Enhancement of Innovation Co-creation Processes and Ecosystems Through Mobile Technologies

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Abstract. The process of value creation was traditionally driven almost exclusively within the firm. The role of the consumer was seen only at the end of the product development process. However, as the emergence of the Internet and its related technologies resulted in greater product variety there was a need for accelerating the innovation process. The concept of co-creation has been presented as a highly valuable trend and the next progression in open innovation. While extensive research has been conducted on innovation co-creation between firms and consumers, a coherent understanding of its application in the mobile environments has not been achieved. This paper explores the general evolution of the innovation co-creation paradigm and the opportunities mobile technologies bring in further developing this. An innovation co-creation framework is proposed along with a roadmap that provides a more detailed understanding of how to implement the components to realise the necessary innovation co-creation ecosystem.

Keywords: Innovation · Co-creation · Consumers · Mobile technology

1   Introduction

The success of an enterprise lies in the development of new products to meet consumer demands, and delivering them profitability in the marketplace. Innovation is one of the primary ways firms can differentiate their products from the competition and thus retain sustainable growth. By creating the perception that no substitutes are available, this strategy allows firms to compete in areas other than price [14]. In the past, many organisations have been able to survive with very limited amounts of innovation. They focused on simply updating products to a minimum level that maintains their competitiveness in the market. However, due to factors such as changes in consumer tastes, ever-shortening product lifecycles, competitive movements, technological advances, and globalisation, there is an increased need for firms to improve their response to changing markets. According to a survey conducted by Accenture, two-thirds of executives identified innovation as one of the five most critical factors required for companies to succeed and sustain a competitive advantage. However, the same survey found that only one in eight executives feel strongly that their companies excel at achieving innovation. While most firms today put high priority on creating

innovative products and services, how they should go about finding the best source of innovation is still lacking [17].

Benkler [2] argues that the best innovative solutions lie not within firms, but within consumers. A survey conducted by the Economist Intelligence Unit [4] suggests that consumers are becoming increasingly important sources of innovation across all regions, industries, and company sizes. Skills and insights from the ultimate users of the output help firms develop relevant products that closely mirror consumer needs. By taking full advantage of the collective creative power in both current and potential consumers, firms have the potential to lead existing markets and create new ones, in a short period of time. Innovation co-creation has recently been gaining popularity among businesses as a fundamental source of competitive advantage. While the idea of creating two-way dialogues with key stakeholders has been around for some time, the availability of powerful web-based tools makes it relatively easier to start conversations and gather input rapidly from a large number of participants. Many of the world's leading companies, such as LEGO, Starbucks and Nike, are actively using innovation co-creation platforms and communities to engage directly with consumers to access new ideas [16]. These enabling tools have predominantly been isolated to the traditional desktop environment. The emergence of mobile technologies presents great challenges and opportunities for the creation of business value [3]. Mobile technologies have provided users with the ability to communicate with other parties and access information from anywhere and at any time. One significant outcome of this increased empowerment is that consumers now desire to play a greater role in their interactions with companies [7]. As a result, there is the question of how the development of mobile technologies will transform the enterprise and its consumer-centric processes such as innovation co-creation.

With mobile technologies continuing to significantly transform the ways in which a firm can interact with their consumers, they have the potential to increase participation in innovation co-creation processes. However, there is little in the existing literature that provides guidance on how to achieve this. This study seeks to address this gap through answering the following research questions: What is the process of innovation co-creation? What is the ecosystem necessary for effective innovation co-creation? How could this ecosystem be enhanced with the adoption of mobile technologies?

2   The Innovation Co-creation Process

This section discusses the key concepts of innovation co-creation to establish the necessary theoretical background and context for answering the research questions. In this section we will review the process of innovation co-creation. Then in the following section we will explore the literature on achieving the required ecosystem for innovation co-creation.

Traditionally, the innovation process was linear and sequential, with firms developing new ideas internally before testing them in the market. Consumers were passive participants in the innovation process, only acting as validators at the end stages of the

product development lifecycle [10]. However, the process of innovation has changed. In the late 1980s, the societal process of individualisation arose when consumers started expressing their preferences through consumption choices. Firms became consumer-centric to appeal to these individual needs, with the offering of customised goods and services. Also, distribution channels and logistics changed in order for firms to deliver products faster and at the location desired by the consumer.

The emergence of Web 2.0 around 2006 was another important development that facilitated co-creation. The Internet became a global interconnected platform of web applications, and enabled people to create and change content. Consumers now have larger choice sets due to the increased ability to exchange information and opinions, to adapt their own perceptions and behaviour, and to define brands on their own. While consumers could customise products depending on the extent to which a firm's production chain allowed it, there were limited or no channels going back into the firm. This made adaptive or generative learning difficult to achieve [19].

The concept of co-creation transformed the traditional closed innovation process into a parallel and open one [6]. Today's new products must satisfy multiple consumer needs in terms of quality, function and price to be successful. To achieve this, innovation activities must take place simultaneously, with information being processed from various sources at the time products are conceived and designed. Linear innovation models that undertake tasks in a step-by-step manner are inappropriate for this purpose [13]. Co-creation allows the transformation of the traditional production chain into a dynamic network where consumers and firms continuously interact with each other and exchange knowledge. Co-creation can be found in all stages of the innovation process, including idea generation, design, engineering, and test and launch. In innovation co-creation, consumers actively engage with the firm at all stages of the product development lifecycle [12]. They are able and willing to provide ideas for new goods and services that fulfil needs not yet met by the market or are better than what is currently being offered. In addition, they are now able to easily communicate these ideas to the firm using the Internet [7]. By being important influencers as well as a main source of innovative ideas, consumers are now considered a main source of value creation and competitive advantage [19].

3   The Innovation Co-creation Ecosystem

Prahalad and Ramaswamy [15] argue that a space of potential co-creation experiences in which individuals jointly create value at multiple points of interaction must be established as the foundation of co-creation. The success of co-creation is focused on the quality of consumer-firm interactions. Participants need to initiate rich dialogues among themselves to exchange and generate knowledge to realise shared objectives. Therefore, it is essential to offer an open and transparent environment where participants feel comfortable and have the right capabilities to contribute their input. Current technologies for supporting remote collaboration are mainly desktop-based, which constrains the users to be close to their desktop computers in order to be updated on each other's statuses and progress. Furthermore, consumers have traditionally lacked

the technical skills and capabilities required for effective innovation co-creation. This in turn restricts their ability to participate effectively in new product development processes.

The Internet and related technologies have played a vital role in enabling innovation co-creation. Firms can use virtual environments as an effective platform to greatly enhance their connectivity with consumers in a cost-effective manner and involve them as true partners throughout the new product development process [11]. As a ubiquitous network, the Internet has also made it possible to communicate to a large group of people as well as engage in rich conversation with particular individuals regardless of location or timezone [20]. The literature suggests that good results from co-creation are generally caused by frequency, direction, and depth of the interactions. With features such as extended reach, enhanced interactivity, increased speeds, and great flexibility, virtual environments can meet these aspects for effective innovation co-creation. Firms can use Web 2.0 technologies to collaborate with consumers and create open innovation platforms. With the interactivity features, they have the ability to coordinate discussions, reach a higher number of people faster, and synchronise group tasks. Participants can contribute to discussions and decision making when they have the time to do it, and without the need to send and resend e-mails.

Some firms currently use social networking platforms such as Facebook and Twitter to directly connect and interact with parties outside of organisational boundaries such as consumers. Social networking allows the accumulation of knowledge that can be searched and shared with like-minded communities [20]. By interacting with consumers through social networking tools, firms have the ability to gain access to the free flow of ideas and understand their customers without face-to-face interaction. Social networking tools facilitate the ability to influence the perception of the firm through improved relationships with consumers and innovation [20].

Jarche [8] suggested a model that illustrates the role of social networks in driving innovation. The model emphasizes that firms must first become open and transparent in order to be more innovative. It also emphasizes that knowledge is shared and diverse points of view are accepted to increase opportunities to participate in co-creation tasks. While participants have to be continuously sharing knowledge in their communities, the roles of the firm and consumer are not defined in this model. With no mention of two-way dialogues, the idea that firms cannot work in silos for effective new product development is not clear.

4 Exploration of Mobile Technologies

This section will begin by reviewing the features of mobile technologies that have been used in collaboration processes. Next, we explore the potential impacts of mobile technologies on both firms and consumers in how they work with each other. Finally, we will discuss the potential of mobile technologies to improve consumer engagement. Due to today's fast-paced world and the ability of the Internet to connect people worldwide, participants of innovation co-creation tend to be distributed and rarely situated in fixed locations most of the time. There is a need for a way to allow these members to collaborate with each other even when they are commuting. Mobile

technologies have the potential to enable firms and consumers with the ability to not only keep in the loop on what has been done, but also to input ideas and give feedback anytime, anywhere with just their mobile devices. By extending activities into the wireless medium, mobile technologies allow users to have constant access to information. This in turn provides greater flexibility in communication, information sharing, and collaboration. In comparison to traditional forms of collaboration, mobile technologies offer several unique features: portability, reachability, localisation, identification, accessibility. Over the past decade, the continuing spread of mobile technology adoption has had a significant impact on the way firms and consumers do business with each other in terms of people, process, and technology.

Enterprise mobility can solve unique business problems by taking the business process to the consumers, who add rich content to business information [18]. From the consumer's perspective, mobilisation means higher quality service and thus increased consumer satisfaction. The proliferation of mobile technologies has led to a profound change in the way people communicate, collaborate, and make decisions. The success of customer relationship management (CRM) lies in the ability of the firm to communicate continuously with consumers on an individual level and provide differentiated value. It is also important to provide CRM activities through channels that consumers are also interested in using to interact with the firm. Mobile technologies can be used to manage the coordination of consumer interactions and relationships. Wind et al. [22] suggest that digital channels can create unique and positive experiences for consumers.

5   Problems, Issues and Requirements

An extensive literature review has resulted in the identification of four problems.

1. Lack of distinction between innovation co-creation and crowdsourcing – There is a huge focus on social networking tools in most literature related to innovation co-creation, but they only talk about using it for crowdsourcing purposes and not innovation co-creation as defined earlier in this dissertation.

2. Lack of research on increasing transparency to information – Meaningful dialogue is difficult to achieve if consumers do not have the same access to information.

3. Lack of research on how to set up an open platform – Innovation co-creation requires an open platform which can be accessed by both the firm and consumers.

4. Lack of research on balancing freedom and control – Co-creation should be an open process to foster an environment where varied inputs, ideas, and perspectives can be generated [5]. On the other hand, there needs to be defined structures and procedures that enable the effective coordination and filtering of ideas [1], [21].

To solve the problems of innovation co-creation and address their related issues, a set of requirements have been proposed to achieve this.

1. Commitment – Successful innovation co-creation in virtual environments is dependent on stimulating participant involvement. In order to achieve effective dia-

logue, it is important to carefully select the appropriate consumers who participate in co-creation tasks [15].

2. Learning – Firms need to be able to rapidly and efficiently respond to the input provided by consumers [9].

3. Engagement – The overall success of co-creation does not rely upon a single encounter between the firm and consumers. Co-creation is an ongoing effort involving synergies of all co-creation instances [1].

4. Prescriptions – There is generally a lack of research that provides support on how to set up the required open platform for innovation co-creation.

5. Connectivity – Increasing access to co-creation platforms enhances the frequency, direction, and depth of interactions [9], [15].

6. Flexibility – To find the right balance between freedom and control, flexible user protocols set up by participants can be used that determine the rules of engagement and can be constantly revised over time based on the experiences [15].

6   Innovation Co-creation Framework

In this section, a framework for innovation co-creation using mobile technologies with three levels of abstraction is proposed. To understand what innovation co-creation is, Figure 1 shows an abstract representation of an innovation co-creation ecosystem based on the three components suggested in Section 3: frequency, direction, and depth. Based on the literature review, increasing the extent to which all these aspects are achieved is crucial to improving innovation co-creation in virtual environments. Not only must there be a high number of conversations that take place over time, but they must also involve the exchange of rich and relevant information.
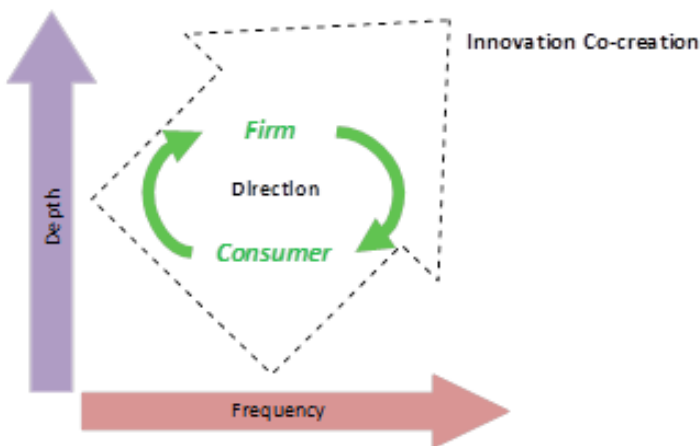

Fig. 1. Abstract innovation co-creation framework

Furthermore, firms must treat consumers as equal partners in the innovation co-creation process. While we increase the frequency and depth of interactions, a balance of exchanges in the form of two-way dialogues between involved parties must be achieved over time. As shown in Figure 2, this framework can then be viewed on a more detailed level in terms of how each of the three components can be realised.
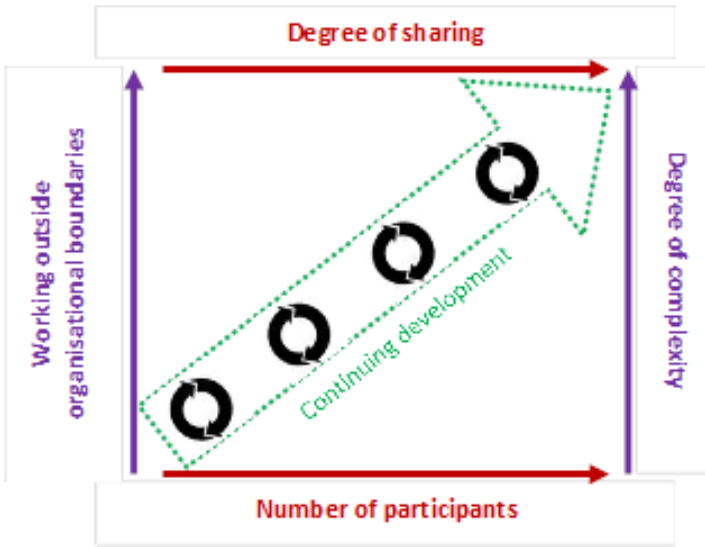

Fig. 2. Innovation co-creation ecosystem framework

Increasing the number of participants and degree of sharing enhances the frequency of interactions, while working outside organisational boundaries and increasing the degree of complexity enhances the depth of interactions. The greater the extent to which the four aspects are achieved and the more two-way dialogues that take place over time, the higher the level of continuous new product development. This in turn improves the chances of innovation co-creation being successful.

A high level technical framework that could support our abstract framework and eco-system framework is illustrated in Figure 3. Essentially at the lowest level are Network Services that take care of transport, signaling, provisioning, etc. These in turn support Collaboration Services such as workflow, real time messaging, real time dataflow, au-thoring, recording, playback, session management, scheduling, calendaring, knowledgebase management, database management, content management, etc. Collabo-rative services in turn become the base for co-creation applications that support activi-ties such as brainstorming, inspiring, creation, drafting, curating, decision support, email, bulletin boards, social networks, forums, etc. These applications together support the entire spectrum of same time same place as well as different place and different time co-creation activities. These applications need to be accessible on devices such as desk-tops, laptops, smart boards and smart mobile devices for a variety of participants within organisations as well as outside organizational boundaries.
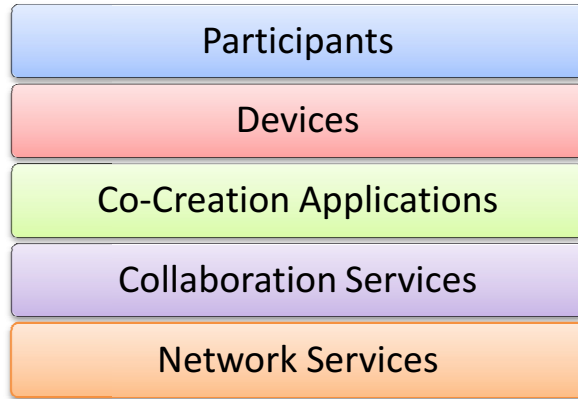
Fig. 3. Innovation co-creation technical framework

7   Innovation Co-creation Roadmap

This section will discuss a generalised roadmap with four stages on how to achieve and maintain the required innovation co-creation framework. We need to establish an environment of processes and technologies that allow direct and immediate communication between co-creation participants. It is important for firms to go through similar steps that will be proposed as it ensures that the required frequency, direction, and depth of interactions will be achieved for innovation co-creation. Figure 4 shows a roadmap for innovation co-creation. Based on the literature review, four steps are required to implement the required enablers, capabilities, and characteristics for initiating and continuing innovation co-creation. Each iteration of the cycle involves a series of two-way rich dialogues which increase the extent to which innovation co-creation can be achieved.

Fig. 4. Innovation co-creation roadmap

Table 1 summarises and classifies the processes and technologies that form the roadmap for implementing the required innovation co-creation ecosystem.

1. Opportunity: Creating the opportunities to participate in innovation co-creation. This can be achieved through the creation of an open platform where multiple connections can be made to start idea generation.

2. Community: Mobile technologies initiate the interaction between potential participants. Allowing users to acknowledge input and prove that they are listening facilitates the building of relationships and engagement.

3. Collaboration: Through dynamically connected communities with the most appropriate users, problems and challenges can be solved collaboratively. Mobile technologies can act as a feedback mechanism during the development and testing phases of innovation cycles when knowledge needs to be shared and validated.

4. Culture: The result is a changed organisational culture of increased sharing and creativity. By opening up the firm to key influencers of the brand or product, this prompts employees to see new perspectives that may trigger new ideas and new strategic directions.

Table 1. Innovation co-creation ecosystem roadmap

	Opportunity ⇨	Community ⇨	Collaboration ⇨	Culture
To increase	Number of participants	Working outside organisational boundaries	Degree of sharing	
			Degree of complexity	
Process	• Listen to all	• Engage with many	• Develop with some	• Validate ideas
Technology	• Design technology to support open platform • Configure and implement platform	• Locate user • Connect with user	• Transfer data	• Test and monitor performance • Verify technology

8   Conclusion

As consumers are no longer just passive recipients of goods and services, their role in new product development has changed. The purpose of innovation co-creation is to allow firms to enable innovation with consumers, rather than simply for them. Consequently, there is a higher chance of market acceptance and thus a lower risk of failed projects.

The Internet and related technologies have provided firms with the ability to implement distributed innovation practices where consumers become active participants throughout the new product development process. However, the challenges of managing communities in virtual environments without compromising the ability to share resources and create active dialogues have yet to be overcome.

Mobile technologies provide participants with the enhanced information and network for innovation co-creation. They offer the greatest power to contribute ideas and select components that should be incorporated into the new product offering. By offering an open platform that is jointly maintained by the firm and consumers, they have the potential to accelerate internal business processes and improve consumer relations.

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