies dealing with internal issues of organizations, less present are papers dealing with strategy-related issues (fourth stream). In particular, we found only two papers dealing with strategic aspects of UI. The first contribution, by Kristensson, Matthing, and Johansson (2008), proposed a conceptual framework and defined key strategies to pur-

sue the successful involvement of users in the process of new product development. They suggested that firms ought to provide an opportunity for users to understand their latent needs and play various roles, consider different users' situations, use analytical tools and benefits, escape from brainstorming, and provide heterogeneity. A second contribution,

by Baldassarre, Calabretta, Bocken, and Jaskiewicz (2017), consists of a theoretical contribution coupled to a qualitative study and deals with business models and UI. In particular, they suggested that the creation of sustainable value propositions through products and services takes place in a repetitive and long process of talking, thinking, and testing.

Table 2: Articles reviewing external-to-the-firm conditions

Categories	Author	Contribution
Innovation-related papers	Lettl (2007)	<ul style="list-style-type: none"> - Provides insights into the interaction dimension of user involvement competence for radical innovations. - Contributes to the development of a more taxonomic approach to the firm and integrates qualified users in the radical innovation process
	Skiba and Herstatt (2009)	<ul style="list-style-type: none"> - Highlights the impact of radical innovation on the service industry - Proposes that service providers should focus their efforts on integration of the right users early in their innovation process
	Gustafsson et al. (2012)	<ul style="list-style-type: none"> - Emphasizes positive results from co-creation with customers caused by frequency, direction, and content - Argues that it is useful while working with incremental innovation to spend time with customers and become absorbed in the customer's context as much as possible
	Perks et al. (2012)	<ul style="list-style-type: none"> - Mentions that co-creation develops an interactional process of inducing and visualizing innovative behavior of the actors - Proposes that in order to achieve radical innovation, a sequence of incremental innovations is required and advances knowledge of the way co-creation occurs in radical service innovation
	Candi et al. (2016)	<ul style="list-style-type: none"> - Introduces two different kinds of radicalness: 1) hedonic, which refers to the degree to which an innovation is novel in terms of technology and functionality; and 2) utilitarian, which concerns sensorial, emotional, or symbolic aspects - Emphasizes that collaborating with users is moderated positively by utilitarian radicalness, but hedonic radicalness moderates the co-creation process negatively
User-related papers	Magnusson (2003)	<ul style="list-style-type: none"> - Stresses that users engaging in a service innovation process offer more original and valuable proposals than do professional developers - Outlines that the technical abilities of professional developers limit them in developing creative ideas
	Luthje (2004)	<ul style="list-style-type: none"> - Summarizes the characteristics that distinguish innovating from non-innovating users - Argues that the benefits which the users expect from using their innovations and their level of expertise discriminate between users - Identifies that new needs, dissatisfaction with existing products, financial reward, fun, experience, and product-related knowledge determine the participation of users
	Schreier and Prugl (2008)	<ul style="list-style-type: none"> - Underlines the antecedents and consequences of consumers' lead user-ness and the behavior of lead users in each stage - Shows that consumer expertise, user experience locus of control, and innovativeness as antecedents have positive relationships with lead user-ness. Consumers' lead user-ness is related to new product adoption behavior as a consequence. Lead users tend to embrace new products faster and more heavily than do ordinary users.
	Fuller et al. (2010)	<ul style="list-style-type: none"> - Elaborates on the role of customers during virtual customer integration and proposes that monetary reward and reputation are not sufficient to attract customers - Highlights that the possibility for product development as well as benefiting from the improved products and technologies become users' willingness to participate

	Hienerth et al. (2014)	- Finds that an open, uncoordinated group of users can be more efficient than producer innovators - Emphasizes that increased efficiency of a group of users within new product development is driven by “efficiencies of scope” in problem-solving
Context-level papers	Gales and Mansour-Cole (1995)	- Shows that unknown uncertainty (operationalized as project radicalism and the stability of the scientific and technological foundation) is a motivation for managers to engage potential users more frequently - Indicates that known uncertainty (operationalized as the extent to which project managers believe they can meet the constraints and requirements of users) affects the number of users that a firm tries to contact
	Freel and Harrison (2006)	- Finds that public policy should strengthen two aspects (internal learning capabilities and absorptive capacity of firms) and increase the availability of external resources
	Alves (2013)	- Indicates that co-creation could be a source of radical innovation in sectors such as the public sector despite having too many insufficiencies
	Heiskanen and Matschoss (2016)	- Underscores that in a challenging context such as the energy industry, lead users’ ideas are helpful for marketing and the development of new relationships with consumers - Emphasizes the role of users as innovators who can also be involved to cause industry-wide innovation in industries such as the electricity industry, which is of significant public interest.

Between strategy- and organization-related papers, Ojanen and Hallikas (2009) discussed the link between UI strategies and inter-organizational routines needed to achieve such strategies and, in particular, to balance exploitation and exploration activities in customer-centered innovation. The results of the study demonstrated that innovation collaboration requires explorative inter-organizational routines, and firms also need to apply routines enabling inter-organizational relationships, inter-organizational learning, and feedback mechanisms in order to enhance effective collaboration transformation process within the organization.

A similar position is shared by Keinz et al. (2012), who discussed the role of organizational design in the implementation of different user innovation strategies. In particular, they define four different strategies (searching, harvesting, cooperation, and ecosystem strategies) and indicate the necessity of changes in the organization design including human and structural components to implement such strategies. More specifically, searching (i.e., lead user) and harvesting (i.e., user contests) strategies need changes associated with human components, whereas for a cooperation strategy (i.e. lead user and expert cycles), firms adjust their structure to achieve radical innovation and assign some employees to manage the relationship with lead users and external parties.

Moreover, an ecosystem strategy (i.e., toolkits and communities) requires major changes related to structural components.

Research stream 5: Organization-related theme

Papers belonging to the fifth research stream – organization-related papers – are the most frequent and mainly deal with intra- and inter-organizational factors (functions, positions, roles, and routines) and behaviors facilitating UI activities in firms (Agostini, Nosella, & Filippini, 2016). One of the earliest studies within this stream, by Nambisan, Agarwal, and Tanniru (1999), explored organizational design actions in the form of mechanisms in order to enhance users’ propensity to innovate in information technology. Furthermore, they identified technology cognizance, ability to explore, and intention to explore as the main organizational antecedents to UI. Foss, Laursen, and Pedersen (2011) recognized some organizational routines – namely delegating responsibility, internal communication, and knowledge incentive – that better organize and manage the transfer of knowledge from users. They focused on practices that improve internal information flows and give more motivation, resulting in better exploitation of knowledge from the external environment. Agostini et al. (2016) analyzed the moderating effects of key factors of internal organizational con-

text – including performance management, autonomy, internal networking, and organization and culture – on the relationship between users’ involvement and radical innovation performance. The results revealed that user involvement enhances radical innovation performance in the presence of organizational context; however, internal networking, organization, and culture seem to have a more crucial influence on radical innovation performance.

Research stream 6: Management-related theme

Finally, papers belonging to the sixth research stream – management-related papers – deal with the management of the process (methods and tools) and the resources and capabilities needed to do that. An example of articles belonging to this stream is the paper by Bengtsson and Ryzhkova (2013), who discussed the need to collect enough internal management competencies in order to benefit from user involvement tools. In particular, the authors argued for disclosure competence (finding and motivating users, support functions), appropriation competence (compensation issues), and integration competence (transfer and further development issues) as appropriate managerial practices for UI. Ashok, Narula, and Martinez-Noya (2016) outlined the role of knowledge management (KM) capabilities of the firm to benefit from user collaboration. They analyzed the effect of firm-level factors – in particular, collaboration with different kinds of users and KM – on innovation activities of a service sector and found that collaborating with existing users has an effect on incremental innovation, whereas to achieve radical innovation, collaboration with prospective customers is needed, which subsequently requires higher investment in KM practices.

Between managerial and organizational study, Roberts and Darler (2017) outlined the need to re-define the co-creation process by considering the importance of having a culture supporting innovation and co-creation, consumer choice with the help of top-level management, and training in business creativity and relationship-building skills. Likewise, Tseng and Chiang (2016) found that organizational culture and communication quality

moderate the relationship between co-creation and development/completion of new products. Furthermore, Bartl et al. (2012) discussed the role of managers’ perspectives in applying UI (in the form of virtual customer integration). They simultaneously highlighted the effect of managers’ cognition, attitudes, subjective norms, and perceived behavioral control on the process of UI. Table 3 summarizes the most relevant contributions related to internal-to-the firm conditions of UI.

5. DISCUSSION AND CONCLUSION

5.1 Theoretical contribution

Regarding the lack of well-defined theoretical foundation of UI concept (Bogers et al., 2010) we provided an overview of theoretical streams and their explanatory support for research on UI. To drive synthesized theoretical perspectives of UI, we identified four theoretical frameworks: user innovation, service-dominant (S-D)_logic, process management, and open innovation perspectives. User innovation (52.1%) is the most applied perspective, followed by the S-D logic perspective (22.3%). We assume that classifying the papers in terms of theoretical perspective could provide a better and clearer picture of the phenomenon.

More than half of the studies are grounded purely in strategies to exploit users’ novel ideas in order to derive innovation in various firms. Based on the user innovation theoretical framework, innovating by individual users and user firms have replaced producer innovation. A user innovator aims to benefit from the innovation by using it, whereas a producer innovator is a single, non-collaborating firm which benefits from selling the innovation (Baldwin & von Hippel, 2011). Studies grounding on the theoretical basis of user innovation focus strongly on the characteristics of users in the process of developing new products and services, such as tracking down end users in sport field activities and products (Luthje, 2004; Luthje, Herstatt, & von Hippel, 2005; Tietz, Morrison, Luthje, & Herstatt, 2005). Lead users started to gain considerable attention because of their specific characteristics, including “high expected benefits” and “being ahead of the market trend” (von Hippel, 1986).

The former characteristic could be caused by heterogeneity and the changing nature of customers, and the latter one indicates that the costs of innovation are lower for users than for manufacturers due to the “stickiness” of preference information (von Hippel, 1994). Finding that users seek other users to fulfill the innovation process, communities became popular in the decade corresponding with the second wave, and have become a strong strategy to enable every user to contribute to the innovation activities of firms (Hienerth et al., 2014; van Oost et al., 2009). Why users often freely reveal their innovations has been studied by many scholars in various industries (Morrison, Roberts, & Midgley, 2004; von Hippel &

Finkelstein, 1979). It has been found that users benefit in a different way than they would by selling it.

Users acquire a reputation (Lerner & Tirole, 2002), have the chance that the producer would be able to produce the innovation and sell it at a lower price than users’ production costs (Harhoff et al., 2003), achieve fun and learning (Lakhani & Wolf, 2003), can increase the chance of becoming known in some communities (Franke & Shah, 2003), provide benefit for other users (von Hippel & von Krogh, 2003), and, when the opportunity costs are quite low, change roles and become producers to benefit from selling the innovation (Baldwin, Hienerth, & von Hippel, 2006).

Table 3: Articles reviewing internal-to-the-firm conditions

Categories	Author	Contribution
Strategy-related papers	Kristensson et al. (2008)	<ul style="list-style-type: none"> - Introduces the most important strategies for user involvement during NPD process - Provides guidelines for managers to implement a successful UDI with market orientation
	Keinz et al. (2012)	<ul style="list-style-type: none"> - Stresses that for harvesting user innovation strategy, processes, incentives, and competencies should be developed to allow the focal producer firm to leverage the creative potential of a large number of users and to adjust the creative contributions with the corporate strategy - Provides a link between UDI strategy and organizational routines in order to develop such strategies - Argues that involving users needs to integrate changes in the human components with changes in the structural components of organizational design
Organization-related papers	Ojanen and Hallikas (2009)	<ul style="list-style-type: none"> - Emphasizes that collaboration in innovation practices requires more extensive usage of explorative inter-organizational routines than traditional arms-length routines - Highlights that organizational routines enable inter-organizational relationships to contribute to the driving forces and prevent restricting forces - Argues that the collaboration process needs inter-organizational learning and feedback mechanisms to increase the performance of exploitation and exploration-related routines
	Agostini et al. (2016)	<ul style="list-style-type: none"> - Emphasizes integrating the external dimensions of connecting with users and the internal facets of the organizational context - Argues that combining internal and external processes affects radical innovation performance
	Foss et al. (2011)	<ul style="list-style-type: none"> - Introduces a model through which organizational practices mediate the interaction between firms and customers. - Gives special attention to internal knowledge flow and motivation
Management-related papers	Ashok et al. (2016)	<ul style="list-style-type: none"> - Emphasizes that translating user’s ideas to radical innovations depends on the firm’s internal potential - Proposes that the higher managerial effort such as investing in knowledge management (KM) practices develops the absorptive capacity
	Bengtsson and Ryzhkova (2013)	<ul style="list-style-type: none"> - Outlines the management competences needed in different stages of the innovation process within online innovation tools - Provides a holistic and integrative perspective on management issues related to implementation of online innovation tools - Shows a detailed and managerially relevant view of the complementarities between external sourcing of knowledge and necessary internal competences such as absorptive capacity
	Bartl et al. (2012)	<ul style="list-style-type: none"> - Emphasizes the role of managers’ perspectives in the process of VCI - Shows that managers identify future customer needs, form a broader decision basis, increase efficiency in gathering and use of customer information, and increase customer retention

The S-D logic perspective has become more popular in studies due to the notable increase in the number of service-oriented firms. A high number of studies in the domain of UI overlap with the holistic view of service science defined by Ostrom et al. (2010, p. 2) as an “emerging interdisciplinary field of inquiry to drive service innovation, competition, and wellbeing through co-creation of value.” S-D logic brings a new perspective to service and co-creation and implies that value is co-created with the user and customer and is experienced and evaluated when the service is understood within the user’s own context (Vargo, Maglio, & Akaka, 2008). Within customer-centric service organizations, the value is co-created with customers and is not predefined and fixed in outputs; therefore, examining new approaches that help to learn from and with customers in new service development is of crucial importance (Matthing, Sanden, & Edvardsson, 2004).

The S-D logic perspective is a powerful theoretical lens that enhances the concept of customer engagement (Brodie et al., 2013), which relates to customers’ perceived empowerment (Fuller, Muhlbacher, Matzler, & Jaweck, 2009) and could be considered as a means to share the experience (Prahalad & Ramaswamy, 2004). Kristensson et al. (2008:475) specified that firms need special strategies for involving users in the co-creation process where the S-D logic and UI perspective overlap the most. The concept of service has changed from the variety of market offerings to creating value for customers. Hence, more scholars started to scrutinize the antecedents and consequences of collaborating with users and customers in developing new services. It is argued that customer involvement influences new service performance by impacting technical quality and accelerating the development process (Carbonell et al., 2009).

Furthermore, some studies investigated areas pertaining to the methods and stages of user integration in the service development process. The results of a study of user involvement in financial services organizations revealed that users can participate in ten stages of service development, but among them user input is more significant in idea generation, service design, and service testing, with the highest intensity in idea generation and screening and less intensity for the stages of test marketing

and commercialization (Alam, 2002). In a similar vein, Edvardsson, Kristensson, Magnusson, and Sundstrom (2012) identified the dominant use modes which provide valuable information about different use situations (activities and collaborations at a specific situation) and different characteristics of users aiding service firms to integrate users.

The process management perspective concentrates on organizing and fine-tuning the new product development process considering users as the sources of innovation. Etgar (2008:98) defined co-production as a process in which “consumers participate in the performance of the various activities performed in one or more stages of the production process.” More specifically, Nambisan (2002:392) indicated that “customers can be involved not only in generating ideas for new products but also in co-creating them with firms, in testing finished products, and in providing end-user product support.” Moreover, Tietz et al. (2005) divided the process of UI into two separate phases, namely the idea generation phase which needs knowledge and experience as prerequisites, and the realization phase, which requires tools, materials, time, and some kinds of incentives. Accordingly, the developed product is tested, changed, and tested again in a single process or several circular processes.

It still remains somehow unclear how user input will be commercialized. Responding to this question, (Baldwin et al., 2006) proposed a model to transfer user innovations to commercial products which allows manufacturers to look systematically at new product opportunities provided by users and user communities and set their business strategies. The model proposes that users first try to seek “design space” and then join the communities and freely reveal their ideas and get motivated by increased efficiency. However, user-purchasers appear in some points of the process and try to buy the copies of user-innovators, which drive user-innovators to become user-manufacturers by using high-variable-cost and low-capital methods. As a consequence, co-creating with customers brings positive results in different phases of the NPD process, including ideation, product development, commercialization, and post-launch phases, for both the firm and the customer (Hoyer et al., 2010).

Lynch, O'Toole, and Biemans (2016) introduced some metrics to better comprehend involvement of customers in the NPD process – rationale, structure, and the process of customer network involvement – which mostly emphasize the interaction of the main parties rather than the locus of innovation. In addition, the process management perspective seeks the process of customers' and suppliers' integration. Lagrosen (2005) mentioned that cross-functional teams are necessary for a close relationship between customers and suppliers, enabling the product development process, and indicated formal methods of customer involvement. Identifying different types of customers is of critical importance during the integration process, and for this purpose some studies emphasize the importance of detecting customers' perspectives, abilities, and social identities during new product development (Brockhoff, 2003; Dahl, Fuchs, & Schreier, 2015).

Regarding the final theoretical background, there are two opposing and competing definitions of open innovation that characterize the innovation literature. According to Chesbrough (2003), open innovation refers to a specific and planned strategy aimed at gaining novel ideas from outside and commercialize innovations. Based on this paradigm, companies try to exploit on purpose the innovation potential of customers, employees, partners, and other interested innovators in order to accelerate their innovation process. On the other hand, von Hippel conceived of open innovation as free innovation in which all information related to the innovation is a public good, non-rivalrous and non-excludable, in contrast to the definition provided by Chesbrough that refers to "organizational permeability."

Accordingly, open collaborative innovation is defined as "the work of generating a design and also reveal the outputs from their individual and collective design efforts openly for anyone to use" (Baldwin & von Hippel, 2011). Corresponding to the latter definition, communities act as contributors through which ideas are generated, and the results are exposed for everyone to use through a process called "freely reveal," such as in open source software projects (Baldwin & von Hippel, 2011; David & Rullani, 2008; de Jong & von Hippel, 2009; Lakhani & von Hippel, 2003; von Hippel &

von Krogh, 2003) and innovation-contest communities (Fuller et al., 2014). Open collaborative innovation provides the opportunity for user contributors to take responsibility for some work and let others fulfill the rest (Baldwin & von Hippel, 2011)

Because the focus of this study is on reviewing papers dealing specifically with users, the number of papers in the sample that were based in open innovation is quite low. The open innovation literature classifies external stakeholders into individual contributors, extra-organizational groups, and wider network and ecosystem (Bogers et al., 2017). We only stressed papers related to open innovation and similar strategies that considered user innovation as one specific channel for opening their innovation processes. In an open collaboration process, everyone – suppliers, customers, designers, research institutions, inventors, students, hobbyists, and even competitors – can participate (Pisano & Verganti, 2008). Battistella and Nonino (2012:18) defined the so-called open community as "places where companies can find the collective intelligence of stakeholders' communities, capture outstanding ideas, and do crowdsourcing by fostering bottom-up innovation within or beyond organizational boundaries."

They also found good strategies to motivate users to take part in such platforms. Building a case study at Get Satisfaction (a social media platform which enables various participants from all around the world to share ideas about new products), Andersen and Morch (2016) examined the process of mass collaboration through a platform in order to determine the pattern of interaction between end users and professional developers. They suggested four patterns of mass collaboration in mutual development: 1) gatekeeping, 2) bridge building, 3) general development, and 4) user-user collaboration. Crowdsourcing of ideas within a consumer product firm competing with professionals and users revealed that crowdsourcing is a good way to absorb user ideas which are highly important in terms of originality and customer benefit (Poetz & Schreier, 2012). Crowdsourcing and netnography, which are open calls for ideas, could be potential sources for identifying lead users (Brem & Bilgram, 2015).

5.2 Limitations with future research agenda

UI is positioned within the broader management topic of open innovation that has been discussed comprehensively throughout the literature and was therefore not examined in detail in this paper. Although this study covers a broad range of studies and themes, it is possible that we neglected some studies while searching in the database. Regarding potential gaps found in this study by reviewing a large volume of academic literature, we provide some direction for future studies to address gaps in relation to the discussed UI topics. Suggestions at the strategic level of research opportunities can be found at the crossroads of strategy, business modeling, and UI. As discussed by Baldassarre et al. (2017), more knowledge is urged on the interplay between business modeling, strategy, and dynamic capabilities. This is true also for UI studies. More theoretical contributions and further empirical validation are needed to understand how such different but complementary dimensions interact with each other in determining the success of UI strategies.

Furthermore, we agree with Kristensson et al. (2008) that future studies need to explore more deeply the surrounding factors (financial, remoteness from R&D laboratories, and relationship with R&D strategies) that enable specific UI strategies to succeed. At the organizational level, we see a huge research potential in the relationship between organizational design and UI, with particular reference to the theme of organizational structures and routines enhancing/hampering the deployment of UI strategies in firms. More research on the interplay between formal and informal organizations is also needed, as suggested by Foss et al. (2011) in order to better understand which organizational setting can better capture and take advantage of the knowledge and the results obtained from informal networks (such as communities of consumers). At the managerial level, we agree with Ashok et al. (2016) about the need to better understand how knowledge from users can be transformed into firm-specific capabilities, and, specifically, the role of knowledge management in this process. In general, a deeper investigation is urged concerning the approaches, practices, and processes used by organizations to manage UI processes.

Regarding research opportunities in the domain of external-to-the-firm conditions, we fully back the suggestion by Ojanen & Hallikas (2009) to carry out more empirical research on the role of industries and contexts – and their characteristics – in determining the success of UI strategies carried out by firms. Although research on users and their characteristics is scarce, we also see some potential in examining individual attitudes and behaviors more explicitly (Foss et al., 2011). In particular, a closer evaluation of the role of mindsets, the values, and the cultures of individuals could enrich our knowledge of which micro-foundations better support the development of innovation capabilities in users and, in turn, in firms.

6. RESEARCH IMPLICATIONS AND CONCLUSION

Overall, this systematic literature review of UI and findings showed that in a period of tremendous growth of studies related to UI, the phenomenon has been investigated mainly from an “external” perspective so far. Because of this, understanding of the internal preconditions favoring and supporting UI is still far from complete. This study has useful implications both for the academic community and for practical application. Referring to academic implications, firstly, we distinguished between scientific papers focusing on the external-to-the-firm conditions of UI and papers focusing on the firms’ internal conditions, with more attention on the latter branch as an ignored part of the literature. We advanced knowledge about the importance of combining an external with an internal perspective in an attempt to provide a holistic view of UI and open an interesting path for future research in this specific field.

In addition, theoretical contributions of studies in the literature were provided in response to the scarcity of a systematic argument associated with theoretical basis of UI. This review makes a unique contribution by enlarging the borders of UI, looking at different aspects of the phenomenon from user and innovation perspectives to environmental effects and firm-related angles. The paper has some managerial implications for firms that wish to engage users for innovation activities. Dealing with practical implications, reviewing the potential and threats of

UI processes in different sectors and industries will help managers to benefit from previous experiences of companies. Regarding the benefits of involving users in the process of innovations, managers should devote more effort to apply such process along with

a supportive internal environment. More specifically, our discussion indicated that applying UI requires a firm to focus on formal and informal relationships, processes, and procedures both within and across organizational borders.

SUMMARY IN SLOVENE / IZVLEČEK

Prispevek predstavlja sistematičen in aktualen pregled literature na področju odprtih inovacij (OI). Za razliko od prejšnjih raziskav, se slednja osredotoča na "lokus" odprtih inovacij, kar pomeni, da razlikuje med študijami, ki se osredotočajo na zunanje dejavnike podjetji (tj. vrste uporabnikov, vloge uporabnikov, platforme, itd.) in študije, ki se osredotočajo na notranje dejavnike podjetji, kot so strategije, zmogljivosti in organizacija, ki sprožajo in podpirajo procese odprtih inovacij. Raziskva je pokazala, da so notranji dejavniki podjetji na področju odprtih inovacij velikokrat spregledani oz. zanemarjeni. Ravno zato prispevek spodbuja k novim raziskavam - tako teoretičnim kot empiričnim - z vidika strateških, organizacijskih in vodstvenih vidikov odprtih inovacij.

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