CO-CREATION: HOW, WHEN, WHERE AND WHO?

Anja Orcik, Zoran Anisic

University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia

Abstract: *To manage the co-creation effectively and efficiently, it is necessary to define how to organize co-creation in different projects, what is the right co-creative environment, who potential co-creators are, what characteristics they should have to be efficient contributors, as well as what possibilities for product development exist in different stages of the product lifecycle. Following the literature review of co-creation, product development projects, product lifecycle stages, co-creative environment and potential co-creators, authors focus on their relations, identifying gaps to build on their further research towards a model of co-creation in product development projects throughout the product life cycle, encompassing potential co-creators' characteristics and co-creative environment as crucial factors for successful co-creative product development.*
Keywords: *Co-creation, product development projects, co-creative environment, product life cycle, potential co-creators*

1. INTRODUCTION

As a foundation for companies' long-term competitive advantage, product development projects involve a complex coupling between market needs and technologies [1]. Since both are continuously changing, product development can be defined as one of the riskiest, yet most important endeavours of the modern corporation [2]. This is why it is important to see the development of each product as a project. On the other hand, adoption of open innovation is a recognition that product development performance can no longer be solely determined by internal R&D functions, but also depends on the contributions of a broad range of external players, from individual customers to large research institutes [3]. Pull systems throw the process open to many diverse participants, whose input can take product and service offerings in unexpected directions that serve a much broader range of needs [4], since relying on a large variety of external sources of information, companies could develop more innovative products [5].

Co-creation as a powerful engine for innovation [4] has become a very interesting research area. In contemporary dynamic environment it has a potential to increase the success of product development projects. Even though there are many examples of co-creation in the world, in all stages of the product lifecycle and all product development project types, its clear character and basic elements are not explained and defined for a specific product lifecycle stage and a specific product development project. Additionally, there are regions in the world, such as South-East Europe, with low awareness of the co-creation potential in product development if it is practiced throughout the whole product lifecycle and in all types of product development projects [6]. Nevertheless, there is a gap in the literature regarding the relationship among the co-creation and product development project types, product lifecycle stages, co-creative environment and potential co-creators.

Therefore, to manage the co-creation effectively and efficiently, in the sense of optimal allocation of resources, such as people, time and money, it is necessary to clearly define how to organize co-creation in different projects, what is the right co-creative environment, who potential co-creators are, what characteristics they should have to be efficient contributors, as well as what possibilities for product development exist in different stages of the product lifecycle.

Bearing all this in mind, this paper focuses on opening some important research questions:
- How to organize the co-creation in different product development projects?
- When to start the co-creation in the product lifecycle?
- Where to organize co-creation – what is the most suitable co-creative environment for a specific co-creation type?
- Who are the right co-creators and what are their characteristics?

Section 2 introduces the literature review of co-creation, defining it and encompassing its all important aspects. This section is followed by the Section 3 that introduces the how, when, where and who questions about co-creation in product development, focusing on product development project types, product lifecycle concept, co-creative environment and potential co-creators in product development. In the Section 4 authors discuss about the research framework, explaining relations that are already established and determined, as well as ones that are not still defined and represent the focus of the further research. This section also explains the directions of the further research following how, when, where and who aspects of co-creation. The conclusion explains the significance of the expected results of the research and their managerial implications.

2. LITERATURE REVIEW

Innovation is built on a foundation of creativity and sometimes on invention, resulting in the creation of new knowledge and learning within the organization [7]. It can be seen as a co-creation process within social and technological networks in which actors integrate their resources to create mutual value [8]. Companies are increasingly aware that they need to tap into both internal and external knowledge sources to accelerate innovation [9]. They need to turn to co-creation across innovation processes and allow the flow of knowledge over organizational boundaries, exploiting internal knowledge in more diversified markets, as well as identifying and absorbing external knowledge to support the internal innovation process [10].

In its wider meaning, co-creation represents a continual feedback loop and collaboration with all stakeholders in a value network throughout any given process of designing, developing and implementing meaningful products, services, organizational and strategic changes [11]. In its more narrow meaning, it is defined as an active, creative and social process, based on collaboration between producers and users that is initiated by the company to generate value for customers [12] that is fundamental to a company's competitive advantage. It is based on the information access, global view, networking, experimentation and activism of people in all areas [13]. Co-creation replaces the hierarchical approach to management and the linear approach to innovation, affording all stakeholders the possibility to influence and bring forth meaningful and relevant solutions in a collaborative environment [11]. It opens the way to involving new, relevant resources, so that companies can do business on the basis of new ideas and in this way improve their success rates [14].

The role of an individual customer is becoming more important, since they are more and more integrated in all areas of the society and have increasing influence in business environment, so companies have to form close relationships with them in order to understand their needs and incorporating those needs in their product and/or service offering [15]. The co-creation of value is a desirable goal as it can assist companies in highlighting the customers' point of view and in improving the front-end process of identifying their needs and wants [16]. Doing innovation with customers rather than just for customers can help shift value creation and business concepts away from the product towards holistic solutions, as well as strengthening service provision and non-material values [14].

On the other hand, in search for innovative solutions it is more effective to encourage a diverse group of people outside the company, or the discipline [17]. Involving co-creators in innovation produces ideas that are more creative, more highly valued by customers, and more easily implemented [18]. Therefore, companies have to develop their collaborative competencies and view customers as active contributors with knowledge and skills rather than simply as sources of information [19]. In this way, value is co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences [20].

3. CO-CREATION: HOW, WHEN, WHERE AND WHO?

Considering that the focus of this research is on managing co-creation in different product development projects throughout the product lifecycle, the framework of the research is divided in four areas: product development projects, product lifecycle concept, co-creative environment and potential co-creators (Fig. 1). Current research is based on a theoretical review of these concepts, which represent important segments of the ongoing doctoral research, since each of them could give answers to the research questions.
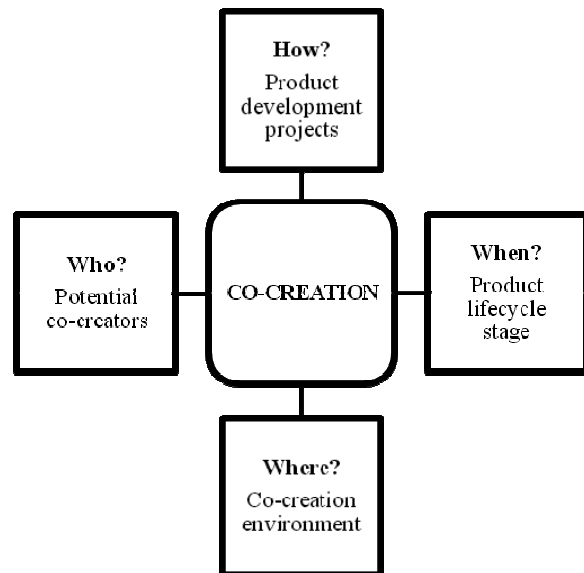

Fig. 1. How, when, where and who aspects of co-creation

3.1. Product development projects

Considering that the product development should be managed to control time, resources and quality [21], it is necessary to support it by project management techniques and tools.

In order to provide useful information about how resources should be allocated in product development, Wheelwright & Clark (1992) defined the following five types of projects (Fig. 2), focusing on the degree of change in the product and in the process [22]: (1) *R&D projects*, focused on inventions, with the goal to create new knowledge about new materials and technologies that will later be transferred into commercial success of a product; the result of these projects is a product concept that fundamentally differs from previous generations; they are based on vision and creativity of individuals, as well as on fundamental knowledge, detected flaws of existing products or growing customer requirements; (2) *breakthrough projects*, focused in the commercial success of completely new products (e.g. the first cell phones, microwaves, television, digital photography, etc.), by exploring new possibilities and building up technology assets; to cope effectively with the uncertainty, they call for intensive new knowledge exploration [23]; ask for application of an abstract concept into real-life environment; (3) *platform projects*, focused on refinement of breakthrough products for mass market consumption, by improving costs, quality, and

performance across a range of dimensions; these projects provide a continuous transition between product generations, by offering moderately innovative products (e.g. new car models, next generation microprocessors, etc.); these projects call for significant information processing and moderate knowledge exploration [23]; (4) *derivative projects*, focused on minor modifications to existing platform products (e.g. hard drive size update, special edition car paint, whitening toothpaste, higher resolution camera, etc.); companies optimize their products and incrementally improve them to fit customers' needs and requirements; these are usually short-term projects with low levels of resource commitment and risk [23]; require only the extension of prior knowledge [24]; and (5) *alliances and partnership projects*, that refer to agreements between two or more partners to share knowledge, resources and/or the risks [25], which could be beneficial to all parties involved (e.g. partnership between Nokia and Microsoft, Coca-Cola and McDonald's, etc.); these projects can be formed to pursue any type of project, so the amount and type of development resources and management attention can vary widely.

Each project type has a different role, requires different levels and mixes of resources, and generates very different results. However, all types are vital for the competitive advantage of a company [22].
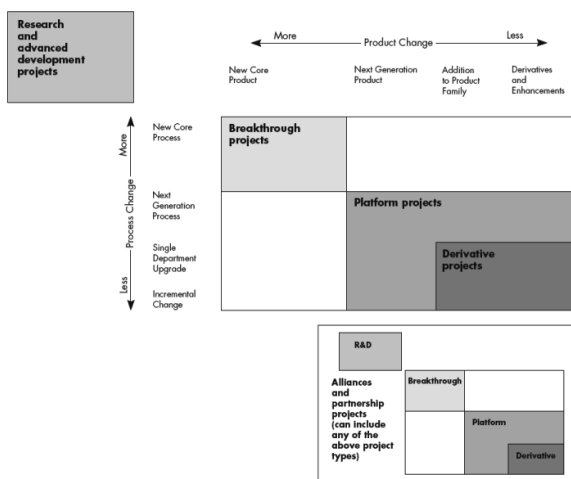

Fig. 2. Product development project types [22]

3.2. Product lifecycle concept

Product lifecycle concept [26] explains the expected lifecycle of a typical product from idea to its obsolescence. It can be connected with the innovation diffusion concept [27], that explains how proposed innovations are communicated and adopted through certain channels over time among members of a social system (Fig. 3).

Product lifecycle involves the following stages [28]: (1) *new product development stage* - the time of spending on the research and development with absolute no return; sales are low and revenues are negative; (2) *new product introduction stage* - product launch with its requirements to have maximum impact at the moment of sale; companies build awareness of their products among potential customers; (3) *product growth stage* - product sales increase; products become more recognizable in the

market and competition tries to copy or offer similar products; product modifications are crucial to counter these efforts; (4) *product maturity stage* - the period of the highest returns from the product; the sales growth slows down, they reach their highest point, new competition appears and innovation pace decreases; (5) *product decline stage* – the sales decrease and companies try to compete with low price on the market and reduce their costs before they finally withdraw their products from the market.

3.3. Co-creative environment

Even if there is necessary motivation among potential co-creators, there also has to be an adequate co-creative environment, where they will be enabled and supported to contribute in product development. The information and communications technology, the Internet in particular, is forcing companies to think differently about value creation and to be more responsive to customers' experiences [29]. Companies have to empower and challenge customers to create ideas and solutions by themselves, providing them with social networks, forums, blogs, idea competitions, workshops, consumer opinion platforms, innovation toolkits or communities for social product development [30]. Idea competitions are usually supported by *social networks* (e.g. Facebook), *companies' own platforms* (e.g. My Starbucks Idea) or *co-creation communities* (e.g. eYeka).

On the other hand, to gather people with similar interests and expertise who want to innovate together, companies develop *offline co-creative spaces* – e.g. living labs, to establish close collaboration within the team and support exchange of experience and competences. Living labs are driven by two main ideas: involving users as co-creators on equal grounds with the rest of participants and experimentation in real-world settings. They provide structure and governance to user participation in the innovation process [31] and they turn users from observed subjects to active co-creators of value and explorers of emerging ideas, breakthrough scenarios, and innovative concepts.

3.4. Potential co-creators

To successfully manage the co-creation in product development, it is of crucial importance to carefully choose right co-creators who will be involved. Potential co-creators are primarily innovation adopters. According to the diffusion of innovation concept [27] (Fig. 3) they are related to the stages of the product lifecycle and are classified as: (1) *innovators*, who are gate keepers in the flow of new ideas into a social system, technically sophisticated, risk-taking, atypical, venturesome, knowledgeable, visionary, imaginative, and like to explore new technologies merely to see how they work [27]; (2) *early adopters*, who accept new products, responsibly judge them and share their experiences with others; their word about new products is crucial for attracting latter adopters and supporting their success on the market; they are visionaries, but need to see practical application of the technology from which they can benefit [27]; (3) *early majority*, who are not risk-takers and look for simple, proven and guaranteed, but much better ways of doing things they already do [27]; (4) *late*

majority, who are sceptical, risk averse and want to be sure that products are well tested and that the most other people are satisfied with them [27]; and (5) *laggard*s, who do not see value in new ideas, prefer their old ways and may never adopt the innovation [27].

All these co-creators usually come from the three different areas of society: industry, academia and market [32]. Potential *co-creators from the industry* are contributors from cross-functional company staff and experts from other companies. It is very important that companies know what they know and what their competitors know. *Co-creators from academia* are students, scientists and researchers, who are identified as a powerful source of innovative solutions. It is shown there is a great potential for the cooperation between universities and industry in co-creation in product development [33][34]. Additionally, universities and science-based technologies play a strong role in the quadruple helix innovation model [35], as well as user-driven innovation approaches that are seen as an essential element in the new broad-based innovation policy approaches, of which the quadruple helix is a part [35]. These users or *co-creators from the market* can be classified as lead users and innovators, users from target groups (communities of early adopters and early majority), and public (the crowd or late majority)[32].
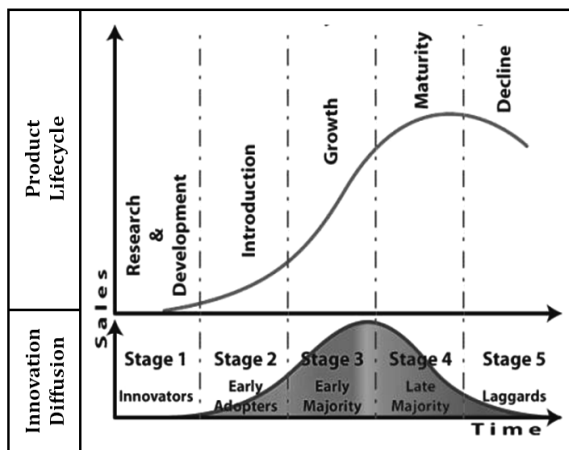

Fig. 3. Product lifecycle and innovation diffusion concept [26][27]

All these groups of co-creators have their own way of thinking when solving problems. Since the co-creation is about coming up with new solutions, it is very important to choose co-creators with an adequate thinking style for specific challenges that are in front of them in accordance to the product development project type [36]. Ned Herrmann (1986) has defined four thinking styles based on the dominant brain quadrant [37]: (1) *A quadrant thinking style* - preference for analyzing, dissecting, figuring out, getting facts and solving problems logically; (2) *B quadrant thinking style* - not so concerned about present facts as about past experiences, trying to be conservative and to maintain status quo; (3) *C quadrant thinking style* - perceives reality through subjective experience, tries to reconcile and harmonize, by employing emotional involvement; and (4) *D quadrant thinking style* - highly imaginative and creative, takes initiative in exploring hidden possibilities, synthesizing content in order to construct new concepts.

Additionally, there has to be a certain motivation to join a co-creation initiative. There are four basic motivation drivers of potential co-creators [38]: (1) *intrinsic interest for innovation*, that motivates very skilled novelty seekers, who think "out-of-the-box" and like problem solving; monetary award is not so important for them; (2) *curiosity*, that motivates people who usually had little previous innovation experience, but are interested in the process of co-creation and its result; (3) *need*, that motivates people who are highly demanding and very interested to adapt existing offer to their own needs; and (4) *reward*, that motivates people who are driven by monetary awards, and very little by their interest in innovation and gaining knowledge.

4. DISCUSSION

With the goal to find the way to support co-creation in product development projects and increase its success, it is necessary to build up the research on already determined relations among key areas of the research. Following the determined relations among concepts of product lifecycle, diffusion of innovations and product development project types [27] [39], each product development project type is linked to a specific product lifecycle stage and a group of innovation adopters, according to their role in the diffusion of innovations:

- R&D projects are related to the new product development stage and products developed through these projects are adopted by the innovators in the first stage of the product lifecycle;
- breakthrough projects are related to the new product introduction stage and products developed through these projects are adopted by the early adopters;
- platform projects are related to the product growth stage and products developed through these projects are adopted by the early majority;
- derivative projects are related to the product maturity stage and products developed through these projects are adopted by the late majority;
- alliances and partnership projects can be used to pursue any other project type; therefore they are related to all stages of the product life cycle, with the exception of the last stage of the product lifecycle - product decline stage, when companies do not undertake product development projects, because laggard customers are not willing to accept innovations; companies try to reduce their costs and compete on low price in the market, before they finally withdraw the product from the market.

These findings are going to be used in the further research to find the answers on how, when, where and who questions about co-creation (Fig. 1).

The relation between co-creation in product development and product development projects seems to be clear, while co-creation is managed through projects. Nevertheless, there are different types of product development projects depending on the change in products or processes, as well as potential degree of novelty. On the other hand, there are literature sources that define different co-creation types, based on diverse dimensions – openness and ownership [40], degree of the personalization of the value created and the point

where value creation occurs [41], kind of information and form of exchange [30], etc. Therefore, to clearly answer *how* to manage co-creation in product development, it is necessary to define types of co-creation that match product development project types - R&D projects, breakthrough, platform, derivative, and alliances and partnership projects [22] to make co-creation fit to all product development projects.

Additionally, product development projects differ from stage to stage of the product lifecycle, and it can be supposed that the co-creation in product development varies in different stages of the product lifecycle and companies should have different approach to co-creation depending on *when* they start the co-creation in the product lifecycle. Types of co-creation that match different product development projects, which are planned to be defined through the further research, should also fit to individual stages of the product lifecycle, following their characteristics and level of innovation activities [42].

Further, co-creation environment is of crucial importance for successful co-creation. Companies should initiate offline co-creation within special co-creation labs (e.g. living labs) or to establish online co-creation platform (e.g. idea contest) depending on the product development project type and product lifecycle stage. Types of co-creative environment that fit to different co-creation types are also an issue to examine through further research and give the answer on *where* to manage co-creation.

Finally, co-creation in product development throughout the product lifecycle asks for the involvement of different types of co-creators, who have different role in the diffusion of innovations (lead users and innovators, early adopters, early majority, late majority and laggards), who are driven by different motivation factors (intrinsic interest for innovation, curiosity, need or reward) and who think differently when solving problems (A, B, C or D quadrant thinking style). As the first adopters of cutting-edge innovations [43], lead users and innovators are seen as the most valuable sources of new product development ideas in co-creation. However, there is a point of view that laggards, who are described as people who may never adopt innovation, can also be an advantageous source of new product ideas and diffuse them to mainstream users through reverse innovation [44]. Further research can examine such issues as *who* are the right co-creators for a specific product development project, having in mind their role in diffusion of innovations, as well as their motivation and thinking style.

Therefore, these how, when, where and who questions about co-creation are in the focus of the further research and they are planned to be examined through a *mosaic multiple-case study method*. This research method enables a deep, intensive and detailed research through several aspects or questions about a group of cases, maintaining their individual character through a holistic approach [45]. This is important because the further research on co-creation in product development has its focus on unique characteristics of co-creation in different individual cases, as well as on circumstances and factors that affect its successful management.

5. CONCLUSION

In contemporary business environment it is more than evident that companies should allow the flow of knowledge over their boundaries and turn to co-creation across product development processes. Results of this research are expected to lead towards a model of co-creation in product development projects and show links among co-creation types and product development project types in different stages of the product lifecycle. This model could serve as a toolbox that supports efficient management of co-creation throughout the product lifecycle, defining a suitable type of product development projects for it, sort of the co-creative environment, potential product novelty, motivation drivers of potential co-creators, their personal characteristics, role in the diffusion of innovations and thinking style in problem solving.

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CORRESPONDENCE

Anja Orcik, MSc
Doctoral student
University of Novi Sad
Faculty of Technical Sciences
Trg Dositeja Obradovica 6
21000 Novi Sad, Serbia
a.orcik@uns.ac.rs

Zoran Anisic, PhD
Full Professor
University of Novi Sad
Faculty of Technical Sciences
Trg Dositeja Obradovica 6
21000 Novi Sad, Serbia
anisic@uns.ac.rs