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Organizing for knowledge creation in a strategic interorganizational innovation project

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ABSTRACT

A fundamental challenge for interorganizational innovation projects is employing diverse actors' knowledge, expertise and perspectives for situation-specific demands of complex innovation. Innovation advancement is dependent on the degree to which knowledge is used and synthesized to address emerging and situation-specific demands of innovation. The goal of this study is to shed light on organizing for joint knowledge creation in a strategic interorganizational innovation project. Based on an inductive analysis of interview data from one strategic interorganizational innovation project, we identified the iterative process, self-organizing working groups and dynamic participation as practices through which the actors involved arranged and enacted their joint efforts, namely, knowledge creation and progress of innovation. This study contributes to research on managing strategic interorganizational projects by suggesting that organizing, which involves structural and informal organizing practices, supports managing strategic interorganizational projects where the diverse actors' knowledge integration is at the core of the innovation project's goals.

1. Introduction

Complex and radical innovations are, almost without exception, strategic achievements that demand the integration of expertise and efforts of diverse actors and are increasingly conducted as temporary joint projects between formal organizations (Czarniawska, 2018). These interorganizational projects bridge diverse actors in different geographical locations and provide an attractive environment to combine knowledge and resources for innovations that would not be achievable by any of the actors alone (Dougherty & Dunne, 2011). Earlier research has tended to view interorganizational projects from the perspective of the focal organization (Klessova et al., 2020), with less emphasis on (1) innovation projects that are conducted outside the control of any single organization (Phillips, 2015;vom Brocke & Lippe, 2015) and (2) how the actual knowledge creation, understood as a joint development of new knowledge among a set of actors (Bhatt, 2000; Gray, 1989; Nonaka & Toyama, 2003), is organized in these projects.

Innovations inherently build on and progress through knowledge creation (O'Connor & DeMartino, 2006). A challenge for interorganizational innovation project management is the employment of a project's rich knowledge base for situation-specific demands along the innovation process (Alves et al., 2007; Dougherty & Dunne, 2011), ranging from ad hoc problem solving to envisioning the future directions of actions and likely business opportunities. This challenge is compounded by the fact that in temporary projects, actors lack a shared history and may not be aware of each other's knowledge, expertise and practices (Bakker et al., 2010). As it is individuals who jointly create knowledge (Nonaka et al., 1995) and pursue most innovative endeavours (O'Connor & McDermott, 2004; Salter et al., 2015), organizing that fosters the communication (Sakka et al., 2016), interaction (Stock et al., 2021) and collaboration (Fjeldstad et al., 2012) through which knowledge is generated is highlighted.

Project management (PM) literature acknowledges the central role of knowledge for project goals, such as knowledge sharing between focal organizations and external actors (Stock et al., 2021), knowledge transfer between projects (Mahura & Birollo, 2021), knowledge sourcing in R&D team creativity (Khedhaouria et al., 2017), knowledge integration in product development project teams (Rauniar et al., 2019) and structuring of knowledge integration in interorganizational R&D projects (Klessova et al., 2020), as well as cross-boundary learning (Wiewiora et al., 2020) and social capital (Miković et al., 2020). Even though both knowledge sharing and integration foster knowledge

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creation (Berggren et al., 2011; Grant, 1996; Klessova et al., 2020), these studies do not address how the dynamic process of knowledge creation, understood as the joint development of new knowledge, can be organized in innovation projects between organizations.

The diversity of actors (Czarniawska, 2018), the demands to interact with the environment (Chesbrough, 2008) and the complexity of innovation indicate that managing such a strategic innovation project requires addressing both the knowledge management and activities of organizing (Klessova et al., 2020) in a situation-specific manner (Hällgren & Söderholm, 2010). Some scholars emphasize the duality between formal structure and informal organizing (Candi et al., 2013; Nilsen, 2013) and temporal structuring (Winch & Sergeeva, 2021), whereas others suggest iterative processes (de Blois et al., 2016) and self-organizing networks (Pryke et al., 2018) as a solution to address the demands of duality. In innovation research, the iterative process is associated with the embedded adaptiveness to address emerging demands and interactions with environments (Sjödin et al., 2020; Van Lancker et al., 2016). Among PM scholars, there are attempts to enhance the understanding of flexible and emergent PM (Artto et al., 2011; Edkins et al., 2013) to address both the complexity of interorganizational collaboration and the project environment, as well as the diversity of strategies within the project (Artto et al., 2008). Despite the rich and rapidly developing research on PM and the evidence about the overlap between knowledge and organizing activities (Klessova et al., 2020), there is a need to adopt the perspective of knowledge management in managing innovation projects.

Given the research gaps identified above, the goal of this study is to shed light on organizing for knowledge creation in a strategic interorganizational innovation project by asking the following research question: *How do actors organize for knowledge creation in interorganizational innovation projects?* We address this in a theoretically interesting and rich case study that consciously applied novel ways of organizing innovation to foster collaboration and achieve flexibility and adaptiveness throughout the innovation process. This study employed a qualitative and inductive research design based on interview data from the respondents of an interorganizational innovation case. By bridging discourses from the literature on knowledge creation, innovation management, PM and managing strategic projects, this study focuses on the implementation (execution) phase of the project lifecycle (Pinto & Slevin, 1988).

In the following chapters, we first introduce the theoretical framework that guided our research. Thereafter, we describe our research design and methodological choices, followed by the analysis. We then present the results and related discussion and conclude with the theoretical and managerial contributions, as well as limitations and directions for future research.

2. Theoretical framework

2.1. Strategic interorganizational innovation projects

Projects as temporary organizations are important mechanisms in designing and implementing strategic change (Lundin & Söderholm, 1995; Martinsuo & Hoverfält, 2018; Huemann, 2022). Projects are strategic when they aim to initiate novel business, radical innovation, change and transformation (Shenhar, 2004) in organizational and interorganizational collaborations (Martinsuo, 2019; Vuori et al., 2012). Such projects typically bridge multiple parallel fields (technology, policy and business) and stakeholders (users, customers, competitors) and the interdependencies between them (Cooper, 1998). Likewise, building an interorganizational collaborative innovation project to pool all critical and diverse actors for joint innovation is a strategic choice. Such projects take place between organizations (Czarniawska, 2018) and comprise a complex and diverse set of actors to form a systemic (e.g. ecosystem) context for innovation within which the autonomous and egalitarian actors are committed to working interdependently towards the attainment of common goals (Dhanaraj & Parkhe, 2006; Valkokari, 2015). Interdependence means that the actions of actors are interconnected in such a way that the behavior of each one affects the others (Dougherty & Dunne, 2011; Peltoniemi, 2006). Our focus is on the kind of strategic interorganizational innovation projects that are independent temporary organizations in their systemic context, with an individual scope, strategy and goal (see Artto et al., 2008).

On the one hand, temporary projects with no previous restrictions (Bakker et al., 2010; Söderlund and Andersson, 1998) can deviate from the parent organizations' structures and processes (Candi et al., 2013; Grundy, 1994) and build not only project-, goal- or situation-specific circumstances (Hällgren & Söderholm, 2010) for collaboration but also emerging self-established goals (Artto et al., 2008) and related ways of organizing. On the other hand, the achievement of joint innovation goals calls for a framework and organization through which joint activities can be arranged (Fjeldstad et al., 2012; Järvi et al., 2018) and the complexities of the project environment can be addressed (Artto et al., 2011; Edkins et al., 2013).

The project structure is a framework for the organization of collaboration and the building of interactions between actors (Calamel et al., 2012), an enabler of learning (Nilsen, 2013; Scarbrough et al., 2004) and knowledge integration (Klessova et al., 2020). Given that projects are temporary organizations (Lundin & Söderholm, 1995) and newly formed evolving spaces among interdependent actors, the structures that evolve and enable temporal shifts (Klessova et al., 2020; Thompson, 2005; Winch & Sergeeva, 2021) better serve joint knowledge creation in highly complex and dynamic circumstances. Given that managing strategic projects requires tailored and project-specific organizing, there is a need to shed light on organizing for knowledge creation in a project that occurs between organizations.

2.2. Knowledge creation and advancement of innovation

Definitions, such as the 'dialectical process, in which various contradictions are synthesized through dynamic interactions among individuals, organization and environment' (Nonaka & Toyama, 2003, p. 2) and 'a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible' (Gray, 1989, p. 5; Wood & Gray, 1991), describe joint knowledge creation as an interdependent achievement. Such a knowledge collaborative or collective comprises diverse specialized actors (often unknown to each other) who commit to solving a specific problem or conducting a complex task within a specific timeframe (Lindkvist, 2005). New knowledge results from the synthetization of actors' diverse expertise, perspectives and interdependencies in their open discourse and collective meaning creation (Hargadon & Bechky, 2006; Harvey, 2014).

The social embeddedness of knowledge (Lam, 2000) requires human interaction, communication and sufficient circumstances (Nonaka & Takeuchi, 1995) through which knowledge is employed. Knowledge creation is a collective process when actors have an equal opportunity to contribute to the process, they constructively deal with differences and remain open to emerging solutions, and when responsibilities and decision making are shared while setting the future direction of the task at hand (Gray, 1989; Harvey, 2014; Sawyer & deZutter, 2009; Vera & Crossan, 2005). The opportunities for interaction are central for the employment of knowledge, as the development of new knowledge demands acquisition, sharing and integration of knowledge through which actors collectively build common understanding, identify problems and create new knowledge (Nonaka & Toyama, 2003). These knowledge-related actions can take place in any situation-specific order (Fong, 2003).

When new knowledge is understood as any change or progress in understanding, technology, product or process, knowledge creation becomes an inherent core of innovation. This refers to the constant movement between the generation and application of knowledge for

innovation (Dougherty, 2004; Drucker, 1985; March, 1991). The intertwining of knowledge creation and innovation is also highlighted in the dynamic process views of innovation, with an emphasis on ongoing flexibility, adaptation and iteration (Arnold & Barth, 2012; Grass et al., 2020; Van Lancker et al., 2016; Sjödin et al., 2020) across boundaries.

Most strategic and game-changing innovations demand the parallel development of the object of innovation (e.g. technology) and its environment (users and markets), which calls for continual adaptiveness to the environment in knowledge creation. Adaptiveness is the ability to respond to stimuli by scanning the environment for demands (Eisenhardt & Tabrizi, 1995; Maynard et al., 2015). It concerns, for example, the participation of external actors in innovation (Bayiley & Teklu, 2016; Lehtinen & Aaltonen, 2020) and seeking feedback from professional peers, users and competitors (Chesbrough, 2008). Within-project adaptiveness enables the employment of the diverse expertise and resources of the actors involved, as well as awareness of how innovation and decision making are shared. This greater awareness (Stock et al., 2021) increases the engagement of actors in joint achievement (Ferraro & Iovanella, 2015; Nambisan & Sawhney, 2008) and strengthens collaboration.

We suggest that joint knowledge creation is a central driver in the advancement of innovation in interorganizational innovation projects and, therefore, is a fundamental basis of organizing.

2.3. Organizing for knowledge creation in interorganizational innovation projects

The complex process of knowledge creation in the configuration of interorganizational innovation projects requires bridging and engaging the relevant people in a situation-specific manner. Organizing can be understood as the actions taken by project actors (either individual or collective) as they adjust and adapt their interaction and communication to address situation-specific and emerging demands (Fortwengel et al., 2017; Orlikowski, 2000), for example, to address the constant movement between complexities and synthesis in knowledge creation (Faraj & Xiao, 2006; Harvey, 2014).

In their study on formal knowledge management (KM) practices promoted by an organization, Andreeva & Kianto (2012) posited a difference between knowledge processes and KM practices. They perceived KM practices as management tools for fostering the utilization of knowledge in organizations. By contrast, informal practices, like communities of practice (Lave & Wenger, 1991) and knowledge collectives (Lindvist, 2005), emerge through the agency of autonomous and motivated actors (Mahura & Birollo, 2021). Self-organizing teams, decentralized decision making, shifting accountability, interdependent relations, dynamic roles, and participative work processes (Child & McGrath, 2001; Kellogg et al., 2006) all refer to informal organizing. Scholars also acknowledge that different combinations of PM practices serve different kinds of demands (Barbosa et al., 2021).

In this study, we focus on the organizing practices and related activities that are jointly enacted by the interdependent actors as they conduct interorganizational innovation. This refers to temporary organizing, namely, practices and activities taken by actors while they pursue objectives within a limited timeframe (Bakker et al., 2016; Lundin & Söderholm, 1995). This perspective is appropriate because, in newly formed interorganizational innovation projects, knowledge creation requires situation-specific attention and practices developed by actors to make tacit knowledge (embedded in expertise) available, share perspectives and knowledge, and synthetize them for new knowledge creation. Likewise, a lack of established formal practices in temporary project organizations stimulates actors to generate and enact novel practices (Mahura & Birollo, 2021), which is also acknowledged in research on PM (Nilsen, 2013; Pryke et al., 2018). In addition to communities of practice, Mahura and Birollo (2021) identified involvement in inter-project debates (Bell et al., 2016) and personal networking (Fong, 2003) as practices to foster communication, connectivity and knowledge transfer in projects.

3. Methods

The following section describes our research design and discusses our approach to data collection and analysis.

3.1. Research design

This study employed a qualitative research strategy to investigate a theoretically selected single case, where organizing for joint knowledge creation in an interorganizational innovation project was clearly visible (Eriksson & Kovalainen, 2016). First, the CORE project case was chosen because, in conversations and pilot interviews conducted in the university-driven research project (Innospring Catch, 2015–2017), we learned about their unique approach in developing innovation and managing an innovation project. Second, the project was part of the strategic research program (Trial). Accordingly, the project aimed to implement novel, experimental ways to produce strategic, collaborative innovations. Third, this purposefully selected case study provided rich data to investigate organizing for joint knowledge creation in interorganizational and multi-actor (academia, companies and public authorities) innovation projects. Beside being an informative resource for knowledge creation in an interorganizational innovation project, the selected case is a rare example of managing a strategic project in which an iterative approach was applied in an interorganizational and collaborative innovation project context.

We limit our scope to the joint goals and achievements of the project actors and exclude individual goals and achievements.

3.2. Research context

The CORE project was part of the large research program ‘Environment for Cognitive Radio and Network (Trial)’ funded by the national research funding agency TEKES (hereafter Business Finland, BF). The trial program aimed to (1) foster the development of cognitive radio (CR) research and experiments by supporting the establishment of an ecosystem in Finland to share knowledge, expertise and hardware (trial environment) related to cognitive radios; (2) transform Finland into a globally attractive cluster of expertise and provide a unique trial environment for CR and networks; and (3) change innovation development towards an experimental way of development (Varnai et al., 2016). The program involved projects ranging from single-actor to large cooperative R&D and parallel industry projects, all clustered around a specific topic and test environment. This study concerns a large interorganizational innovation project (labeled CORE) over the two-year period of 2015–2016.

3.2.1. Case description

The objectives of the CORE project ‘Intelligent Control Solutions for Networks and Radios and Related Novel Business Models’ were ambitious. First, it aimed to research and develop not only disruptive CR technology but also related business models and necessary changes in regulation. The idea was to develop these areas in parallel so that the results of one area would support the others. For this purpose, a specific environment (innovation ecosystem) was composed of the focal actors (universities, research institutes, applied universities, mobile operators, regulatory authorities, defence forces, technology companies and start-ups). Second, the project aimed to develop and apply an experimental culture familiar in a start-up context to a large interorganizational innovation project context. Third, the basic operating philosophy behind the innovation project was to create an open environment for fruitful interaction across all three focus areas (technology, business and regulation), as well as for interaction with competitors and customers. One of the respondents described it as follows:

We look in parallel at new opportunities in business, technology and

regulation. When we find that some transformation is going to take place at the same time in all of these and that it would allow for new ways of doing business or other opportunities, then we are active there. It starts from the fact that we actively scan technologies and new opportunities in them both in terms of our own research and research institutes and universities. At the same time, we scan what's going on in regulation, standardization and business. What's more, we don't only focus on our own business, but we follow very closely what's ongoing on the media side and what the big Internet players are doing. (Rs10)

The actors of the project were four research institutes and three industry companies with their own subprojects, two public organizations without subprojects and three companies that were invited to participate in theme-specific workshops (Fig. 1). The actors were in geographically separate sites across Finland. One research institute served as the main coordinator.

The project comprised a formal project organization with project and subproject plans and the three theme-specific cross-boundary working groups (WGs). The steering group, consisting of the representatives of the project actors (including the funding agency), was responsible for the administration and acted as an advisory body. Each subproject holder participated in the joint project efforts through the WGs, while simultaneously implementing its research plans independently. In this study, we limit our focus to the joint efforts (knowledge creation and innovation) and related activities for which the three WGs were responsible.

As an outcome, the CORE project validated the feasibility of spectrum sharing between mobile broadband networks and other types of incumbent spectrum users utilizing the Finnish CR field trial environment (CORE). The project was the first to develop and validate end-to-end system concepts for the most prominent spectrum-sharing concepts from the US- and Europe-initiated licensed shared access (LSA) in end-to-end field trials (Yrjölä et al., 2017). The validation was implemented using commercial technology-based experimental design setups to provide practical knowledge for the selection of technology components for the next generation of 5 G needs while carefully considering scalability and the total cost of ownership. The project's results have been utilized by regulation and standardization forums, not only for studying the spectrum-sharing concepts themselves but also for the future of spectrum management and the evolution of mobile broadband systems enhanced with innovative spectrum-sharing-enabled business models to cope with the growing demand for capacity and new services by humans and machines. Finally, the researched and validated US Citizens Broadband Radio Service (UBRS) concept (Federal Communications Commission, 2015) was adopted for commercial use in 2020.

The CORE project was successful as it achieved its goals and contributed to the trial program by (1) advancing CR technology and research and building an ecosystem and trial environment in Finland; (2) bringing Finland into a global cluster of expertise in CR networks; and (3) advancing experimental methods of innovation.

3.3. Data collection

We used semi-structured interviews in one-on-one conference calls, which were recorded with the permission of the interviewees for transcription. We received the contact list of the most knowledgeable informants from different functional perspectives and organizations ($N = 20$) from one of the authors of this paper (representative of an industry actor in the CORE project). We invited the informants to participate, and 15 respondents participated in the interviews.

In the interviews, we first asked for the respondents' background information (organization, location and participation in the project WGs). Thereafter, the questions addressed themes such as WG organization and functioning, the implementation of a recent joint trial, goal setting in trials, the project as a context for joint knowledge creation, and how the current project was different from previous projects. Each interview lasted between 30 and 97 min Table 1. As secondary data, we used public project reports (Varnai et al., 2016) to understand the context of the project. Informal conversations with industry actors were used as complementary data. These conversations were related to the Innospring Catch research project during which data collection was conducted.

3.4. Analysis

For the data analysis, we utilized data-driven inductive analysis (Gioia et al., 2013) to investigate issues that have not been examined in depth in prior scientific research. We used both NVivo software and manual coding. While analyzing the data, we focused on the respondents' experiences and perceptions regarding the organizing for collaboration and joint knowledge creation within the innovation

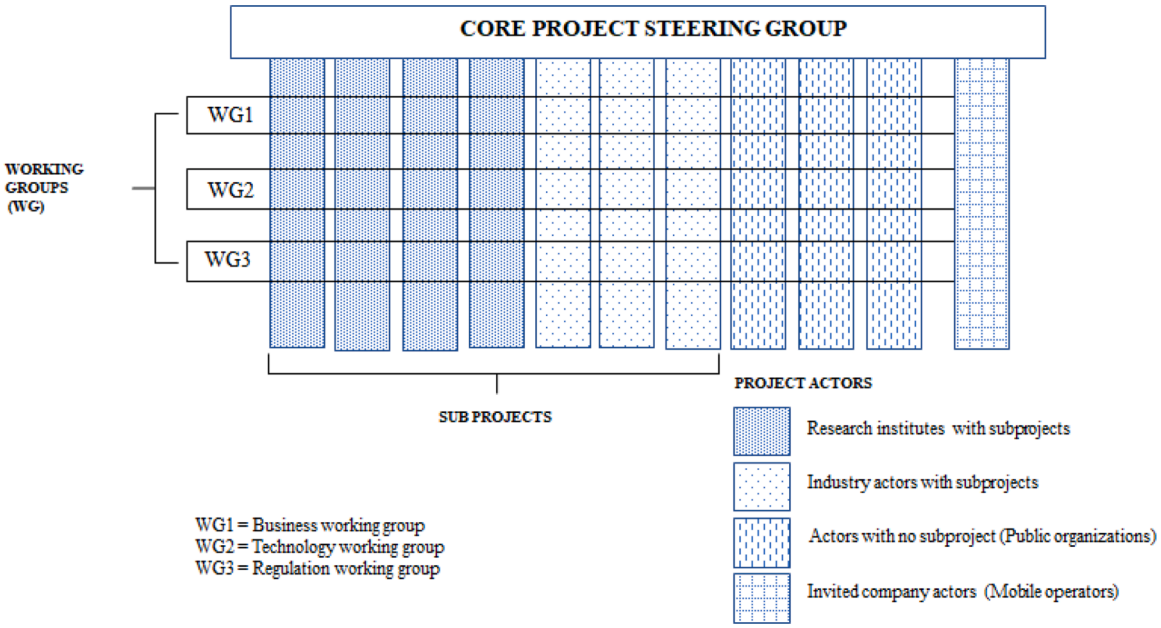

Fig. 1. Project structure.

Table 1
Key informants with their participation and interview data.

ID	Informant	Organization	T	B	R	S	Interview duration
1	Expert	Business school			x	x	30
2	Expert	Research institute	x		x		47
3	Expert	Military research center		x			26
4	Expert	Regulatory body				x	24
5	Expert	Applied university	x	x			27
6	Expert	Private company	x	x			53
7	Expert, Working group (WG) leader	Business school		x	x		55
8	Coordinator	University	x				97
9	Expert	Applied university	x		x		78
10	Expert	Applied university	x				71
11	Expert, Coordinator	Technical research center	x	x	x		88
12	Expert	Private company	x	x			77
13	Expert	Private company			x	x	91
14	Representative	Private company				x	91
15	HR manager	Private company					28

Note: Working groups are named as T = Technology WG, B = Business WG,. R = Regulation WG and S = Steering group.

project.

We started by carefully reading through the data and selecting all excerpts related to project structure, organizing, WGs and joint knowledge creation. Next, we conducted first-order coding and were careful to remain as close to the interviewees' speech as possible. After rounds of iteration, we agreed on the open coding labels and were ready to reduce the number of codes (combine and rename) for the set of first-order codes. We re-ordered similar codes to create a common theme for the second-order codes, and after further rounds of iteration, we were able to label the aggregate dimensions (Gioia et al., 2013).

In each round, one researcher conducted the data coding independently, and another researcher inspected it. We used researcher triangulation and discussed the findings in joint meetings to ensure that we shared the same understanding of what the data expressed. Some changes were made in the second-order themes and aggregate dimensions. Based on our analysis, we were able to identify the data structure in which the aggregated dimensions dealt with the core themes of our research: iterative process of knowledge creation, self-organizing WGs and dynamic participation (Fig. 2, Table 2). Specifically, drawing carefully from the interviews, we first constructed one typical cycle (trial) that recurs throughout the innovation process. We sent our construction to one of the actors (co-author of this paper), and based on the feedback received, we modified it.

4. Findings

In our empirical exploration, we found three main patterns of organizing: (1) iterative process; (2) self-organizing WGs that were responsible for the joint efforts; and (3) dynamic participation. In the following, we discuss them in more detail.

4.1. Iterative process

One important success factor was that we progressed with small steps rather than taking large steps. (Rs2)

The development process is a continuous process of planning, implementing and interpreting results by considering emerging setbacks and surprises. (Rs6)

Our findings showed that the iterative process consisting of chains of cycles (trials) was a central practice in bridging and engaging dispersed WG members and other participants (external and company representatives) to explore the current state of innovation, synthetize perspectives and knowledge, and plan the future progress of innovation. Specifically, the iterative process was a joint achievement of the three theme-specific WGs (technology, business and regulation) and, accordingly, was crucial in organizing. Based on our empirical exploration, we identified the iterative process comprising five major practices: (1) building common understanding (A); (2) setting joint goals (B); (3) creating knowledge (C); (4) sharing knowledge (D); and (5) searching feedback (E) (Fig.Y). This cycle recurred every three to four (3–4) months, with three to four cycles per year.

Building common understanding (A): In the joint meetings, the

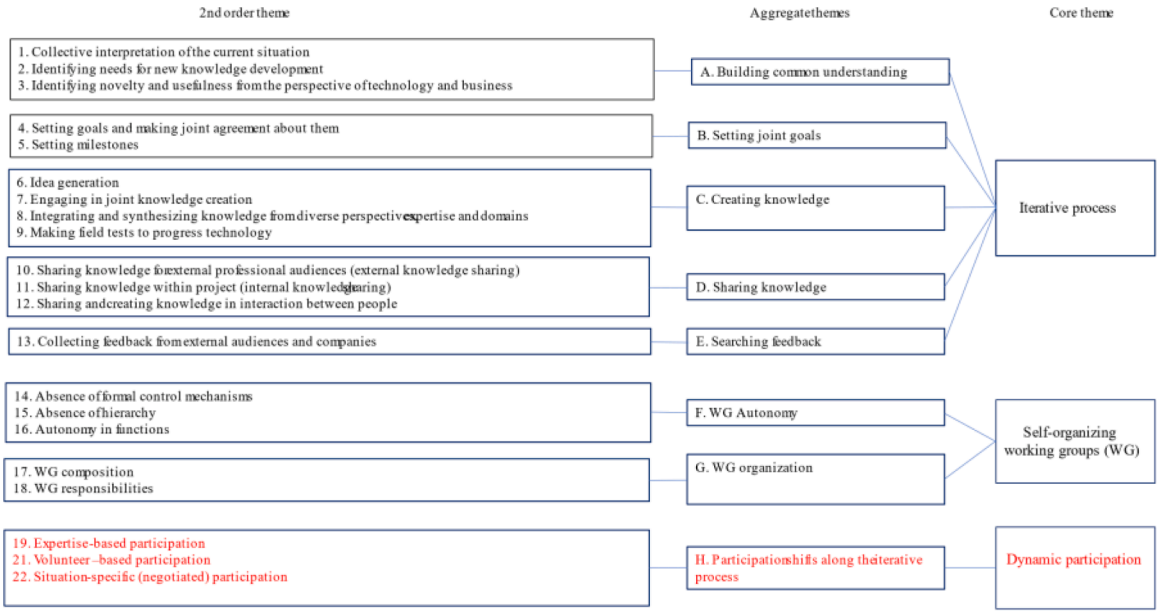

Fig. 2. Data structure.

Table 2
Participation and interaction spaces of joint activities along the iterative process.

Cycle	Building shared understanding	Setting joint goals	Creating knowledge	Sharing knowledge Internal	 External	Searching feedback
Participation	Wide within project participation	Wide within project participation	Composing specific participation	Inviting and engaging wide within-project participation	Presenting Demo (Work-in-progress)	Collecting feedback
	• WG members	• WG members	• Problem/expertise -based	• WG members	• Small expert group (presenters)	• Small expert group (presenters)
	• Steering group members	• Steering group members	• Small teams (field tests)	• Steering group members	• External audiences	
	• Volunteers by interest	• Volunteers by interest	• Emerging teams	• Volunteers by interest	• Professionals and scientists	
				• Invited and company members	• Competitors	
					• Company actors	
Spaces of interaction and joint activities	• Regular WG meetings	• Regular WG meetings	• Small group interaction according to demand	• Regular steering group meetings	• International conferences and workshops	• International conferences and workshops
	• Joint meetings across WGs	• Joint meetings across WGs	• Interaction between small group and experts in the field	• Within project meetings and workshops		
			• Joint meetings across working groups	• Specific theme-based meetings for project parties		
			• Specified theme-based meetings for project actors			
			• Flexible frequency of meetings on need basis			
			• Informal interactions			

members of the WGs jointly interpreted the current situation.

After each "trial" [demonstration], we sat down to compare the results with the roadmap, discuss with researchers and other experts, and consider the content of the next trial. (Rs4)

This concerned the bringing of existing knowledge from various sources into the discussion, such as the results from the previous cycle and field test results, as well as feedback received from demonstrations.

It is a kind of update of the current situation before the next progress. (Rs6)

At this point, knowledge (what is known) is interpreted from the diverse perspectives of actors and domains to build a shared understanding among the actors involved. Existing understanding is also examined in relation to the tentative plan (road map) while building an agreement about it (what is known) from which to build. This kind of anchoring activity confirms that despite the diverse perspectives and knowledge domains, all participants have the same understanding of the starting point to build on for further steps.

We consciously aim to create [something] new by building on existing [knowledge] and on what we have discovered. (Rs9)

Based on the collectively built understanding of the existing knowledge, the WG members start planning the next cycle by identifying needs, including emerging ones, and aiming to form joint goals to create new knowledge (innovation advancement). The needs may be derived from the specific demands in the field of expertise or the WG goals (technology, business, regulation), and they may represent a single perspective being brought into the discussion. The needs may also emerge from the technology choices.

The need appears, for example, from the specific technology features we need to test. (Rs5)

At this point, the members aim to confirm the novelty and usefulness of the expected outcomes.

… And then the choice that we do something that is technically novel from a research point of view and will benefit these companies. (Rs10)

Setting joint goals (B): Once the needs are identified and become visible, the members start to build a collective synthesis about the likely content of the next cycle and agree to it.

While starting to plan the demo, we set joint goals and agreed to them. (Rs2)

The chosen content of the next cycle, in turn, determines whose expertise and knowledge contributions are required in the implementation of the content plan.

While setting the joint goals, the milestones were employed; that is, members mutually agreed on the forums where to demonstrate the next version of the work-in-progress innovation (external milestone) and the date for the internal demonstration (presenting the results to the steering group and project actors).

We jointly explore and make decisions about the forum and the date of the next presentation. (Rs4)

The participants considered milestones helpful in scheduling joint knowledge creation and coordinating related tasks and activities. In addition, the milestones were considered very motivating:

Presenting trial results in international forums, as well as in internal forums, has been motivating and has directed the progress of development. (Rs7)

Overall, milestones were considered an effective way of organizing.

In the spirit of agile and start-up behavior, the trial presentations [demonstrations] played an important role in the joint achievement of the WGs. (Rs10)

Creating knowledge (C): The various joint meetings were interaction spaces for idea generation and knowledge creation. Various theme-specific workshops or whole-day seminars were organized to gather all participants (including invited ones) around specific themes, such as exploring 'how the business scenarios, mobile operators and their business models or ecosystems will change in the future' (Rs1). Idea generation often took place outside organized events while also occurring continuously in the WGs. Moreover, knowledge creation took place in many of the informal and externally organized meetings and events. It occurred spontaneously based on emerging demands, in interpersonal collaborations, in building a shared understanding between knowledge domains and in solving specific problems that demanded the synchronous involvement of multiple experts for the problem at hand. Knowledge creation occurred across knowledge boundaries when individuals from diverse knowledge domains transferred and translated knowledge to build a shared understanding.

Actors wanted to do their best, and the intense engagement to achieve shared goals accelerated joint knowledge creation and left room for

tacit knowledge to emerge. The openness of solutions to problems versus predetermined solutions, diversity in perspectives and knowledge domains, and a culture of questioning were important for joint knowledge creation.

The field tests—that is, the implementation of the plans—were undertaken by the theme-specific expert members or small groups of them who took responsibility for seeking solutions to problems and conducting field tests and experiments.

Sharing knowledge (D): Knowledge sharing for professional audiences occurred through trial demonstrations (also used as a milestone). In these demonstrations, the work-in-progress innovation was presented to external and international professional audiences in conferences and workshops. The rationale for external knowledge sharing was to make the advancement of innovation visible to peers, pave the way for change and collect feedback.

Every quarter, we presented our results, for example, at the most important scientific conferences in the field. (Rc2)

Within-project knowledge sharing—that is, between project groups and actors—is concerned with sharing and communicating the advancement of innovation and related results for the steering group. Theme-specific workshops were organized for all project actors, including invited ones, to leverage knowledge, for example, after the field tests. Some members produced written documents to influence the work of other groups. Finally, much of the knowledge sharing among members took place informally while they interacted by sharing and creating knowledge in the WG meetings and mutual conversations, meaning that knowledge sharing was inseparable from the joint activities and occurred during any phase of the cycle.

We discuss, work together and simultaneously share and create knowledge. (Rs8)

Experts also shared and communicated knowledge in joint meetings to clarify the current understanding.

Some of the key experts (domain specific) presented and communicated the results in WG meetings to start planning the next round. (Rs7)

Knowledge was likewise shared in response to specific requests.

Searching feedback (E): Feedback played an important role in achieving joint knowledge creation and directing the development of technology. It was consciously and regularly collected from professional conference audiences in each demonstration.

We used feedback from a variety of respondents [audience] of the trial demonstrations: academics, customers, operators, regulation authorities, etc. (Rs5)

Once received, feedback was interpreted, communicated and shared among the WGs (either informally or through documents). Feedback was also utilized in setting future goals for the next cycle. The WG members considered obtaining feedback to improve their motivation.

Feedback has been valuable both in directing future development and [serving as a] motivating factor. (Rs6)

4.2. Self-organizing working groups

The three theme-specific (technology, business and regulation), diverse (Table 1; Fig. 2) and geographically dispersed WGs were the primary sources of and responsible for the joint knowledge creation and the advancement of innovation.

The WGs operated autonomously under the absence of centralized control mechanisms, meaning that they independently organized their functions, goals and ways of achieving their goals, including their interactions and collaborations with other groups and actors (F).

There were no rules or guidelines on how to proceed. There was just a common way to act. (Rs1)

The respondents considered WG-based organizing central for the project results.

The WG-based function has been successful—we couldn't gain results without it. (Rc1)

The composition (members) of the WGs (G) were jointly negotiated and assigned to ensure that each of the WGs consisted of representatives from different organizations.

The WGs were formed in such a way that they had the broadest possible expertise from as many fields as possible. We aim to have one representative from each organization in each WG; that is, we decentralized the representatives of the organizations into different WGs. Thus, we got the most diverse WGs possible. (Rs8)

Some members belonged to two or three WGs or to one WG and the steering group (Table 1), so there was some overlap in groups. Likewise, the WG leaders were assigned to represent different research institutes (subprojects).

4.3. Dynamic participation

The participation in knowledge creation activities was dynamic, as it changed and was negotiated according to the demands and along the iterative process (Tables 2 and 3).

First, while the members of the three WGs were obliged to participate in joint meetings during the iterative process, active participation in the joint process and advancement of innovation was continually discussed and enacted in joint meetings to respond to situational demands of expertise (Table 3.3). Thus, not all participants were active all the time. Active participation was dependent on the problem and expertise at hand, which typically required a situation-specific composition of expertise. For example, the theme-specific expert members or temporary small groups took responsibility for the field tests and experiments. As the active WG in charge of joint achievement (trial) changed according to the field and expertise required, the participation of the WG leaders varied accordingly. Likewise, participation in international demonstrations (conferences) was based on expertise and was jointly negotiated among the members involved in the discovery to be demonstrated.

In addition to expertise-based participation, voluntary participation was highly emphasized in the sense that anyone who was committed to contributing to the joint achievement could participate.

Those who wish to contribute to this activity are welcome to participate. (Rs10)

Some active individuals voluntarily participated in organizing activities as required while also contributing to joint knowledge creation. Some members were involved in a variety of tasks or groups, thus constituting cross-group participation. Project members also invited representatives of the companies and other external actors to participate in joint meetings and specific theme-based workshops (invited participation).

Second, there were shifts in participation and spaces of participation during the iterative process (Table 2). Building common understanding and setting joint goals involved all WG members and, often, some steering group members as well. Knowledge creation (development of new knowledge) mostly took place in regular WG meetings and also in smaller theme- or expertise-specific groups. For example, field tests to advance technology were conducted by such expert groups. Once the results were available, they were shared with all the project actors (internal knowledge sharing). Participation in the within-project knowledge-sharing events was broad, as it concerned not only the members of the WGs and the steering group but also company actors who were not involved in the project but interested in it. The representatives of the invited company actors participated through their interest in knowledge-sharing events or theme-specific workshops for all project actors.

The external knowledge sharing took place in international conferences and workshops in which the expertise-specific group of members demonstrated the work-in-progress. The purpose of these demonstrations was to involve external actors in listening to the results. These events were important sources of feedback from the diverse actors of the innovation environment, such as academics, customers, operators and technologists. The received feedback was valuable and collectively

Table 3
1: Codes and illustrations regarding the joint process cycle 2: Codes and illustrations regarding self-organizing WGs 3: Codes and illustrations regarding dynamic participation.

Aggregate and 2nd-order theme	*1st-order concept*	*Quote*
Iterative process		
A. Building common understanding		
1. Collective interpretation of the current situation	1.1 Collective interpretation of the results from the previous trial (cycle)	'After the previous trial, we sat down to discuss with the researcher, make the follow up and review the roadmap (tentative plan). We evaluated the relevance, timing and content of the trial and compared them with the tentative plan'.
	1.2 Collective discourse about the current situation	'After a collective conversation, we started to think about the content of the next trial, namely, which issues are included and which are slated for the future. We also discussed where (conference) the next demo presentation could be'. 'In cases when the "idea" was not yet ready to be tested, we collectively accepted it and moved it to the next trial. However, we also hoped that we would get a piece of it and could participate in its testing'.
	1.3 Update of the current situation before the next plan	'Trial (demo) is a continuous developing demonstration for technology [new knowledge]'. 'We do not start from the very beginning to plan the future; instead, we have all the existing knowledge and the current state available'.
	1.4 Developing new knowledge by building on existing ones	'We consciously aim to create something new by building on an existing or already discovered knowledge'. 'Each trial is a new and improved version of the previous one'.
2. Identifying the need for new knowledge development (problem identification)	2.1 Bringing needs into discussion and looking at the tentative plan (roadmap)	'The specified needs (what needs to be discovered) presented by the actors direct the trial (cycle) planning. 'After each trial, we sat down and compared the results with the roadmap and then started to plan the next trial (demo)'.
	2.2 Communicating diverse needs	'The need for new knowledge (progress in technology) is communicated and collectively determined in the WG meetings or other conversations'. 'WG members bring needs or demands for new knowledge (e.g. technology) into the conversation, which, in turn, direct the goal setting'.
	2.3 Considering emerging needs	'The need appears, for example, from the specific technology feature we need to test….'
3. Identifying/ confirming novelty and usefulness from the perspective of technology and business	3.1 Considering the development of novelty from both technology and business perspectives	'… Then the choice that we do something that is novel in technology from a research point of view and also serves well these [involved] companies.
B. Setting joint goals		
4. Setting goals and making a joint agreement about them	4.1 Joint goal setting in WG meetings	'The goals are generated in the WG meetings'. 'The WGs are the ones who jointly define the common goals'. 'While starting to plan the demo, we set goals and agree on them'.
	4.2 The need to advance technology directs goal setting (roadmap)	'Once we have compared the results of the previous trial (demo) with the roadmap, we start planning the next one and where to present it'.
5. Setting milestones	5.1 Setting and utilizing within-project milestones	'We collectively explore and make decisions about the forum and date of the next presentation (demo)'. '… We have a certain day when we have to be ready and have a plan for the issue under testing….' 'Presenting trial results [demo] in both international and internal forums has been motivational and has directed the progress of development'.
	5.2 Setting and utilizing external milestones (demonstrations in conferences)	'The external deadlines were very effective in organizing the development of technology in small steps'. 'The conference demonstrations and presentations scheduled the development of trials'.
C. Creating knowledge		
6. Idea generation	6.1 Idea generation outside organized meetings and events	'… Brainstorming [idea generation] does not occur during the meetings but when these people see each other. Even in the context of another meeting or in between meetings, ideas are thrown, but less often, it is forced'.
	6.2 Idea generation while interacting	'With regard to ideation and flow, I would say that those joint meetings have been successful in the sense that a lot of new ideas have come into being there'. '… In the WGs, there is an ongoing brainstorming'.
7. Engaging in joint knowledge creation	7.1 Intense engagement for the shared goals	'It is so that together we do. Everyone definitely wants the next demo to succeed'. 'When the event [demo] itself approaches, then the spirit of togetherness intensifies'.
	7.2 Commitment of actors in exerting their best efforts	'All involved actors always try to come up with the best knowledge available from their own organization'.
	7.3 Collaborating for knowledge creation as needed	'… There is a very good and spontaneous collaboration in this project. When there is a question, you just call or email the actor in charge'. '… These complex systems require collaborative work, which can take place even remotely'. 'We start by email or phone call, asking whether it could be done like this, as we have thought, and whether we have understood

(*continued on next page*)

Table 3 (*continued*)

		it correctly. It progresses in such a way that if the trial measurements are needed, we then catch the "ball"'.
	7.4. Openness to knowledge creation	'It [knowledge creation] has been really open. When no one knows the answers, we start exploring with the logic of action research'. '… It [knowledge creation] starts from a WG meeting (and related theme), in which we discuss, collaborate and create knowledge and simultaneously share knowledge'.
8. Integrating and synthesizing knowledge from diverse perspectives, expertise and domains	8.1. Acknowledging the diversity of perspectives	'Because our business WG is made up of people from different fields, we feed each other with our ideas. In that sense, the atmosphere there is good; the way we work is inspiring'. 'The workshops were very diverse and resulted in a lot of perspectives. The WGs had the most diverse occupation as well'. 'When there are people from different backgrounds, the co-creation is more fruitful and brings different aspects to it'.
	8.2 Considering diversity in knowledge domains	'… My job is to bring a clear, critical and perhaps out-of-the-mainstream perspective to the development of this technology. That is why I belong to the business WG'. 'My role is to cover the conditions under which this [progress of technology] makes commercial sense, and what kind of business models would be appropriate'.
	8.3 Actors converting and communicating knowledge across boundaries	'The people who were members in several WGs brought external perspectives, and perhaps the perspectives of customers and also views about what is going on elsewhere. This extended the vantage point of the technologists and helped them in planning the trials'. 'People with technology and business education were able to understand the language of both fields and helped in contributing to them'. 'When we get feedback about a certain issue, we need to integrate diverse perspectives and expertise to integrate it into the next trial version'.
9. Conducting a field test to check the progress of technology	9.1 Advancing technology by producing working and tested technologies	'Core is a good example of a trial project with tangible and visible, live demonstrations'.
	9.2 Conducting field tests (probing)	'In the field tests, the aim was to provide assurance on the radio behavior and its timing'. 'In practice, the process was even more iterative and involved various subtests to figure out what works and what does not'. 'The goal of each trial was to test the plans and produce working technology'.
D. Sharing knowledge		
10. Sharing knowledge for professional audiences (external knowledge sharing)	10.1 Making the progress of innovation (work-in-progress) visible to professional and interdisciplinary audiences and eliciting feedback	'… Every quarter, we showed our results, for example, in the most important scientific conferences in the field'. '… There were academics, technology experts, as well as customers and operators, in the conference audience listening to the presentation'. 'We presented demos (work-in-progress results) regularly in international forums'.
11. Sharing knowledge within the project team (internal knowledge sharing)	11.1 Sharing results (from field tests) with WG members	'Some of the key experts (domain specific) presented and communicated the results in the WG meetings…' 'The results were presented, for example, in an hour-long workshop to introduce them to others. The presenters varied based on the theme/field. Thereafter, we discussed a new topic'.
	11.2 Sharing written documents to influence the work of other groups	'We also make conscious contributions by sharing documents to influence things or contribute to the other WGs'.
	11.3 Communicating results in steering groups and workshops (invited actors)	'We shared the results with the steering group and all interested project actors'.
	11.4 Sharing (documented) knowledge through group-specific email lists	'We had traditional mailing lists through which we distributed memos and documents. We shared all the documents extensively and openly'.
12. Sharing and creating knowledge in interactions among people	12.1 Sharing and creating knowledge in interactions among WG members	'We discuss, work together and simultaneously share and create knowledge'. '… There is also interpersonal communication between members who are active in specific themes or issues, like in implementation, in which they mutually communicate and share knowledge'.
	12.2 Sharing knowledge to respond to related inquiries within the project	'… These actors contact each other and ask for knowledge or assistance'.
E. Searching feedback		
13. Collecting feedback	13.1 Collecting feedback from the audience (customers, operators, academics) during presentations (demo)	'We presented our demo in the conferences to elicit feedback from various external actors'.
	13.2 Applying the feedback for further development	'We build the next demo based on the received feedback. It has been valuable for directing future planning. For example, when someone from the European Commission suggested that to better influence our regulation, you could test these kinds of issues….'
SELF-ORGANIZING WORKING GROUPS		
Aggregate and 2nd-order theme	*1st-order concept*	*Quote*
F. WG Autonomy		

(*continued on next page*)

Table 3 (*continued*)

14. Absence of formal control mechanisms	14. 1 Lack of control mechanisms	'WGs have the autonomy to plan their work. There is no centralized control'. 'For that [coordination], there are "official" mechanisms'.
15. Absence of hierarchy	15.1 No hierarchical relationships	'There were no hierarchical (supervisor–employee) relationships in WG'.
16. Autonomy in functions	16.1 Autonomy to set goals and plan ways to achieve the goals	'WGs direct their functions themselves'. 'WGs have the freedom to function independently, and they keep the steering group informed about their progress (every three to four months)'. 'WGs are like self-organizing and self-directing groups with clearly stated common goals'.
B. WG organization		
17. WG Composition	17.1 Negotiated (assigned) members in WG	'At the beginning of the project, we discussed and negotiated the compositions of the three WGs, for example, how diverse research personnel are located in the WGs'.
	17.2 Cross-group membership: members in two or more WG	'There are some people who participate in at least two WGs'.
	17.3 Temporary membership (invited actors)	'We invited company members and interested external members to participate'.
	17.4 WG leaders	'The leader of the responsible WG at hand is in charge of the WG coordination; he/she convenes, hosts and facilitates in often very informal meetings'. 'The responsible leader of the WG convenes the meeting and acts as a master or facilitator in such an informal meeting'. 'One WG with a related WG leader is responsible for the trial turn by turn depending on the field of expertise required. The other WGs provide support and participate'.
	17.5 Volunteer leaders	'… Coordination relies on the participants' activities and interests. There are no formal mechanisms for that. For example, some people and I have been in the role of coordinator while participating in WG work'.
18. WG Responsibilities	18.1 Organizing interaction and collaboration (joint) events	'WGs organize their work independently according to their demands by arranging workshops or meetings around themes or other important issues, either for the project (joint WG workshops) or WG, or specific small group meetings'. 'For our part, the workshop was run in such a way that we first did some preparatory work and introduced the theme. Thereafter, we decided and set the theme of the next workshop'.
DYNAMIC PARTICIPATION		
	1st-order concept	*Quote*
Aggregate and 2nd-order theme		
H. Participation shifts along the iterative process		
19. Expertise-based participation	Contribution by expertise	'Our contribution to this project has been in the practical implementation of technology, that is, the design and implementation of methods and technologies'. '… My job is to bring a clear, critical and perhaps "out-of-the-mainstream" perspective to the development of this technology. That is why I belong to the business WG'.
20. Voluntary participation	Interest-based participation	'Those who wish to contribute to this activity are welcome to participate'. 'Participation in WGs was open to all those interested'.
	Cross-group participation	'The steering group members also participated in WGs'.
	Invited participation	'Participation was open for those who want to contribute; external parties and company members were also invited to participate'.
21. Situation-specific participation	Negotiated participation	'… We may establish case-specific small problem-solving teams'. 'The identified needs (what needs to be discovered) direct the trial planning and related participation'.

interpreted and utilized in building common understanding (next cycle).

To conclude, the participation in the joint efforts of knowledge creation and innovation process was dynamic, which means that it varied according to demands along the iterative process, and there were several shifts in participation along each cycle (trial). Such participation acknowledges diverse, even contradictory, perspectives and knowledge contributions of all members and fosters the building of synthesis among them to achieve new knowledge.

5. Discussion

This study investigated a specific type of strategic project, namely, the strategic interorganizational innovation project, to contribute to research on managing strategic projects between organizations and build linkage between knowledge management and project management literature. Drawing from the literature on knowledge creation and integration (Bhatt, 2000; Gray, 1989; Harvey, 2014; Nonaka & Toyama, 2003), this study focuses on knowledge creation as a core of organizing in an interorganizational innovation project. Specifically, this study advances understanding on managing strategic projects by identifying organizing patterns through which interdependent project actors arrange and enact both knowledge creation and activities of organizing to advance joint innovation. Our results show that organizing that is composed of an iterative process, self-organizing WGs and dynamic participation enables project actors to address the challenges of knowledge integration (Dougherty & Dunne, 2011; Klessova et al., 2020) and complexity innovation and project environment (Artto et al., 2008) in managing strategic interorganizational projects, as discussed in the following.

First, the research provided evidence that the iterative process, in which each cycle builds on the previous one, serves the organizing demands of the innovation project in which situation-specific knowledge creation among diverse actors is at the core. We identified such a

recurring process to include practices facilitating knowledge flows (building common understanding, knowledge creation, sharing and eliciting feedback) and fostering activity organizing (joint goal setting). While earlier research on interorganizational projects have acknowledged the interplay between knowledge integration and activity organizing (Klessova et al., 2020), they focused on it through lenses of structuring (Klessova et al., 2020; Rauniar et al., 2019). By contrast, this study shed light on the jointly enacted practices through which interdependent actors arranged their interaction for knowledge creation and progress of innovation. Earlier research have introduced an iterative service innovation model (Sjödin et al., 2020) and iterative processes in large construction projects (de Blois et al., 2016), whereas this research provides insights into the application of the iterative process in strategic interorganizational innovation projects. In this context, this study sheds light on managing strategic projects, which inherently requires the engagement of diverse actors to interact and share their perspectives and knowledge to create new knowledge and advance innovation.

The identified iterative process is valuable in interorganizational projects that put together diverse actors lacking a common history for joint innovation for the following reasons. It enables collective knowledge creation (Gray, 1989; Harvey, 2014;Vera & Crossan, 2005) and engages project actors to build and enact interactions and practices for emerging and situation-specific demands (Ben-Menahem et al., 2016; Faraj & Xiao, 2006; Kellogg et al., 2006). Indeed, it engages the participating actors from the very beginning of the project to interpret the situation, establish a common understanding and set goals by acknowledging diverse perspectives and contributions. When actors have an opportunity to contribute to the determination of the situation at hand, they likely engage in such joint activities (Thomas & Velthouse, 1990), which is also acknowledged by research on participatory innovation (Buur & Matthews, 2008). Furthermore, the jointly generated and enacted practices foster the mobilization and utilization of the knowledge pooled in the project. In addition, the iterative process allows rich adaptiveness to the project environment and constant interplay between demands in the fields of technology, business and regulation, both of which are mechanisms that pave the way for change and serve strategic projects goals.

Second, the research shows that the designed self-organizing WGs collectively bear responsibility for the organization of the iterative process for knowledge creation, which refers to informal organizing practices often associated with knowledge processes. In prior research, communities of practice (Lave & Wenger, 1991) and knowledge collectives (Lindkvist, 2005) represent informal organizing. Likewise, in project management literature, self-organizing networks (Pryke et al., 2018) represent informal organizing. The research also shows that the design of the WG composition can act as a facilitator for joint activities. We found that the decentralization of the representatives of the project organizations into three WGs to gain as much diverse expertise and representativeness of the involved actors as possible was a practice to break the likely sub-project silos. It fostered building novel connections between actors and increased the awareness of the actors about knowledge of other actors, as well as ongoing issues in each group. This kind of group design refers to the three characteristics of modern teams: fluid, overlapping and dispersed (Mortensen & Haas, 2018). In addition, the blurring WG boundaries fostered flexibility in participation. For example, anyone (including invited external actors) had the opportunity to voluntarily participate and contribute to ongoing knowledge creation. This refers to dynamic organizing (Mortensen & Haas, 2018) rather than structural membership.

Third and finally, the research provides evidence and support to earlier findings concerning the duality between formal and flexible organizing (Candi et al., 2013) or their coexistence (Nilsen, 2013). We found that a carefully designed project structure can provide freedom and flexibility in organizing knowledge creation in the ways that it requires. This is especially important in strategic interorganizational projects pursuing interdependent goals. Whereas the formal organization is responsible for the administrative aspects of the project, it can take a strategic choice to emphasize and foster dynamic organizing for knowledge creation and innovation. This coexistence that enables interaction between formal and informal organizing (Nilsen, 2013) is central for managing strategic projects and using projects as a vehicle of change (Huemann, 2022) in highly knowledge-intensive interorganizational configurations.

There are inevitably limitations in our study. First, our analysis was based on a single and theoretically interesting case that purposefully aimed to apply novel and iterative ways of organizing and producing disruptive innovations in an interorganizational innovation project among diverse actors. Another limitation is that our study focused on a narrow area of organizing. Specifically, our study focused on organizing for knowledge creation and related participation and excluded other aspects of the organizing, such as the role of documented knowledge. This limitation is a conscious choice of focus made by the researchers.

6. Conclusion

6.1. Contributions

This study aims to advance understanding of managing strategic projects by shedding light on organizing for knowledge creation in an interorganizational innovation project. Through an empirical qualitative analysis of an interorganizational innovation project that developed and applied novel ways of organizing strategic collaboration, this study advances understanding on projects in which knowledge creation is at the core. By bridging research streams of knowledge management and project management, this study focuses on knowledge creation as a core of organizing and targets organizing practices through which the actors enact and arrange joint knowledge creation and progress of innovation. The findings show that the identified iterative process, self-organizing WGs and dynamic participation are practices that foster joint knowledge creation and advancement of innovation in the strategic project taking place between organizations.

The study provides theoretical and managerial contributions to managing strategic projects between organizations. As a theoretical contribution, this study sheds light on organizing practices that consider both knowledge creation and activity organizing, as well as engage all the critical actors to explore and contribute to situation-specific demands of innovation. The identified practices enable project actors to address challenges on the mobilization of a project's knowledge base (e.g. Dougherty & Dunne, 2011; Klessova et al., 2020), adaptiveness to the environment (e.g. Chesbrough, 2008; Maynard et al., 2015) and the complexities of the project environment (Artto et al., 2011). While earlier research on PM focused on knowledge sharing (Mahura & Birollo, 2021; Stock et al., 2021), knowledge sourcing (Khedhaouria et al., 2017) and knowledge integration (Klessova et al., 2020; Rauniar et al., 2019), this study advances understanding on organizing for knowledge creation in a strategic innovation project. This study also contributes to the research field on the coexistence of formal project structure and informal organizing practices (Candi et al., 2013; Nilsen, 2013).

As a managerial contribution, this study offers a model of organizing which managers, as well as other actors, such as facilitators of temporary projects, can employ to foster knowledge creation, participation and engagement of diverse actors in joint achievements. These practices are applicable in various knowledge collaborations and collectives. This study provides an example of flexible organizing that serves as a process model for those who wish to deviate from the conventional management of innovation and for those who build innovation collaborations that are highly dynamic, complex and involve dispersed actors for joint achievement.

6.2. Future research directions

While aiming to provide a deeper understanding of the organizing

practices for knowledge creation in interorganizational projects, in future studies, scholars could consider ethnographic and, when possible, real-time research design and related data collection. Such research would shed light on organizing as an emergent and subjective phenomenon and pave the way for the emergence of a systemic view on organizing. On the other hand, as project objectives determine the level of management and organizing, it would be important for future studies to investigate different cases in a variety of contexts from the perspective of organizing for knowledge creation to build more coherent theorizing. This is specifically important as organizing should fit with the project objectives, which means that the contextual differences may lead to different choices in terms of managing strategic projects. Furthermore, an interesting research direction is to conduct an in-depth investigation of human interaction and joint knowledge creation in temporary interorganizational projects. For example, it should be established when diversity is beneficial and when it is harmful for knowledge creation in interorganizational projects and how the actors can manage it in self-organizing teams.

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