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Co-creation of Knowledge for Innovation requires Multi-Stakeholder Public Relations.

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Abstract

Co-creation of knowledge offers significant opportunities for innovation. This chapter seeks to gain understanding of the process of co-creation of knowledge for innovation and Public Relations in multi-stakeholder projects by exploring current insights in academic literature. The research questions look at how co-creation of knowledge for innovation has been investigated in the scholarly literature; the roles of end-users; and the modes and challenges of end user participation and in collaboration relating to communication.

The method of this chapter is a structured literature review, following a series of rigorous steps: a search of databases, analysis of 33 articles found, summarizing relevant content using a data extraction table and a data extraction continuum as analysis tools to show the range of projects discussed in the literature to create a comprehensive overview.

The findings indicate that multi-stakeholder networks can be structured for different aims. In the articles found different types of projects were investigated. Four categories of projects were found: (1) Co-creation projects benefiting one company; (2) Co-creation projects benefiting business-to-business value chain networks; (3) Co-creation projects benefiting public entities; and (4) Co-creation projects benefiting innovation network stakeholders.

Complexity is highest for multiple-stakeholder co-creation projects benefiting innovation network stakeholders, where the roles between stakeholders are fluid and changing constantly. Solving common issues motivates the stakeholders to collaborate and build trust. Open innovation environments may facilitate communication and interaction.

Co-creation of knowledge requires intensive collaboration. Knowing the main challenges to address this, will help the functioning of co-creation collaboration networks and their Public Relations.

Key Words: co-creation, innovation, knowledge, project, end-user, public relations

1. Introduction

Increasingly, creation of knowledge for innovation requires collaboration between research and business partners. Traditionally participation of end users, which in this chapter are considered authority partners and stakeholders of EU funded projects, has been initiated to validate research results. Now, the roles of end user organizations have become broader. For example, listening to different types of end user

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representatives can clarify the range of end user opinions and needs (Ruoslahti and Knuuttila, 2011).

This chapter looks at relevant literature with a focus on co-creative communication and Public Relations between end users and research project partners. There are many innovation ecosystems, on different levels, the European Union, Member State, and Municipality that stimulate innovation through collaboration. A recent comprehensive literature overview of publications on co-creation research Galvagno and Dalli (2014) identify three streams of co-creation research: Service science; Marketing and consumer research; and Innovation and technology management. This research focuses on the latter of the research streams: innovation and technology management.

Co-creation is a collaborative activity involving objectives, arenas, collaborators, tools and processes, and contracts (Bhalla, 2014), and it can include three layers: co-creation of futures; policies; and the involvement of agents (Accordino, 2013). Innovation is based on new knowledge, and drives growth and success (Dandonoli, 2013; Burdon *et al.*, 2015).

Within the literature on projects for co-creation of innovation and technology management, this chapter identifies end user roles, communication enablers, and challenges, related to end user participation. The aim is to clarify current insights in academic literature on co-creation of knowledge in research projects from the perspective of inter-organizational communication and multi-stakeholder collaboration. It seeks to answer the following research questions:

RQ1: How has co-creation of knowledge for innovation been investigated in the scholarly literature?

This clarifies the main topics discussed, methods used, and trends over time.

RQ2: What roles of end-users are discussed in the literature?

This relates to the aims of participation for different kinds of end users.

RQ3: What modes and challenges of end user participation are mentioned in the literature?

This concerns different forms of collaboration and related communication problems.

2. Method

The structured literature review (Jesson, Lacey, & Matheson, 2011) followed a series of steps. This section continues first describing the Search, followed by the Criteria of selection, and analysis with a Data Extraction Table and a Data Extraction Continuum, before moving to Results.

2.1 Search

A search was conducted in May, and repeated in November 2017, by using the databases ProQuest Central, and EBSCOhost. It included peer-reviewed literature of the past 10 years. To ensure relevance to the article in question, key words of the search covered abstracts, titles and keywords.

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For example, the key word *co-creation* alone rendered over 5.000 search hits. Therefore, Boolean search was conducted, pairing the key word with *innovation* OR knowledge AND project OR end-user** which limited the number of hits to 52 articles that met the search criteria.

The included article references were stored and organized with the online literature review tool RefWorks. In the next phase the abstracts of the found articles were read against the selection criteria.

2.2 Selection Criteria

Decisions to include an article, identified in the key word search, in to the sample of this chapter was based on inclusion criteria of articles. Using the selection criteria (see Table 1) ensured that non-relevant articles were not part of the sample. The initial 52 articles were narrowed down to a sample of 33 articles that met the inclusion criteria.

Key Word Search in ProQuest Central & EBSCO	Initial result	Sample after selection criteria
co-creation AND (innovation* OR knowledge) AND (project OR end-user)	52	33
Selection Criteria; articles include all four elements below:		
– Co-creation of innovation knowledge (knowledge is to create new innovations and innovative product or service applications)		
– Multi-stakeholder involvement (public, private, research organizations share tasks)		
– Participation of end users		
– Project(s) (finite end and funding)		

Table 1: Key Word Search and Selection Criteria

2.3 Data Extraction Table

The articles that met the inclusion criteria were further analysed. For this purpose, a Data Extraction Table (DET) was formed; rows were based on the articles, and relevant content was summarized, using columns based on the research questions.

- Co-creation of innovation: used to identify what topics the authors have discussed on co-creation of innovation (RQ1).
- Research Methods: used to identify what methods were used in the studies that were included in this literature review (RQ1).
- End-user roles: used to identify what the authors discussed on end-user roles and aims of their participation (RQ2).
- Modes and challenges of end-user participation: used to identify what modes and challenges of end-user participation the authors have identified and discussed (RQ3).
- Title, Author(s), and Source (as in reference list)
- Publication year: used to easily order articles by publication year to identify trends.

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The sample articles were downloaded and fully read. Elaborating notes and additions were made to the DET. Table 2 (above) summarizes how using the DET narrowed the final sample to 33 articles from an initial result of 52 articles. These 33 articles were then included in the thorough investigation, during which the DET was continuously used as a tool of analysis.

To analyse this further, the sample articles were placed on a continuum in relation to each other. Criteria for the placement were the complexity and type of co-creation collaboration discussed. These were examined by looking at stakeholder involvement. Levels and complexity of end-user roles, and levels of power balance between consortium partners were looked at. To visualise this analysis, a Data Extraction Continuum (DEC) was created for this study (Figure 1, below).

Customer projects / one-company				One-company driven innovation network				Public service / Multi-stakeholder networks				Innovation projects with multiple stakeholders			
Fosstenlökken				Tokman & Beitelspacher				Kallio & Lappalainen				Pinho et al			
Sjodin & Kristensson				Dawe & Sankar				Reiter et al							
Gustafsson et al				Kazadi et al				Chang et al							
Bhalla				Burdon et al				Reed et al							
Constatinides et al				Edvardsson				Franz				Accordino			
DeFillippi & Roser				Halonon et al				Powell				Pino et al			
Guillart				Katzy et al				Diaz-Diaz & Perez-Gonzales							
Mele				Schertzer et al				Harmokivi-Saloranta & Parjanen				Doyle			
Quero & Ventura								Dandonoli							
Windahl															
Livari															
Pichyangkul et al															

Table 2: The Data Extraction Continuum (DEC)

Analysis with the DEC, showed a classification into four types of articles. Headings for these four types of articles emerged from the data. Based on these findings, besides adding additional notes and remarks to the DET, its rows were re-structured, based on these four classes of innovation projects from the DEC. These four types of innovation collaborations are described below in the findings section of this study.

3. Findings

This section is structured based on the research questions RQ1, RQ2, and RQ3. Subsection (3.1) Co-creation of knowledge for innovation in the scholarly literature describes four classes of articles that were identified in the DEC analysis; and subsections (3.2) Roles of end-users; aims of participation; and (3.3) Modes and challenges of end user participation; and (3.4) Table of Main Topics Discussed in the Literature elaborate further findings from the DEC and DET analysis.

3.1 Co-creation of knowledge for innovation in the scholarly literature

Pinho *et al.* (2014) note that, what they call many-to-many perspectives, where interaction between customer networks and supplier networks are studied from a multi-actor viewpoint, are little discussed in literature. The relatively small number of articles found by this study, supports this view.

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The 33 articles that meet the selection criteria range from the year 2010 to 2016. The articles range from a focus on less complex innovations, e.g. from one company involving their customers to innovate a product or service for themselves, to much more complex innovation projects where multiple stakeholders co-created innovation in a more equal power structure with a common goal.

Analysis with the DEC, showed this classification, based on the types of project focus that the article in question discussed:

1) Co-creation projects benefiting one company

Twelve (n = 12) articles discuss co-creation projects benefiting one company (the first group). These articles were omitted from this study, because these articles look at service, and marketing and consumer development for the benefit of that one company or organization. They were deemed less relevant for this study, and are not listed individually or included in the reference list.

2) Co-creation projects benefiting business-to-business value chain networks

Seven (n = 7) articles deal with innovation projects that include multiple stakeholders, which are part of the same value chain. These projects are typically initiated and led by a single actor looking for better business.

3) Co-creation projects benefiting public entities

Eleven (n = 11) articles discuss projects that have multiple-stakeholders, but mainly work for one lead entity, such as a public municipality, or other.

4) Co-creation projects benefiting innovation network

Three (n = 4) articles deal with knowledge and innovation projects where multiple stakeholders share common benefits and goals of development.

Further results of this study are structured according to three of these four categories of innovation projects. Twelve articles dealing with Co-creation projects benefiting one company were only used as background information for this study. The following results section looks at what literature sees as important for co-creation in each of these innovation project categories.

Complexity increases, beginning from Co-creation projects benefiting one company (group 1), and moving on to the most complex type of Co-creation projects benefiting innovation network (group 4). These seem to have potential for the most rapid innovation, as the multiple actors may openly expand on the knowledge provided by other innovation project stakeholders.

3.1.1 Co-creation projects benefiting an innovation network

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Three (n = 3) articles, ranging from 2010 to 2014, were classified as ‘Co-creation projects benefiting an innovation network’:

Pinho, Beirão, Patrício, & Fisk (2014)	Complex value networks with many actors
Accordino (2013)	IT-tool to engage stakeholders in the co-creation of the futures
Doyle (2010)	Mixed teams involved in improving universities' regional engagement

Table 3: Articles on Co-creation projects benefiting an innovation network

These articles deal with knowledge and innovation projects where multiple stakeholders share common benefits and goals of development. The networks that they discuss are complex value networks. They raise the importance of common frameworks, platforms, and services to co-create value, which are noted in all three articles. Also, the importance of stakeholder participation comes forth from these four articles, as an element needed to drive the co-creation of knowledge and innovation.

Complex value networks with many actors to design and manage services benefit from a common framework to select methods and guide the processes. Pinho et al., (2014) use grounded theory to understand value co-creation from multiple perspectives of multiple actors, noting that “grounded theory allows deriving further general, abstract theory that is grounded in data” (p. 474).

Accordino (2013) promotes, on behalf of the European Union, an IT-tool that combines the informal nature of social networks with a methodological approach of foresights to engage stakeholders in the co-creation of the futures that they all want. Doyle (2010) reports on a large international project, where mixed teams of academics and regional administrators are involved in improving universities' regional engagement.

A common note for these four articles is that change and development require new thinking from businesses and universities, alike. Common tools, approaches, and frameworks make it easier to guide the multiple perspectives of multiple actors to understand co-creation of knowledge and value in the same way.

3.1.2 Co-creation projects benefiting public entities

Eleven (n = 11) articles, ranging from 2010 to 2016, were classified as ‘Co-creation projects benefiting public entities’. These articles discuss projects that have multiple-stakeholders, but mainly working for one lead entity, such as a public municipality, or other:

Dawe & Sankar (2016)	Project success factors leading to effective value co-creation
Diaz-Diaz & Perez-Gonzales (2016)	Social media as a value co-creation and participation tool
Franz (2015)	Possibilities and limitations of Living Lab in social urban research.
Kallio & Lappalainen (2015)	Collaborative service development as organizational learning
Reiter, Gronier, & Valoggia (2014)	Involve citizens, authorities, industry and non-governmental organizations

Reed, Stringer, Fazey, Evely, & Kruijsen, J. (2014)	Principles for effective practice of knowledge exchange
Chang, Chih, Chew, & Pisarski (2013)	Projects conceptualized as a value creation process for stakeholders
Dandonoli (2013)	Open innovation as a way to structure collaborations
Powell (2012)	Best practice projects; partners have powerful and collective co-creation
Halonen, Kallio, & Saari (2010)	Multiple points of view for research and innovation projects
Harmokivi-Saloranta & Parjanen (2010)	Users take active part in development and innovation

Table 4: Articles on Co-creation projects benefiting public entities

Several of these articles also note the importance of having the right tools and framework to drive forth co-creation. As new elements, active facilitation and key success factors, are noted as a basis for effective value creation. The key success factors should be tied to common aims, promising stakeholder benefits, so that they come across as the basis for active stakeholder involvement.

Collaborative service development is an organizational learning process for an innovation network. Kallio & Lappalainen, (2015) divide it into five phases: (1) The need for change – evaluating earlier practice; (2) Planning and ideating by scenario building; (3) Experimenting by prototyping; (4) Implementation – applying in daily practice; and (5) Generalizing – evaluating the lessons learned. Driving innovation can greatly benefit from future-oriented and interdisciplinary approaches that combine behavioural, social, and design sciences with technological knowledge. Research and innovation projects should be seen from multiple points of view: management, customers and research collaborators (Halonen *et al.*, 2010).

Open innovation, is a paradigm that offers a way to structure collaborations between entities and people; to combine internal and external ideas and paths to market to achieve advances in processes or technologies (Dandonoli, 2013). Dawe & Sankar (2016) look at key success factors in a service-learning project leading to effective value co-creation for both students and a community; value was co-created through partnership between a university and a municipality.

Powell (2012) examines best practice projects. Partners co-produce real world solutions, pass innovative skills to others for “powerful and collective co-creation” (p. 396), Powell calls this a “virtuous knowledge sharing cycle” (p. 402). Projects should be conceptualized as a value creation process for disparate stakeholders, where stakeholder values are identified at the project commencement stage and captured at the end, as is argued by Chang *et al.* (2013). They criticize traditional project management in focusing too much on efficient delivery of outputs (on time and on budget). Diaz-Diaz and Perez-Gonzales (2016) look at social media as a value co-creation and participation tool. New technologies allow citizens take a more active role in public management and consumers to interact with organizations, to co-creating value.

A way how citizens can be involved in local governance is establishing both physical and intellectual spaces for collaboration between stakeholders. Using a Living Lab approach to involve citizens, authorities, industry and non-governmental organizations (Reiter *et al.*, 2014). Franz (2015) examines possibilities and limitations of Living Lab in social urban research, and note that: methods of social living labs

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must be interactive and engaging; participants should be a representative sample, not just the active ones; Living labs are an applicable method for interactive approaches of social and urban research that results in long-term involvement; local stakeholders provide early stage support, are a translating institution and, are valuable actors, and shift research strategy towards long-term engagement.

Harmokivi-Saloranta and Parjanen (2010, p. 75) write: “In the Living Lab development projects, the users take active part in development and innovation. The user not only supplies information to the developers but also is part of the development team”.

Innovation networks need common aims. Aims that promise benefits for all concerned. An active co-creation process requires cooperation tools and environments, easily accessible by all, to foster the development of long-term relationships and sharing knowledge. The cooperation processes need facilitation and monitoring. This monitoring process is facilitated by key success factors. Co-creative cooperation should be an on-going cyclical endeavour.

In summary, the literature notes that to create common aims, it is first important to understand the multiple points of view, different values and individual aims that the multiple stakeholders in the innovation network may have. Identified key success factors can aid in both the selection of cooperation tools, and in guiding the facilitation toward structured collaborations. Co-creation may be achieved by finding best practices.

3.1.3 Co-creation projects benefiting business-to-business value chain networks

Seven (n = 7) articles, ranging from 2011 to 2016, were classified as one-company driven innovation co-creation networks. These articles deal with innovation projects with multiple stakeholders that are initiated and lead by a single actor looking for better business:

Kazadi, K., Lievens, A. & Mahr (2016)	Stakeholder co-creation capabilities in generating valuable knowledge
Burdon, Mooney, & Al-Kilidar (2015)	Identify requisites needed in building high value co-creation alliances
Edvardsson, Meiren, Schäfer, & Witell (2013)	Strategy for interacting with the customer
Katzy, Turgut, Holzmann, & Sailer (2013)	Strategy of exchange across stakeholder boundaries
Schertzer, Schertzer, & Dwyer (2013)	High-performance relationships over
Pino, M., Plichart, M., Kerherve, H., Bouilly, C. & Rigaud (2012)	Multi-stakeholder partnerships for the co-production of innovations
Tokman & Beitelspacher, (2011)	Supply chains as value co-creation networks

Table 5: Articles on Co-creation projects benefiting business-to-business value chain networks

These articles focus on needs based aims, facilitation and practical cooperation tools and methods. Facilitation is ideally guided by facilitation strategy. Focus should be put on the competences of project managers, who are the active facilitators of the co-creation process. Burdon *et. al.* (2015) have analysed engineering services

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partnerships, and summarize nicely the need to identify and understand “requisites needed in building high value co-creation alliances – especially where innovation is the strategic goal.” (, p. 285).

Co-creation of service offerings and value proposals for end-users derive from an exchange of knowledge and use of operant resources among the network members (Tokman & Beitelspacher, 2011). In their perspective they combine service-dominant (S-D), which views supply chains as value co-creation networks, with supply chain management (SCM), which creates competitively compelling value propositions, for the transformation of end-user experiences to perceptions of superior value-in-use. Edvardsson *et al.* (2013) argue for a service development strategy, including a formalized, stage-gate model based, development process, and a strategy for interacting with the customer during the different stages of the development process. They use a sample of service development projects to test a conceptual model for key strategic factors in new service development (NSD), which they see as a formalised development process, with integrated development teams and customer co-creation.

Strategies of exchange across stakeholder boundaries can increase returns from innovation (Katzy *et al.*, 2013). They offer open innovation as an example of a strategy for innovation intermediaries, who as process coordinators benefit from three strategic innovation capabilities: (1) Innovation process management capability; (2) Matchmaking capability; and (3) Valuation and portfolio management capability. Pino *et al.* (2012) discuss a Living Lab (LL) approach encouraging multi-stakeholder partnerships for the co-production of innovations in the fields of innovation and entrepreneurship. The approach is a way to go “beyond traditional user-centered design practices” (p. 150).

High-performance relationships take time to develop, and supplier firms need to recognize that “the needs of newly acquired and longer-term customers differ, and to accommodate these differences” (Schertzer *et al.*, 2013, p 610). Longitudinal customer data was used to classify customers based on relationship tenure, which showed that inter-firm business-to-business cooperation for the co-creation of value requires time for these inter-firm relationships to develop.

The literature on this type of projects emphasized an active need for collaboration. Based on these articles, relationships need time to develop and co-creation requires a strategy for it to have an innovative outcome. A working and long lasting co-creative relationship requires active management, which the internal structures of the organization must also support. A structured development process calls for active and open exchange of knowledge. First key strategic factors, and strategies for interaction and exchange of innovation, are identified, then the process coordinators. They serve as the intermediaries for innovation, as they coordinate the exchange use of operative resources and exchange of knowledge, over the time that the inter-stakeholder relationships require to develop into open value co-creation.

3.2 Roles of end-users; aims of participation

According to Dandonoli (2013, p. 1), “open innovation collaborations can be designed to foster true co-creation among partners in rich and poor settings, thereby breaking down hierarchies and creating greater impact and value for each partner”.

Including both customers and employees in development projects will improve the performance of the development of new services (Edvardsson *et al.*, 2013); as activities, requirements, information, and value co-created among actors are all highly interconnected (Pinho *et al.*, 2014). Three types of interdependencies between actors in value co-creation are identified: (1) dynamic role interdependency, where actors' roles may change between provider to consumer; (2) temporal interdependency, where interactions occur sequentially through time; and (3) self-interdependency, where value creation depends on the own actions of the actors. This notion of roles shifting through time and depending on the actions of the actors is important and interesting. These dynamic roles can be facilitated, but not controlled.

Collaborative service development, as an organizational learning process in an innovation network, involves a “complex and interactive learning process requiring both creative problem solving and systematic, conceptual co-construction” (Kallio & Lappalainen, 2015, p. 154). This calls for open interaction and mutual trust building among the actors in the network; and a common object of development to, during the entire complex shared networked learning process, phase by phase, guide the construction of shared tools, knowledge, social structures, and practices.

Broader and better engagement in knowledge sharing and co-creation for universities that develop socially inclusive projects with their surrounding business and community partners is suggested by Doyle (2010), so that universities become drivers of creative change. For engagement in knowledge sharing Halonen *et al.* (2010) offer a workshop process, combining foresight and organizational learning methods, for cross-discipline co-creation in a service research network. They explain (p. 128) that “this method worked as a concrete way for managing future-oriented networking across organizational borders as a basis for continuous learning and innovation.”

Information is, according to Pinho *et al.* (2014, p. 489), a key resource underling value co-creating factors: “companies can enhance their offering by facilitating value co-creation through resource integration among other actors in the value network”. Open innovation environments integrate user driven innovation (Reiter *et al.*, 2014), build trust and establish a common goal to co-create new products, services, and societal infrastructures. Thus, Reiter *et al.* (2014) propose to add a human-centred design approach, to take into account people's interactions in a Living Lab IT-system; this combined approach makes both citizens and the IT system real actors in governance. Stakeholders should actively be engaged by project management throughout the project life (Chang, *et al.*, 2013). Along these lines Harmonkivi-Saloranta, & Paajanen (2010, p. 75) state that the, “Living Lab is a system for building a future in which real-life user-driven development and innovation will be a normal co-creation technique for new products, services and societal infrastructure”. This is critical not only in identifying and solving problems but also in managing expectations. Joint teams build a sense of community and shared purpose, as partnering relationships progress may include phases, such as (1) traditional service outsourcing, (2) trusted collaboration partnering, and (3) strategic joint engagement (Burdon *et al.*, 2015).

According to Edvardsson, *et al.* (2013, p. 35), “co-creation stands out as the key to succeed with NSD, while the formalisation of the development process is of least concern for managers”. New service development (NSD) is defined as a process to

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develop new services together with practitioners, and with frameworks. Project management should focus on individual competencies within the development team and on their interaction with customers throughout the development process. Katzy *et al.* (2013, p. 296) note that: “The systemic setting for innovation, much like all markets, only runs with the necessary intermediaries in place that make interactions and matching of partners possible.” Partnering with other organizations to progress innovative ideas is important for organisations that seek better commercial success and higher competitive advantage (Burdon *et al.*, 2015).

Most business-to-business customer-partners look for radical and transformational innovation opportunities, thus co-creation is a collective experience (Burdon *et al.*, 2015). Longer relationships render more innovative outcomes in co-creation, as customers are classified into three tenure related groups: (1) transactional; (2) emergent; and (3) mature relationships (Schertzer *et al.*, 2013). The service development strategy and activities in a new service development process should take into account that services are activities and interactions, which are carried out by not only by service providers, but also by customers, and other network actors (Edvardsson, *et al.*, 2013).

In the literature it is underlined, that there are strong interdependencies between stakeholders. True co-creation is a complex and interactive learning process, with trust as a key component and information as a key resource. Thus, joint teams, including customers and employees, with open innovation environments integrate stakeholder participation and build the necessary trust and engagement in knowledge sharing. It is noted that it is important to partner, to progress innovative ideas, engage in knowledge sharing and co-creation, where information is a key resource. Open innovation collaborations are a complex and interactive learning process, where actors are interconnected, and systemic conceptual co-construction and strategical approach are needed, as well as are tools for interactions and time to increase innovative outcomes.

3.3 Modes and challenges of end user participation

Both the innovation network, and its learning process are constructed simultaneously by interaction. It is essential to take into account the objectives of all parties to find a common object to co-construct (Kallio & Lappalainen, 2015). To develop cost-effective highly interactive learning, partners must collaborate to (1) define a problem that is worth their combined efforts, (2) develop dialogues with strategic partners, (3) improve knowledge sharing, and (4) develop collaborative processes. Searching for opportunities for mutual benefit of the partners unlocks the talents of the diverse groups working together in co-creation (Powell, 2012).

There is a lack of awareness of the advantages of open innovation. Many projects are isolated and based primarily on either research objectives, or on business goals (Pino *et al.*, 2012). Doyle (2012) raises similar issues related to universities' engagement with their regions. It is complex and pervasive cooperation, and occasioned by other policies or agendas, mostly promoting economic, social inclusion, or community development. There is a need to facilitate the development of mutual understanding, calling for a common language and mutual expectations. Additionally, Pinho *et al.* (2014) note, that potential conflicts between stakeholders

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should be considered, and communication and reconciliatory strategies be anticipated on.

Multi-stakeholder partnerships demand a continuous investment in project management, processes, and people. Careful stakeholder mapping can help identify all stakeholders concerned and enable having a holistic view of the entire innovation process (Pinho et al., 2014). Kallio and Lappalainen (2015) make the observation that collaboratively developed and co-created structures or processes cannot be controlled by a one single party.

Innovation is “not easy, either to foster or to achieve” says Dandonoli (2013, p. 1). Moreover, navigating the partnering dynamic can be harder than expected, as it is “potentially hindered by misunderstandings and differing expectations between enterprises” (Burdon et al., 2015, p. 285). Thus, maintaining any virtual community requires adequate resources for active follow up (Diaz-Diaz & Perez-Gonzales, 2016). This explains that many large organizations struggle to re-tune their business model towards innovation, even though they are aware it can lead to corporate success (Burdon et al., 2015).

Management practices should move towards enabling and supporting radical, collective learning (Kallio & Lappalainen, 2015), as multi-stakeholder partnerships are resource demanding and require continuous investment in project management, processes, and people (Pino, et al. 2012). Customer co-creation can use very different methods and practices to involve customers, and to actively gain information and knowledge about the customer (Edvardsson *et al.*, 2013). Diaz-Diaz and Perez-Gonzales (2016) find that the usability of co-creation technology is important, and Doyle (2010) identifies the need for awareness to clarify meanings between partners.

A strategy helps align “a service development strategy has to do with the internal strategic alignment of resources, capabilities and organisational units, including value capture in a service system that enables and facilitates customers in their context-specific, value-creation situations and efforts” (Edvardsson, *et al.*, 2013, p 38).

End-user participation was seen as an activity which should be strategically structured by the organization driving the innovation project. Networks and learning become constructed through interaction, where open innovation, facilitation, and cooperation tools can bring advantages. We should enable collective learning. Co-creation of knowledge, value, and innovation are constructed only through interaction. So it is, first of all, important to partner and have a strategy for cooperative interactions. The objectives of all parties involved should be taken into account, as active resources from all are needed, and clear management practices are to facilitate mutual understanding between the various innovation network partners.

3.4 Table of Main Topics Discussed in the Literature

The table below summarizes the main topics discussed in the articles related to co-creation.

Co-creation projects benefiting innovation network	Co-creation projects benefiting public entities	Co-creation projects benefiting business-to-business value chain networks
Need for collaboration:	Need for collaboration:	Need for collaboration:

<ul style="list-style-type: none"> - Value is co-created in the network when actors integrate resources through their actions and interactions with each other (Pinho <i>et. al.</i>, 2014) - Value co-creating factors (Pinho <i>et. al.</i>, 2014): quality of information, and facilitation of different actor's activities - Broader and better engagement in knowledge sharing and co-creation (with surrounding business and community partners) (Doyle, 2010) <p>It takes time:</p> <ul style="list-style-type: none"> - Value is co-created in a flow over time; actors constantly change their roles (Pinho <i>et. al.</i>, 2014). - Engage stakeholders (in the co-creation of the futures that they all want) (Accordino, 2013) - Develop of mutual understanding (through a common language and mutual expectations) (Doyle, 2010) <p>Challenges:</p> <ul style="list-style-type: none"> - Multi-stakeholder partnerships are resource demanding and require continuous investment in project management, processes, and people (Pino <i>et. al.</i> 2012) - Lack of awareness of the advantages of open innovation among organizations (Pino <i>et. al.</i> 2012) - A need for awareness to clarify meanings between partners (Doyle, 2010) - Activities, requirements, information, and value co-created among actors are all highly interconnected (Pinho <i>et. al.</i>, 2014). - The benefit an actor gets today is dependent on what he or she and others 	<ul style="list-style-type: none"> - Open interaction and mutual trust building among the actors in the network (Kallio & Lappalainen, 2015) - Value was co-created through partnership (Dawe & Sankar, 2016) - Partners “worked extremely closely together to co-produce ‘real world’ solutions (Powell, 2012) <p>A common problem needed:</p> <ul style="list-style-type: none"> - Active engagement of stakeholders throughout the project life to identify and solve problems, manage stakeholder expectations, and co-create value (Chang <i>et. al.</i>, 2013) - Partners have to collaborate to define a problem that is worth their combined effort (Powell, 2012) - Innovation, networks, and the learning processes result from interaction and become constructed simultaneously (Kallio & Lappalainen, 2015) <p>Innovation Environments:</p> <ul style="list-style-type: none"> - Collaboration between stakeholders in physical and intellectual spaces (Reiter <i>et. al.</i>, 2014) - Open innovation environments integrate user driven innovation, build trust and establish a common goal to co-create (Reiter <i>et. al.</i>, 2014) - New technologies allow citizens take a more active role ..., to co-creating value (Diaz-Diaz & Perez-Gonzales, 2016) <p>Challenges:</p> <ul style="list-style-type: none"> - Innovation is not easy, either to foster or to achieve (Dandonoli, 2013) - Co-created structures or processes can no longer be controlled by any single 	<ul style="list-style-type: none"> - Joint teams build a sense of community and shared purpose (Burdon <i>et al.</i>, 2015) - Focus on: individual competencies in development team, and interaction with customers (Edvardsson <i>et. al.</i>, 2013) - Open innovation as a strategy of exchange across firm boundaries can benefit from innovation intermediaries (Katzy <i>et. al.</i>, 2013) - Inter-firm relationships and cooperation for the co-creation of value require time to develop (Schertzer <i>et. al.</i>, 2013) <p>Challenges:</p> <ul style="list-style-type: none"> - Misunderstandings and differing expectations (Burdon <i>et al.</i>, 2015) - Businesses struggle to re-tune their business model towards innovation (Burdon <i>et al.</i>, 2015) - Contrary to management belief: a service development strategy is needed to improve new service development performance (Edvardsson <i>et. al.</i>, 2013) - Firms need to recognize , and to accommodate to the differing needs of newly acquired and longer-term customers (Schertzer <i>et. al.</i>, 2013)
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<p>have done before (Pinho <i>et. al.</i>, 2014).</p>	<p>party (Kallio & Lappalainen, 2015)</p> <ul style="list-style-type: none"> - Usability of co-creation technology is very important (Diaz-Diaz & Perez-Gonzales, 2016) - Maintaining virtual communities require resources for follow up (Diaz-Diaz & Perez-Gonzales, 2016) 	
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Table 6: Main focus concerning co-creation in innovation networks

4. Discussion, Conclusions, and Further Study

Roles between stakeholders are found to be fluid and in constant change. One common point in the co-creation literature examined is that end users participate actively – also in research.

The findings (see Figure 1) show that co-creation of knowledge for innovation and active multi-stakeholder participation of end users calls for: (1) collaboration; and (2) a common problem. The results also show that to ensure open communication toward co-creation of knowledge, there are the three main challenges to manage in an innovation network: (3) stakeholders need to be actively engaged of throughout the project, and this; (4) takes time; and (5) effort.

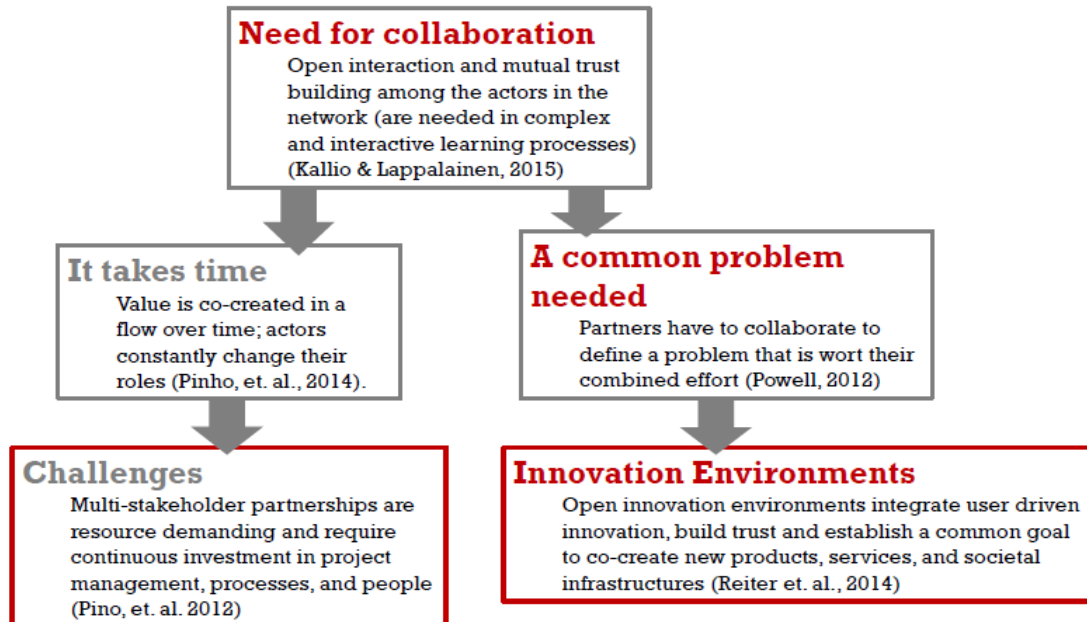


Figure 1: Elements of co-creation of knowledge for innovation identified from the sample literature.

Innovation environments and collaboration technology are widely discussed ways to tackle these challenges. Active and open collaboration is the key to successful co-creation. Collaboration is jointly constructed and lead. Any one organization cannot

be in charge alone, but all must feel that they will benefit from the process and its outcomes.

A common goal or benefit guides the innovation process. Finding a common problem may already be a co-creation process in its self. Innovation ecosystems may publicly (by the European Union, Member States, or Municipalities) stimulate innovation, and reward collaboration. Work that could otherwise be left undone may get done by the scale of different actors.

The literature studied suggests that there be a cyclical connection between value co-creation networks (see Figure 2); the cooperation platforms, tools, and active facilitation needed to foster co-creative innovation and knowledge sharing; active stakeholder participation stemming from common aims, which promise benefits for all; and an active drive for co-creation of knowledge, innovation, and change. Besides being cyclical, this connection can move both forward and backward. These cyclical connections, the cooperation efforts between project stakeholders, can either evolve and move forward to the next, higher level of the four categories of innovation projects with multiple stakeholders, identified in this study, or recede backward to the previous, lower level category: (1) Co-creation projects benefiting one company; (2) Co-creation projects benefiting business-to-business value chain networks; (3) Co-creation projects benefiting public entities; (4) Co-creation projects benefiting innovation network.

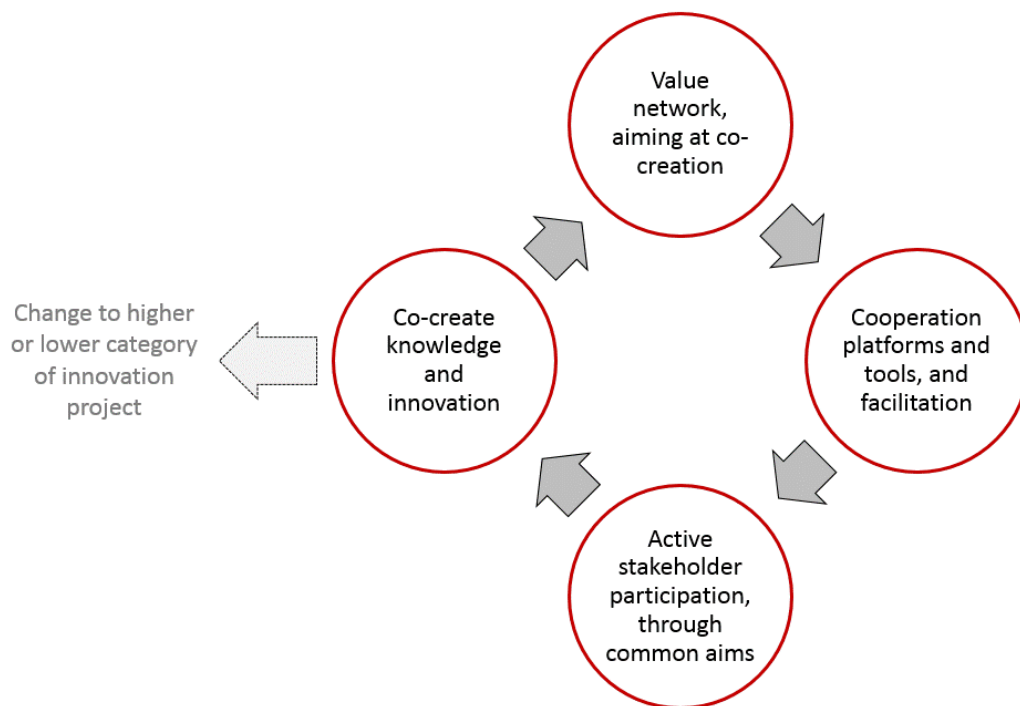


Figure 2: The cyclical connections in co-creation projects.

A limitation of this study is the somewhat limited number of 33 chosen articles from a comprehensive total of over 5.000 search hits for key word *co-creation*. On the other hand this gives the study specific focus, needed to identify the most relevant articles.

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More study is recommended to further deepen the study on modes of collaboration and related Public Relations.

Further study is planned to look at scenario building and the use of expert panels as forms of input and throughput communication in innovation projects. This may involve the study of end user scenarios and end user involvement in setting requirements for network performance.

Another interesting question for further research stemming from this study is, if more complex value networks can lead to faster and deeper co-creating innovation. This may be the involvement of end users in creating collaboration network cases for the co-creation of knowledge and information sharing to look at how attributes of complexity affect innovation in these cases of collaboration networks,

Further interesting topics are resilience in collaboration networks, and how Public Relations, external communication and dissemination by a project, matches requirements set by funding instruments.

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