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# Interventions for the Co-creation of Inter-organizational Business Process Change

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**Abstract.** This paper increases scientific knowledge about developmental interventions in inter-organizational processes by applying coordination theory. The interventions interfere intentionally with the process they aim to develop, reveal interdependencies between the participants, and coordinate their interaction for knowledge creation. The three elements of the developmental intervention are: (1) the participants from the different organizations, (2) the boundary objects that represent the inter-organizational business process, (3) the external facilitator, responsible for designing the other two elements, and for establishing among the participants the knowledge-creating conversational interaction mediated by boundary objects. In a successful intervention, the facilitator and the participants co-develop the necessary coordination mechanisms to support the knowledge co-creation of the participants from the different companies towards the common goal, i.e. the shared knowledge about the inter-organizational process.

**Keywords:** Intervention · coordination · co-creation · process · change · business ecosystems

## 1 Introduction

The current digitalization of industry drives companies to develop their inter-organizational networks and create new networks for business innovation. The increasing amount of information content as part of products and services opens new business possibilities for companies to serve their customers and end users in novel ways as part of a larger service offering network. This means a huge innovation potential in networked business processes and models [1]. Creating new ICT-enabled business ecosystems is a growing necessity for the survival of many companies nowadays.

Also innovations develop more and more in collaboration between organizations. Collaboration in networks enables individual companies to create solutions to complex problems they cannot solve on their own [2]. Collaboration is required also because networked innovation requires significant adjustments in other parts of the business

system than the individual companies are embedded in [3]. However, the creation of networked innovation is challenging because networks are hybrid forms of organizing, and their structures emerge in competitive settings of specific industries [4], and more and more also crossing over the borders of traditional industries [1]. Thus, no company alone can be responsible for managing the network towards innovation.

This paper argues that networked innovation can be supported by developmental interventions. Specifically, an intervention can coordinate the collaborative action between companies to enable knowledge creation across company boundaries. The intervention involves purposeful action by an ‘external’ agent to create change [5]. In this study, the intervention takes place in a network of companies and the agent acting and executing the intervention is a group of researchers external to the companies.

The concept of developmental intervention originates from organizational development [6] and participative action research [7], where interventions are seen as learning and action processes, consisting of the phases of planning, action, and results [8]. The intervention aims at improving the functioning of the participating organizations. The theoretical understanding of interventions is however limited due to the fact that most work on intervention methods and strategies is instrumental in nature, and is decoupled from mainstream organization science [9].

This paper aims at increasing scientific knowledge about interventions for inter-organizational process development by theorizing interventions through the lens of organizational coordination. Interventions interfere intentionally with the organizational process they aim to develop, by revealing the interdependencies between the participants, and coordinating their interaction for knowledge creation and innovation. The question becomes, how to coordinate these interactions over the whole intervention process, so that new inter-organizational knowledge is created, i.e. the intervention succeeds?

When asking this question about the coordination of interaction for inter-organizational process development, we have to bear in mind that the object of the intervention is the inter-organizational process, with a new basis for the differentiation and coordination of tasks [9]. Thus, the knowledge created via the intervention concerns centrally the coordination of the emerging inter-organizational process.

We discuss a preliminary empirical study of an inter-organizational business process development intervention to support the applicability of coordination theory in theoretically describing developmental interventions.

## **2 Theoretical Viewpoints**

In a facilitated intervention that aims to develop an inter-organizational process, the facilitator brings together the participants that co-create knowledge about their interdependencies and ways of collaboration. The successful creation of new inter-organizational practices (process innovation) requires that the participants have the necessary expertise and capabilities to produce innovative solutions. Thus, it is important to engage all relevant stakeholders to the co-creation process [10]. Together they form a

shared space, “ba” [11], a virtual community of practice [10, 12] or an innovative knowledge community [13] for knowledge co-creation.

The interactive knowledge creation includes mediating artefacts, often called boundary objects that visualize the object that the participants co-develop. The boundary objects reveal gaps in current understanding [14], and help the participants to cross their knowledge boundaries and create of common understanding [15]. The representational objects are particularly useful in developing collaborative work processes [16]. They help participants to create a holistic understanding of the collaboration process [10], to co-orient towards common objectives, and organize collaborative activities [17]. In addition, these kinds of objects can be collaboratively modified to improve current practices [13]. The possibility to collaboratively modify the boundary objects is essential for knowledge co-creation.

During the co-creation process, the collaborative sharing and creation of knowledge requires conversational interaction between participants. The participants bring in the discussion new observations concerning collaboration, reflect these observations against the current practices, and can produce jointly accepted conceptual change that constitute new knowledge [18]. After this, new ideas produced can be ascribed into boundary objects [19] that represent the process to be developed. The dialectic between conversations and boundary objects produce legitimate representations of the collaboration that gain authority in the relationship, and help coordinate collaboration [20, 21]. The dialectic, collaborative creation of knowledge via modifying the boundary object can be called triological learning [22, 23].

Coordination can be defined as the management of interdependences [24]. The need for coordination stems from the need to integrate the interdependencies between differentiated tasks. Successful coordination ensures that the differentiated tasks contribute towards a common goal. The task interdependencies, in increasing order of task uncertainty, are pooled, sequential, and reciprocal, and the corresponding coordination mechanisms are standards and rules, planning, and mutual adjustment [25, 26]. The coordination mechanisms are additive; thus, with increasing task uncertainty, all previous coordination mechanisms are often used, and new ones added.

As environmental uncertainty, level of task interdependence, and time constraints increase, task coordination is not enough but relational coordination is also needed [27]. Relational coordination refers to coordinating work through relationships of shared goals, shared knowledge, and mutual respect. These relational ties reinforce and can be reinforced by communication which is frequent, timely, accurate, and oriented at problem-solving. [28]

### **3 Empirical Developmental Intervention Project**

We conducted a developmental intervention project to support the co-creation of a networked process innovation. We applied a participative action research approach where the participants took part in the research process [7]. Action research applies action and reflection, theory and practice, to enable the creation of practical knowledge for the participants of the process [29].

The intervention took place in a network of companies, and the facilitator executing the intervention was a group of researchers. Following the participative approach, the employees of the companies were involved as participants in the intervention. The developmental intervention consisted of three activities: 1) mapping the inter-organizational activities, 2) guiding social interaction for promoting participation, and 3) using mediating artefacts for co-creating knowledge.

The intervention was part of a consortium project of the Finnish Strategic Center for Science, Technology and Innovation for the Built Environment. Eleven companies from the architecture, engineering, and construction industry and two universities developed in the project new, more efficient and innovative inter-organizational project processes and business models, based on the successful use of digitally enabled Building Information Modeling (BIM).

The successful use of BIM in construction projects enables, even requires more intensive collaboration between companies across the traditional professional and sectoral borders. With the use of BIM, the division of work and the interdependencies between the organizations change, and new forms of digitally enabled construction project processes become possible. This necessitates that all parties in the network collaboratively develop new ways of working together. No company can alone be responsible for the process changes. Instead, development has to take place collaboratively and concurrently between the companies in the network.

The intervention was conducted between January and October 2012. The intervention consisted of three phases: 1) collaborative planning of the intervention, 2) a three-day co-creation workshop organized in a relaxing conference center surrounded by Finnish nature, and 3) the further development of ideas into concrete ways of working during a real construction project. In this paper, we will focus on the first two activities.

### **3.1 Collaborative Planning of the Intervention**

In January 2012, a group of researchers and company representatives collaboratively planned a co-creation workshop that should develop a future BIM-based inter-organizational process for the design and development of infrastructure. Three planning workshops á 3 hours, and lots of collaborative spirit, were required to develop the plan for a co-creation workshop of three full days, where three parallel groups would approach the development of the BIM-enabled collaboration process, each from their own viewpoint: 1) value creation, 2) the beginning of the process, and 3) the ending of the process.

According to knowledge co-creation theories, the co-creation workshop participants would need a lot of facilitation, and boundary objects, to be able to co-create new practical knowledge about working together in a future BIM-enabled design and development process. During the planning phase, a first “prototype” model of the future BIM-based collaborative process was thus developed, to be used as a boundary object to help the participants share and co-create their practice-based knowledge.

### 3.2 The Co-creation Workshop

Six Aalto University researchers acted as facilitators during the three-day co-creation workshop. During the first workshop day, the participants had difficulties with getting started. In spite of all the preparatory planning, the participants used the whole day to understand what they should collaborate on during the workshop. It seemed that the participants had problems in trusting each other. However, in the facilitated conversation mediated by the pre-modelled BIM-based process, the participants were able to discuss difficult issues that they thought were hindering collaboration in the present-day construction industry. These issues concerned the companies' different business models and the 'traditional' ways of doing business. These hindrances could now be used as starting points for creating new ideas. The facilitators made sure that each participant could share her/his ideas and could contribute to the shared discussion.

The second day was more successful in terms of co-creating new knowledge. The participants started drawing new ideas on sticky notes that were put on white boards. At the end of the workshop day, the participants co-created an idea of an agile co-working method which would enable the participants to collaborative work with BIM. This idea turned out to be a successful process improvement which was later on tested in the design phase of a potential construction project [30].

During the third workshop day, the participants focused on more thoroughly understanding their new work interdependencies to further develop the idea of the agile co-working method. They wanted to understand when and how they should use the agile co-working method in their BIM-based collaboration process that had been developed for an earlier reference project. The facilitators helped the participants to reveal their work interdependencies in the collaborative BIM-based process, and used process models and other boundary objects to support the conversation. Table 1 presents the tasks of the facilitators during the planning and the three-day co-creation workshop.

**Table 1.** The participants, boundary objects, and tasks of the facilitators in the intervention.

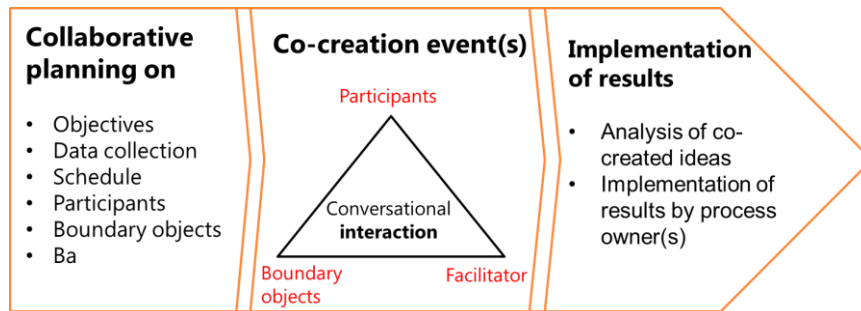
	The planning of the co-creation workshop	The three-day co-creation workshop
<b>Participants</b>	- 5 voluntary participants from 5 companies - 6 researchers from 2 universities	- 25 voluntary participants from 9 companies - 13 researchers from 2 universities
<b>Boundary objects</b>	Process model and process specification documents enabled the planning the of co-creation workshop and provided a common object of development.	Process model, power point presentations, specification documents to discuss about common objects of development, and as platforms for creating new ideas.
<b>The tasks of the facilitators</b>	- Idea collection for the co-creation event - Deciding on the facilitation techniques - Manuscript for the co-creation workshop - Detailed plans of the group assignments - Implementation of Online group work tool - Design of web-based survey for feedback	- Keeping the schedule - Pre-planned material for the group work - Challenging the participants' views - Making sure that progress takes place - Suitable climate for knowledge creation - Writing down ideas - Ensure the free presentation of ideas

## 4 Results and Discussion

In this paper, we have aimed to increase scientific knowledge about developmental interventions in inter-company business processes by theorizing interventions through the lens of organizational coordination. We have shown that interventions interfere intentionally with the inter-organizational business process they aim to develop, show the interdependencies between the participants, and coordinate their interaction for knowledge creation and innovation.

The paper finds three key elements of the developmental intervention that are crucial for the coordination of shared knowledge creation: (1) the participants from the collaborating organizations, (2) the boundary objects that represent the participants' interdependencies in the inter-organizational business process that is to be developed, and (3) the external facilitator of the intervention, responsible for establishing the conversational interaction of the participants, mediated by the artefacts, to support the creation of shared knowledge concerning the business process.

The intervention consists of a sequence of phases: planning, co-creation events, and implementation (Fig.1), and the facilitators can plan the intervention to some extent in advance. The facilitators collect a lot of data from the participating organizations before the co-creation event, and design the co-creation event in collaboration with key representatives of the participating organizations. More precisely, the facilitators 1) set the goal for the intervention in collaboration with the key participants; 2) collect the data and select the participants using interviews and snowball sampling; 3) design the boundary objects in collaboration with the key participants; 4) prepare a 'manuscript' and schedule for the co-creation event.



**Fig. 1.** The phases of a developmental intervention and its three elements that are crucial for the coordination of shared knowledge creation.

In the co-creation event, the boundary objects, often visual maps or scenarios of the inter-organizational process to be developed, provide some “rules” that help the facilitator to guide the conversational knowledge co-creation, and the manuscript acts as a plan and schedule to steer the highly interactive conversational process.

The results of this case study confirm that the participants of the co-creative events, the boundary objects, and the facilitators are required to coordinate the co-creation of

shared knowledge concerning the future inter-organizational process. However, the object of the development is highly uncertain: an emerging inter-organizational process. Therefore, not all participants are even known at the beginning of the intervention, not to speak of their interdependencies that will become the object of co-creation. Interaction and mutual adjustment between the facilitator and the collaborating organizations are therefore needed throughout the intervention project.

The paper suggests that in highly uncertain and complex inter-organizational business process transformation, such as in the BIM-enabled project process change, the facilitator and the participants can co-develop the coordination mechanisms to support the necessary knowledge co-creation of the different organizations towards the common goal, i.e. the shared knowledge about the future inter-organizational process. The important coordination characteristics of a successful developmental intervention include both task coordination and relational coordination. The intervention 1) helps to identify and co-develop novel task interdependences [25, 26] and 2) the intervention helps to create common understanding about how to manage them [27].

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