Customer Involvement into Open Innovation Processes: a Conceptual Model

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Abstract

The studies on open innovation as a phenomenon have been increasing dramatically in the few past decades. There are two basic approaches towards open innovation analysis from the firm perspective: 1) open innovation as a result of networking and collaboration of various types of business and non-business organizations, 2) open innovation as a result of firm’s partnership and collaboration with its customers. The paper contributes to the body of scientific innovation related literature which is concentrated to analyse open innovation processes and customer participation in it. Customer involvement and participation in an open innovation process can be analysed while using networking, value creation, or innovation inputs (knowledge for innovation perspective). The paper is based on the later approach, which allows us analysing the customer’s role. The paper proposes the structure for the classification of customer’s roles in the open innovation process, as analysed from the perspective of changing levels of involvement and variety of innovation inputs along the innovation development stages. Drawing on the analysis of customer roles and involvement levels at the certain stages of innovation process, the authors suggest a conceptual model for customer involvement in an open innovation.

Keywords: open innovation, customer involvement, customer driven innovation, customer co-creation, co-design.

Introduction

Innovation studies of the past decade have increasingly focused on the changes of innovation model, with the emphasis on open innovation processes and their impacts on the firm’s innovation performance. The open innovation model impacts changes in the organizational structures, goal settings, and innovation strategies in order to empower knowledge flows and exchanges among internal and external players (Chesbrough and Crowther, 2006; Docherty, 2006; Almirall and Casadesus-Masanell, 2010). The concept of open innovation has been analysed in the literature from various perspectives, providing key features of the phenomenon and further research implications. The related literature can be classified into the studies of open innovation concept as such (Chesbrough, 2003; West and Gallagher, 2006; Vanhaverbeke and de Vrande, 2008; Dahlander and Gann, 2010; Gassmann, Enkel and Chesbrough, 2010), studies of open innovation as a business model (Chesbrough, 2003; Chesbrough, 2007; Gassmann et al., 2010; Huston and Sakkab, 2007; Pangsy-Kania, 2008), and studies focused on management of open innovation within organizational leadership, structure and culture (de Jong, Vanhaverbeke and de Vrande, 2007; Pangsy-Kania, 2008; Cegarra-Navarro and Sanchez-Polo, 2011). The openness of innovation has led to the particular attention on the of firm capacities to identify, attract and anchor the external knowledge for innovation activities from different knowledge sources (Cohen and Levinthal, 1990; Zahr and George, 2002; Kaarela, 2010; Spithoven, Clarysse and Knockaert, 2010; Flatten et al., 2011) and the extension of organizational boundaries in order to create value for customer (Chesbrough and Schwartz, 2007; Chesbrough, 2007). While interorganizational cooperation and knowledge sharing are widely discussed within innovation and business strategy literature, the customer involvement, traditionally left out for marketing thinkers, has been brought into the attention of innovation scholars only recently. The new approach to open innovation model by highlighting a customer involvement perspective attracted a great interest of researchers and practitioners. The studies have shown a more active role of customers in innovation (von Hippel, 1990; Gales and Mansourcoul, 1995; Salter and Laursen, 2006; Steiner et al., 2009; Piller, Ihl and Steiner, 2010), it was also proven that the identification of lead users and use of their information has positive effect on innovation performance (von Hippel, 1990; Piller and Ihl, 2009; Steiner et al., 2009; Piller et al., 2010), customers were analysed as co-creators and creativity source in the innovation process, or defined as the central entity of the value chain (von Hippel, 1990; Prahalad, 2004). There is also attention drawn to the frequency and scope of customer-firm interaction influence the performance (Gales and Mansourcoul, 1995; Steiner et al., 2009) and also the mode and kind of communication and interaction with customers in context of innovation (Piller and Ihl, 2009). In spite of increasing attention to the customer as an important input source for innovation, the key questions related to the effective management of customer involvement into innovation process remain to be further exploited, as the varieties of firm – customer interactions as well as the modes of interactions are further increasing, customers roles in innovation processes might vary with regard to the stage of innovation process.
customer interaction model chosen, complementarity of customer and firms knowledge bases within the given innovation context, etc. However, the search for answers remains limited before we classify available knowledge in terms of: 1) roles of customers in open innovation processes, 2) types of customer participation in open innovation processes, 3) levels of involvement into innovation processes according to the firms innovation strategy in terms of open vs. closed innovation approach. Consequently, the paper focuses on these research questions, and aims to provide the conceptual model of customer involvement into the open innovation process. The paper is based on the comparative literature review and synthesis, as a method best suited for the theoretical agglomeration of already existing case studies and various research findings in the field.

The first part of the paper focuses on the analysis of changing role of customer in open innovation processes, and key modes of customer – firm interaction in innovation process of the firm. In the second part, we aim to link open innovation processes (define, design and validate) of the firm to the activities of customer involvement. The third part of the paper provides a conceptual model for the conceptualisation of customer involvement in the open innovation process, with reference to the roles of customer in innovation processes, firm - customer interaction type and strategic firms innovation openness dimensions. Finally, we provide key research findings and implications of analytical model proposed for further research towards the search of analytical models and typologies of interaction models for an effective customer involvement in open innovation processes from the knowledge management perspective.

Customer’s roles and customer-firm interaction types in an open innovation process

With reference to Chesbrough, Vanhaverbeke and West (2006), open innovation model relies on innovation ideas developed internally either coming from outside, i.e. knowledge and information sharing lies at the core of it as a tool to enrich organisational knowledge bases for innovation. Linking external and internal knowledge sources within the open innovation boundaries becomes an important challenge, as it requires intense knowledge management practices. Petraite (2010) notes that in the context of strategic innovation business companies are building their innovation strategies on opportunity search and resource acquisition in international networks of knowledge, human resources, venture capital and also customer basis. Open innovation entails creating value networks. By co-creating value with customers, the innovating firm may open up the innovation process and insource ideas from the network and thus benefit from external knowledge while developing internally (Vanhaverbeke and de Vrande, 2008).

In terms for customer driven open innovation, the specific challenge is related on how we could involve customers knowledge into the innovation processes at much more intense than traditional levels, basically limited to the ideas search phase, in order to achieve key benefits associated with open innovation model, classified as the enlarged information base to be utilized for the innovation process (Piller and Ihl, 2009), ability to leverage new product development on external sources (Docherty, 2006), faster action on ideas and technology, development of innovative culture from the ‘outside in’ through continued exposure and relationships with external innovators.

Customers and users domains usually provide large base of information about needs, applications and solution technologies that resides in the domain.

While the cooperation with business companies, science institutions, suppliers, partners and competitors in innovation literature overshadow the potential of customer as an open innovation partner, in the marketing field customers as an active partner in new product development literature was analysed already since 1978. The von Hippel’s (1978) ‘customer-active’ paradigm points out that the customer can be an active participant in the new product development process as a new product idea developer and transmitter to the manufacturer.

Wecht and Baloh (2006) work has proven that thoroughly executed customer integration into new product development can be beneficial for a company’s innovation performance. The same is also said by Thomke and von Hippel (2002), who defined users as a common source of innovations. User innovation is considered as one of open innovation’s part fields (Gassmann et al., 2010). The main contribution of the customer is perceived as an enlargement and enrichment of information bases that can be utilized for the innovation process, especially the information on needs and solutions, applications that resides in the domain of the customers and users of a product or service (Piller and Ihl, 2009). Thus the customer involvement in new product development and/or innovation process is widely analysed by a large stream of innovation scholars in various social contexts and industries (Thomke and von Hippel, 2002; Reichwald and Piller, 2003; Franke and Piller, 2004; Prahalad, 2004; de Jong et al., 2007; Lettl, 2007; Piller and Ihl, 2009) and others. However, the management of customers’ ability to innovate outside or within the business company as an active participant of innovation process remains complicated because of lack of conceptual framework.

Fuller and Matzler (2007) acknowledge that customers can be invited to contribute their creativity and problem solving skills by generating and evaluating new product ideas, elaborating, evaluating or challenging a detailed product concept, discussing and improving optional solution details, selecting or individualizing the preferred virtual prototype, testing and experiencing the new product features by running simulations, getting information about the new product or consuming practices. The customers’ role and contribution type at the aggregated level can be classified along the value chain: lead users, co-designers and decision makers (Piller et al., 2010). Customer role and activities in innovation process also vary by the analytical perspective taken: new product development (NPD) or broader approach to innovation processes; and
Customer involvement activity in innovation process

<table>
<thead>
<tr>
<th>Concept</th>
<th>Author, year</th>
<th>Definition</th>
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<tr>
<td>Co-creation</td>
<td>Prahalad (2004)</td>
<td>Co-creation is about joint creation of value by the company and the customer. Allowing the customer to co-construct the service experience to suit her context. Joint problem definition and problem solving. Creating an experience environment in which consumers can have active dialogue and co-construct personalized experiences; product may be the same but customers can construct different experiences.</td>
</tr>
<tr>
<td>Co-creation</td>
<td>Chesbrough and Schwartz (2007)</td>
<td>Co-creation is central to open innovation, and co-development partnerships that entail creating and delivering a new product, technology or service can be used as an effective way of innovating the business model and improving innovation effectiveness.</td>
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<td>Co-creation</td>
<td>O’Hern and Rindfleisch (2008)</td>
<td>Co-creation is defined as a collaborative NPD activity in which customers actively contribute and/or select the content of a new product offering. Customers are central and vital participants in the NPD process, and in some cases, are capable of creating new products with little help from firms. There are four distinct types of customer co-creation: (1) Collaborating, (2) Tinkering, (3) Co-designing, and (4) Submitting.</td>
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<tr>
<td>Customer co-design</td>
<td>Piller and Ihl (2009)</td>
<td>Customer co-design means that customers are integrated into value creation by defining, configuring, matching, or modifying an individual solution. Co-design activities are performed in an act of company-to customer interaction and cooperation.</td>
</tr>
<tr>
<td>Customer co-design</td>
<td>Anderson-Connell, Ulrich and Brannon (2002)</td>
<td>Customer co-design is a collaborative relationship between consumers and manufacturers wherein, through a process of interaction between a design manager and a consumer, a product is designed according to consumer specification and based on the current manufacturing components (appliance industry context).</td>
</tr>
<tr>
<td>Customer co-design</td>
<td>Piller and Ihl (2009)</td>
<td>Three modes of customer involvement in new product development: mode 1 – Design for customers (observed data on customer preferences), mode 2 – Design with customers (different solutions or concepts to customers so they can react to proposed design solutions), mode 3 – Design by customers (the manufacturer is either empowering its customers to design a solution by themselves or is implementing methodologies to efficiently transfer an innovative solution from the customer into the company domain).</td>
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<tr>
<td>Lead users</td>
<td>von Hippel (2007)</td>
<td>Lead users are users that: 1. Expect attractive innovation related benefits from a solution to their needs, so are motivated to innovate; 2. Experience the needs that will become general in the market place, but experience them months or years earlier than the majority of the market; 3. Have solution skills to transfer need into a feasible solution.</td>
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<tr>
<td>Lead users</td>
<td>O’Hern and Rindfleisch (2008)</td>
<td>Lead users play an important role in some of the types of co-creation.</td>
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<tr>
<td>User innovation</td>
<td>von Hippel (2007)</td>
<td>Innovation by users tends to be concentrated among ‘lead users’ of the products and processes focused upon. User-innovator can typically expect to benefit financially only from its own internal use of its innovation. Benefiting from diffusion of an innovation to other users in a marketplace has been traditionally assumed to require some form of intellectual property protection followed by licensing. Both matters are costly to attempt, with very uncertain outcomes.</td>
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<tr>
<td>User manufacturer</td>
<td>von Hippel (2007)</td>
<td>User self-manufacturer – analysed in the context of user communities. Such users participating in the network design and build innovative products for their own use – and also freely reveal their design information to others. Those others then replicate and improve the innovation that has been revealed and freely reveal their improvements in turn – or they may simply replicate the product design that has been revealed and adopt it for their own, in-house use.</td>
</tr>
<tr>
<td>User entrepreneurs</td>
<td>Franke and Piller (2004)</td>
<td>User entrepreneurship: some innovative users create new products (often to profit from using them), but also get enabled to share their developments (at larger quality) with a larger group.</td>
</tr>
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<td>User driven innovation</td>
<td>Wise and Hogenhaven (2008)</td>
<td>User-Driven Innovation is the process of tapping users’ knowledge in order to develop new products, services and concepts. A user-driven innovation process is based on an understanding of true user needs and a more systematic involvement of users. This includes latent user knowledge that cannot be easily articulated, and tacit user knowledge that cannot be easily transferred.</td>
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<td>Living Labs</td>
<td>CoreLabs (2007)</td>
<td>Living Lab – a system enabling people, users/consumers of services and products, to take active roles as contributors and co-creators in the research, development, and innovation process.</td>
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<tr>
<td>Living Labs</td>
<td>European Network of Living Labs</td>
<td>Living Lab – a methodology for User Driven Innovation.</td>
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<td>Living Labs</td>
<td>Svensson, Eriksson and Ebbesson (2010)</td>
<td>Living Labs – a milieu in which specific methods are used to involve different stakeholders in open innovation processes to create and validate IT-products and services in a real world setting.</td>
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also by the degree of involvement and stage of innovation process, as summarised in Table 1.

The literature overview shows that customers are active players and co-creators of knowledge as participants of innovation process (Prahalad and Ramaswamy, 2004). The customer roles and levels of involvement in open innovation processes can be analysed from the perspective of customer participation in value creation processes. The concept of user driven innovation is defining a result of collaborative co-creation process – innovation initiated, created and/or developed by user. User manufacturing or so called user entrepreneurship defines value creation process, where users have most or even all initiative and action and benefits in value creation process.

In the value creation processes, co-creation is most general concept defining joint collaborative activities of customer and business enterprises in search for new value. Co-creation is defined as a value creation route in innovation process where co-design activities are employed. Customer co-design is a collaborative co-creation activity in the new product development conceptualisation and prototyping stage, where customers can define, configure, match, or modify the product according to their needs. Consistent with the level of integration and involvement of customers in value co-creation processes, the special role is given to lead users. Lead user concept defines processes of customer integration in idea generation and later product development phases, where cutting-edge customer ideas are needed.

The living lab concept in the joint collaborative customer – business enterprise value creation process serves as a milieu for innovation. The concept integrates the certain contributors, methodology, infrastructure and activities for successful innovation co-creation process.

Reviewing the scientific literature on innovation process as well as innovation stages and activities of innovation partners can be stated, that most approaches analysing innovation process incorporate three generic steps: a phase where ideas are collected or generated (idea generation), another one to develop and specify those ideas (development) and finally the last one where value creation takes place by transforming ideas into products (commercialisation). Customers as active participants of open innovation process can take different roles in respect of type of customer involvement. The first stage of idea generation process is focused on the identification and generation of opportunities, fresh ideas and novel concepts. External resources for this process stage are e.g. inventors, lead users, designers, engineers, other innovative community members or heavy users. Their contributions can be added to suggestions created by company’s staff. The collection of ideas and concepts has than to be evaluated and refined in the following stages. Again, internal and external resources can be consulted. Following this iterative process the most promising ideas and concepts can be selected out of a range of alternatives and then be further processed (Fuller and Matzler, 2007).

So the second stage of innovation process is development where the customers take role as co-creators. Whereas some scholars (Fuller and Matzler, 2007) give an active lead user role just in idea generation stage, the others (O’Hern and Rindfleisch, 2008) consider lead user approach as a part of whole co-creation process. According to Fuller and Matzler (2007) where the design and engineering activities of new product development are employed, a customer role as co-creator or co-designer can be engaged.

O’Hern and Rindfleisch (2008) note that the co-creation process can be led by business enterprise or by customer itself. Customer contribution activities vary in the degree to which a firm releases control and empowers their customers as active participants. The scholars suggest that the type and format of NPD contributions can range from being essentially fixed by a firm to wholly open to customer input and that the selection of these contributions can be either directed by a firm or directed by customers. O’Hern and Rindfleisch (2008) distinguish four types of customer co-creation: (1) Collaborating (2) Tinkering, (3) Co-designing and (4) Submitting. This typology classifies a considerable body of co-creation activity. The scholars define each four distinct types of co-creation, identify their key features, provide relevant exemplars and discuss their benefits and limitations.

Collaborating is defined as a process in which customers have the influence to collectively develop and improve a new product’s core components and underlying structure. Collaborating is conceptualized as the form of co-creation that offers customers the greatest power to contribute their own ideas and to select the components that should be incorporated into a new product offering (O’Hern and Rindfleisch, 2008).

Tinkering is defined as a process in which customers make modifications to a commercially-available product and some of these modifications are incorporated into subsequent product releases. Tinkering is similar to collaborating in terms of allowing customers a relatively high (but somewhat lower) degree of autonomy over NPD contributions. However, firms that employ tinkering usually retain a considerable degree of control over the selection of these contributions. Although knowledge regarding the outcomes of tinkering is at a formative stage, it appears that this type of co-creation may deliver several benefits to firms. In crowded markets with similar offerings, tinkerer-based co-creation may provide a basis for product differentiation (O’Hern and Rindfleisch, 2008).

Co-designing is defined as a process in which a relatively small group of customers provides a firm with most of its new product content or designs, while a larger group of customers helps select which content or designs should be adopted by the firm. Co-designing is characterized by a relatively fixed contribution approach but a high degree of customer autonomy over the selection of these contributions (O’Hern and Rindfleisch, 2008).

Submitting is defined as a process in which customers directly communicate ideas for new product offerings to a firm. Submitting is differentiated from traditional forms of customer inquiry (e.g., focus groups, satisfaction surveys, tracking studies, etc.) by both the
degree of customer effort required and by the nature of the input that customers provide to the firm. In contrast to most traditional forms of customer inquiry that simply ask customers to provide responses to a set of prearranged queries, submitting requires customers to expend considerable energy developing (either in isolation or as part of a team) tangible ideas for new product offerings. In addition, while traditional inquiry approaches typically involve customers solely in concept ideation and evaluation, submitting often requires customers to translate general ideas into well-defined processes, detailed graphic depictions, or working new product prototypes (O’Hern and Rindfleisch, 2008).

Reichwald and Piller (2003) also identify three different kinds of contributions in shape of decision, information and creation activities in a co-creative innovation process:

- **Decision**: during decision activities users are able to decide or evaluate given facts, this can be done by, for example, surveys or voting systems.
- **Information**: information activities enable the user to express needs, preferences or solutions to problems. A common way of doing this is by the use of focus groups and idea competitions.
- **Creation**: during a creation activity the user is able to be creative and is allowed to come up with their own solutions and designs in creative ways, common methods used for creation activities are mock-ups and prototypes (cited in Svensson et al., 2010).

Kahn and Pinegar (1999) proposed a matrix, which serves as a typology of customer involvement in business-to-business NPD. Customers can take roles as (1) coaching, (2) partnering, (3) reporting and (4) advertising actors in the value creation process on business-to-business settings. Coaching customer contributes to the technology forecasting, problems and opportunities identification, concept generation and definition of a new product development. Coaching role provides high level of technology development but considerably low level of application development. The co-development activities as well as sharing of resources, and exploring the application undertakings customer fulfils as partnering actor of new product development. Partnering role provides high level of technology development and also high level of application development. The product councils, focus groups and beta testing serve as a advising activity in the process. Advising role delivers low level of technology development and high level of application development. The reporting role of customers implies on testing, customer research and market sensing activities. A low level of technology development and high level of application development refers to reporting role of customer.

To sum up, the co-creation activities implies on active role of customer and defines his/her active contribution to value creation process. Co-creation can be reflected as a joint partnering activity between business enterprise and customer.

Returning to the idea of innovation process the last commercialisation phase has to be summarised. Fuller and Matzler (2007) consider this stage as the test and launch phase of the idealized innovation process where the process members may take on the roles of testers, end users or buyers (Fuller and Matzler, 2007). This stage is widely analysed in marketing research field and will not be further developed in the framework of this paper.

The concept encompassing all or focussing an all mentioned innovation process stages can be can be considered as a Living Lab approach, whereas, according to Svensson et al. (2010), Living Lab is enabling people, users/consumers of services and products, to take active roles as contributors and co-creators in the research, development, and innovation process. Living Lab serves as a milieu where the specific methods are used to involve different stakeholders in open innovation processes in order to create and validate products and services in a real world setting (Svensson et al., 2010).

According to Almirall (2008), Living Labs cover not only some stage of innovation process but the whole funnel. Living Labs organize users in needs finding exercises contributing to ideation, support them in acting as entrepreneurs, orchestrate the innovation process, organize user contribution in incremental innovation through localization exercises or promote societal involvement for a certain platform, product or service. Therefore, they are playing a more encompassing and systemic role in the innovation process.

In conclusion, with reference to the innovation process and customer roles that can be taken in this process, it may be noted that customer activity differs according to stage of innovation process, firm goals and expectations for customer and customer role in the process. The forms of user engagement in open innovation process can vary from simple knowledge transactions, to the widely developed collaborative actions, as it occurs in the case of lead users and living labs. Innovation in customer basis is more likely to be possible in the contexts where customers can create some value in the innovation value chain. Within this type of customer involvement, as empirically proven by von Hippel (2007) in his reviews on functional sources of commercially important innovations in knowledge intensive fields lead to the incremental improvements rather than some radical solutions. As an opposite, in the case of lead users and open innovation processes strongly moderated by the firm, the open innovation activities may lead to the radical innovations (Kriaucioniene and Ragauskas, 2008; Lettl, 2007).

Further classification of customer roles and involvement in open innovation process is analysed according to the stage of innovation process and firms perspective, as provided in the next sections of the paper.

Customer involvement modes based on innovation process and type of customer involvement

In the context of open innovation, where set of various external actors are employed to facilitate or even drive innovation process, Gassmann and Enkel (2004) distinguishes three types of open innovation processes:
1) The outside-in process: Enriching the company’s own knowledge base through the integration of suppliers, customers and external knowledge sourcing can increase a company’s innovativeness.

2) The inside-out process: earning profits by bringing ideas to market, selling IP and multiplying technology by transferring ideas to the outside environment.

3) The coupled process: coupling the outside-in and inside-out processes by working in alliances with complementary partners in which give and take is crucial for success.

Each of the above listed models implies different activities of customer involvement. Those activities can be classified by the innovation related knowledge acquisition goals (i.e. identify, attract, anchor, and use). External knowledge related innovation processes in general are classified as the outside-in innovation processes. For better understanding of open innovation processes Gronlund, Sjodin and Frishammar (2010) proposed the Stage-Gate process. The Stage-Gate process consists of a series of stages where essential activities are carried out. The stages are complemented by gates where interim achievements are evaluated. The stages comprise the actual development work. The specific activities performed depend on which stage the project is in. In the early stage innovation activities generally are focused on discovering opportunities and generating ideas, in general it can be called as defining stage of innovative product, while the later stages innovation process focus on concept development, it is in general called design stage, finally flows the testing, and commercialization where innovative product is validated. Stages are typically cross-functional and each activity is undertaken in parallel with others so as to enhance speed to market. Each stage typically costs more than the preceding one, resulting in increased commitments but also in a reduced number of unknowns and uncertainties so that risk is effectively managed. The open innovation potential at each stage is different because the new product development process struggles with different technical, organizational, and managerial activities at each stage. In addition, partner selection for inbound and outbound activities also seems partly stage-contingent (Gronlund et al., 2010). As the outside-in or so called inbound innovation process is most relevant to the subject of customer involvement, the process activities and potential innovation partners can be summarised as presented in Table 2.

The presented three-staged of innovation process stage-gate model, presented in Table 2 defines the stages of innovation process and most important innovation activities as well as innovation partners. However according to this model customers can participate just in first stage of innovation process. This statement can be argued by Lettl (2007) who analyses user involvement in radical innovation, and states, that users can be active participants in all three innovation phases: idea generation, development, testing. However, the actual role and activities of customers in each phase of the value creation process remain obscure. Piller and Ihl (2009) highlight three modes of customer participation in new product development: Mode 1 – 

<table>
<thead>
<tr>
<th>Define</th>
<th>Design</th>
<th>Validate</th>
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<tr>
<td>Innovation Process activities</td>
<td>Business opportunity identification, establish customer needs, team definition, create new product concept, evaluate feasibility of product concept, conduct program plan and budget review.</td>
<td>Preliminary design review, risk review, sourcing review, design &amp; test product, finalize product design establish manufacturing approach, develop new product.</td>
</tr>
<tr>
<td>Inbound knowledge Activities</td>
<td>Spin-in ideas, knowledge or product concepts from innovation partners for internal development, joint development, or application.</td>
<td>Solve technical problems or spin-in external inventions through collaboration with innovation partners.</td>
</tr>
<tr>
<td>Innovation partners</td>
<td>Inventors, start-ups, suppliers, customers, research institutions or other external sources.</td>
<td>Intermediaries (science and technology parks, incubators, innovation centres, technology centres, business support agencies, funding organizations), research Institutions, suppliers, competitors or firms in other industries.</td>
</tr>
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</table>

Table 2

Key Inbound Open Innovation Activities

diverse input channels to explore needs: listening into the customer domain by analysing sales data, internet log files, or surveying sales personnel; ethnography; quality function deployment; Mode 2 – Design with customers: display solutions or concepts to customers so they can react to proposed design solutions: pilot customers or beta users, concept testing, focus groups; output-driven innovation method; Mode 3 – Design by customers: there is an active integration of customer participation in NPD, often with tools that are either provided by the firm or by customers themselves. The manufacturer is either empowering its customers to co-design a solution or is implementing methodologies to efficiently transfer an innovative solution from the customer into the company domain.

Another useful perspective on innovation process is the innovation value chain. The innovation value chain is viewed as an end-to-end process encompassing three main stages: idea generation, conversion and diffusion, with conversion including both selection of ideas and the subsequent development of them (Mulvenna et al., 2010).

This discussion provides rationale for the idea that even if open and multidisciplinary innovation is still viewed as a linear process in the scientific literature. The complexity of the processes and nature of innovation requires for more dynamic rather cyclic than linear innovation creation model integrating external and internal innovation processes.

The whole open innovation process with main focus on customers as external players is summarised in Figure 1. The conceptual open innovation process model modified after the open innovation model presented by Chesbrough (2003) and customer involvement model (Fuller and Matzler, 2007).

Rather than linear research – development – commercialization approach it is used cyclic approach where research in continues improvement process over all stages of innovation creation and where is possible to go forward, return and lope to idea generation, development and testing phases over and over again by imputing new results, adding new knowledge, experience and value. Through all research process customers can take different roles according to their contribution needed. Knowledge in the proposed model is viewed as a main and continuously circulating resource of innovation. The idea funnel is viewed taking basic steps of innovation chain during the creation process.

Figure 1. Customer in innovation process
Modified after the customer involvement model (Fuller and Matzler, 2007), the open innovation model (Chesbrough, 2003) and the cyclic innovation process model (Kline and Rosenberg, 1986)
Table 2

**Customer-business company interaction in innovation process**

Modified after customer integration into innovation process model (Reichwald and Piller, 2003), customer involvement model (Fuller and Matzler, 2007) and modes of customer involvement in the new product development (Piller and Ihl, 2009)

<table>
<thead>
<tr>
<th>Co-creation modes</th>
<th>Innovation model</th>
<th>Firm – customer interaction</th>
<th>Stage of innovation process</th>
<th>Role of the customer</th>
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<tr>
<td><strong>Mode 1:</strong></td>
<td><strong>Listening in:</strong></td>
<td><strong>Indirect collection of market, customer information</strong></td>
<td>Idea generation</td>
<td>Passive target of observation for information and data collection</td>
</tr>
</tbody>
</table>
|                   | Using customer data from passive information sources to explore unmet customer needs (design for customers) | • Evaluation of literature and trade journals of customer’s industries  
• Evaluation of patents  
• Evaluation of feedback based on analysis of CRM systems  
Customers as a passive target of observation | Idea generation Test and launch | End users and buyers |
|                   |                   | **Manufacturer initiated dialogue with customers** | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | • Customer/user panels; user surveys on (future) requirements;  
• Consumer idealized design;  
• (Web based) conjoint analysis  
• Quality function development and Kansei engineering  
• Securities trading concepts (virtual stock markets)  
• Creativity workshops with customers  
• (Virtual) concept testing and prototyping  
• Piloting and field tests, (web based) critical incident technique  
• Product clinics (also form of online discussions) | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | **Customer initiated dialogue with manufacturers** | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | • Evaluation of complaints  
• Evaluation of customer requests/customer recommendations  
• Systematic complaint manager  
• Screening of use groups and user communities | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | **Customers are equal partners of the organization** | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | • Manufacturer initiated and operated toolkits for innovation  
• Intermediary initiated and operated toolkits for innovation  
• User design: Using virtual drag-and-drop, respondents trade off features against price of performance;  
• Joint product development with customers (lead users)  
• Temporary employment of suppliers staff at customer  
• Temporary employment of customers staff at suppliers  
• Lead user workshops initiated by the manufacturer | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | **Customers as independent innovators** | Idea generation Test and launch | Source of ideas End users and buyers |
|                   |                   | • Lead user activities without initial motivation of manufacturer  
• Community innovation (e.g. open source)  
• Customer initiated and operated platforms/ toolkits for innovation | Idea generation Test and launch | Source of ideas End users and buyers |

Note: Co-creators in this context are considered as a participants of cyclic innovation process, where it can be dynamic cyclic vs linear process, where is possible to go forward, return and lope to idea generation and testing phases over and over again.

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1 Co-creators in this context are considered as a participants of cyclic innovation process, where it can be dynamic cyclic vs linear process, where is possible to go forward, return and lope to idea generation and testing phases over and over again.
As the discussion above shows, customers are becoming more and more active participants of innovation process. In the open innovation context, customers are one of the most important external innovation partners and valuable source of external knowledge. It is crucial to manage this involvement process in order to get successful innovation commercialization results. There are different types of customers’ involvement in innovation process, which depends on stage of the process, customer-firm interaction activity and customer’s empowerment level. The stage of innovation process defines whether customers are just a source of ideas, active co-creators or end-users and buyers.

**Conceptual model for the customer involvement into the open innovation process**

The discussions referred to in this paper demonstrate that customers can take different roles in innovation process. The degree of customer involvement also differs according to customer interaction type and strategic firm’s innovation openness dimensions.

The innovation model contrasts closed innovation based only on internal innovation sources and open innovation model where external knowledge and external innovation partners are employed. With reference to Reichwald and Piller (2003), in the strategic level of the company, while closed innovation is concentrated to use some information about customers as external players of innovation process, open innovation model integrates customer to the open innovation process for joint collaborative value creation.

Either of the innovation models in the innovation process involves the general stages of idea generation, development and product commercialization. Each of the stages can be linked to different customer roles according to the modes of co-creation process, and therefore customer would take different activities in a value creation process. In the customer involvement and empowerment context customer’s interaction in innovation process may vary from a passive object of observation, information provider to an active participant of the process (Fuller and Matzler, 2007). Customers may take different roles through whole idea generation, development and commercialization process. Depending on customers, firm interaction level customers can take a role from an idea generator, developer, tester and end user. The customers’ role can define the customer-firm interaction activities emphasised by Reichwald and Piller (2003).

We incorporate these customer-firm interaction modes, roles and types along with innovation models, innovation process stages, and as a result we provide an integrated model for customer involvement in an open innovation process, based on the roles of customer in innovation processes, firm - customer interaction type, and strategic firms innovation openness dimensions (Table 2).

The proposed integrated conceptual model (modified after Fuller and Matzler, 2007; Piller and Ihl, 2009; Reichwald and Piller, 2003) for the conceptualisation of customer involvement in the open innovation process, based on the roles of customer in innovation processes, firm - customer interaction type and strategic firms innovation openness dimensions summarises the customer participation in the innovation context. The conceptual model allows us to distinguish and develop research on certain customer involvement types, design the framework for analysis of customer participation in an open innovation process and further analytical and customer involvement facilitating tools.

**Conclusions**

The role of customers in a value creation process is a changing across several different dimensions: time frame, the nature of business exchange and the role of the customer, managerial mind-set, the company’s interaction with customers and how it develops products and services and the purpose and flow of customer communication value.

The roles of customers in an open innovation process can be classified along the few dimensions: type of contribution and knowledge inputs along the innovation process; intensity of customer activity on certain stages of innovation process; responsibilities assigned to the customer along in the new value creation (from simple testing and ideas to improvement to co-creation, and the like).

Types of customer participation in an open innovation are defined on a base of knowledge inputs requested and the role in a value creation process. We can distinguish the simple knowledge transactions, which are defined by basic innovation inputs at certain innovation development stages with the increasing customer involvement as widely developed collaborative actions, i.e. customers as an innovation partners (co-creators and co-designers) or independent innovators, as it occurs in the case of lead users and living labs.

The firms approach to innovation openness defines the variety of customer involvement levels into the open innovation process. Such types, by means of customer as a source of valuable information, passive subject of observation are more associated with the lower levels of innovation openness in the firm, while customer co-creation activities are widely exploited within the high levels of innovation openness. i.e., we can state, that customer involvement, knowledge contribution and its complexity into the open innovation process increases together with the level of innovation openness in the firm.

While modelling customer involvement into the open innovation process, we should link firm innovation model, stage of innovation process, mode of co-creation, type of firm – customer interaction, and role of the customer in the innovation process. The innovation model contrasts closed innovation based only on internal innovation sources and open innovation model where external knowledge and external innovation partners are employed. Either of the innovation models in the innovation process involves the general stages of idea generation, development and product commercialization. Each of the stages can be linked to different customer roles according to the modes of co-creation process, and therefore customer would take different activities in a
value creation process. As a result we provide integrated framework for customer involvement in an open innovation process, which allows us to distinguish and develop research on certain customer involvement types, design the framework for analysis of customer participation in an open innovation process, and further analytical and customer involvement facilitating tools.

Further research might be drawn to empirically evidence the proposed model of customer participation in innovation process. Supplementary studies can also be directed towards the search of analytical models and typologies of interaction models for an effective customer involvement in open innovation processes from the knowledge management perspective.

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References


Vartotojų įtraukimas į atvirųjų inovacijų procesą: konceptualus modelis
Santrauka

Inovacijų tyrimai pastaraisiais dešimtmečiais vis labiau akcentuoja pokyčių inovacijų modelius, vis didesnį dėmesį skiriant atvirųjų inovacijų procesui ir inovacijų modeliui įtakai įveikti jų įtraukininko veiklos sėkmėje. Atvirųjų inovacijų modeliai apima organizacijų struktūros pokyčius, tikslių nustatymą bei inovacijų strategijas siekiant įgalioti žinių mainius tarp šeiminių ir vidinių inovacijų kūrimo dalyvių (Chesbrough, Crowther, 2006; Almirall, Casadesus-Masanell, 2010). Atvirųjų inovacijų koncepcija plačiai analizuojama mokslinėje literatūroje keliomis dimensijomis atskleidžiant pagrindinės fenomeno sudėtinges dalių bei pateikiant tolimesnes tyrimo kryptis. Mokslinė literatūra, susijusia su atvirųjų inovacijų koncepcijos analize, gali būti skirstoma į tyrimus, kurie orientuojasi į pačią atvirųjų inovacijų koncepciją (Chesbrough, 2003; West, Gallagher, 2006; Vanhaverbeke, de Vrande, 2008; Dahlander, Gann, 2010; Grassmann, Enkel ir Chesbrough, 2010); kurie analizuoja atviriasias inovacijas kaip verslo modelį (Chesbrough, 2003; Chesbrough, 2007; Huston, Sakkab, 2007; Pangsy-Kania, 2008; Grassmann et al., 2010); kurie koncentruojasi į atvirųjų inovacijų valdymo problematiką organizacijinės dydinės, kulštinos ir struktūros kontekste (De Jong, Vanhaverbeke, de Vrande, 2007; Pangsy-Kania, 2008; Cegarra-Navarro, Sanchez-Polo, 2011). Inovacijų proceso atvirumas reikalingas didelio dėmesio analizuojant įveikti jų įtraukininko veiklos sėkmėje. Atvirųjų inovacijų modelį išskiriant uždavinį siekti kurti didesnę vertę vartotojams valdymui (Chesbrough, Schwartz, 2007; Chesbrough, 2007). Tuo tarpu kai tarptautinės bendradarbiavimos įvairiose srityse keliantys dėmesį į vartotojų dalyvavimą, tradicija lieka atsirasti ir technologinių inovacijų srityje išrinktina kaip viena iš pagrindinių vartotojų įtraukimo į inovacijų procesą tyrimų ir teorinių studijų rezultatų (Chesbrough, 2003; Chesbrough, 2007; Ge, Güth, 2008; Gassmann et al., 2010). Atvirųjų inovacijų veiklos impactai organizacijoms parengtų dėmesį skiriant atvirųjų inovacijų veiklos atsakomybės įvairiose srityse. Tai dar yra simbolis finansinės sėkmei ir integracijos tikslus. Naujoji atvirųjų inovacijų veiklos sėkmė taip pat taip pat skiriamas vartotojų - verslo organizacijos interakcijos dažnumui ir intensyvumui, kuris labiausiai yra įtraukiant vartotojus į verslo veiklos procesus. 

Atvirųjų inovacijų veiklos sėkmės faktorius yra įvairus, įskaitant inovacijų modelio analizę, pateikimo strategijas, inovacijų veiklos vartotojų įtraukimą į inovacijų veiklos procesą. Inovacijų veiklos sėkmė turi pasiekti tik čia, o ne tik atvirųjų inovacijų veiklos sėkmė. Tai yra vienas iš pagrindinių vartotojų įtraukimo į inovacijų veiklos procesą tyrimų mokslinėje literatūroje.
Straipsnio tikslas yra pagrįsti konceptualų vartotojų įtraukimo į atvirųjų inovacijų procesą modelį.

Straipsnis grindžiamas lyginamąja mokslinės literatūros analize bei sintezė, siekiant atskleisti teorines sąsajas ir sujungti anksčiau atliktą šios srities tyrimų rezultatų interpretacijas.

Straipsnis žymiai prisideda prie inovacijų srities mokslinės literatūros, analizuojančios atvirųjų inovacijų procesų ir vartotojo dalyvavimo jame problematiką. Straipsnyje pateikiamas trūkstama sąsaja – konceptualus modelis vartotojo įtraukimo į inovacijų procesus struktūrai ir apriščiai klasifikuoti. Straipsnyje pristatomas inovacijų proceso kompleksifikumas ir galimi vartotojo vaidmenys sąveikos su verslo organizacija kontekste. Vartotojo vaidmuo vertės kūrimo procese yra kintantis priklausomai nuo skirtų dimensijų: laiko, verslo įsitraukimo ir vartotojo dalyvavimo įvairių vėžių ir vystymo rutinos, komunikacijos su vartotoju tikslu ir kuriamos vertės.

Vartotojų vaidmuo atvirųjų inovacijų procese gali būti klasifikuojamas pagal kelių dimensijas: įsitraukimo tipą ir žinių indėlį į inovacijų procesą, vartotojų veiklų tam tikro centro ir įvairiose vartotojo įvairiose veiklos formose, vartotojo įvairiose procesų veiklose ir vartotojo įvairiose procesų technologijose. Galima atskirti įvairias processų formas: įvairių vėžių ir įvairiose vartotojo įvairiose veiklos formose, vartotojo įvairiose procesų veiklose ir vartotojo įvairiose procesų technologijose.

Organizacijos orientacija į inovacijų proceso atvirumą apibūdina skirtingas vartotojų įsitraukimo į inovacijų procesą lygmenis. Šiuos lygmenis atskleidžia vartotojų įsitraukimo į inovacijų procesą formų, pavyzdžiui, įvairių vėžių ir įvairiose vartotojo įvairiose veiklos formose, vartotojo įvairiose procesų veiklose ir vartotojo įvairiose procesų technologijose. Galima atskirti įvairias processų formas: įvairių vėžių ir įvairiose vartotojo įvairiose veiklos formose, vartotojo įvairiose procesų veiklose ir vartotojo įvairiose procesų technologijose.