Stakeholder influence on teaming and absorptive capacity in innovation networks

Hoosbeek, Arnold; de Vries, Jan

Published in:
Creativity and Innovation Management

DOI:
10.1111/caim.12448

Received: 6 February 2020 | Revised: 19 April 2021 | Accepted: 10 May 2021
DOI: 10.1111/caim.12448

SPECIAL ISSUE ARTICLE

WILEY

Stakeholder influence on teaming and absorptive capacity in innovation networks

Arnold Hoosbeek[1] | Jan de Vries[2]

[1]TmapConsult BV, Rhee, The Netherlands
[2]Operations, University of Groningen, Groningen, The Netherlands

Correspondence
Arnold Hoosbeek, Tmapconsult BV, Rhee, The Netherlands.
Email: arnold@tmapconsult.nl

Through technological developments, innovation increasingly occurs within a network of organizations such as Industry 4.0 fieldlabs. As a result, collaboration between different companies and institutions with different interests needs to take place. Three Dutch smart industry fieldlabs were analysed to study how these collaborative relationships are being established and what their impact is on the absorptive capacity of the network in question. Contrary to what was expected, we found that stakeholders hardly exercised power. Also, a high level of psychological safety was found in the network, which positively affects collaboration. Furthermore, collaborative elements—such as open conversation, collaborating, experimenting and reflecting—are important factors affecting the absorptive capacity in the fieldlabs examined. The article concludes with several practical implications on how to stimulate innovation capability.

KEYWORDS
absorptive capacity, industry 4.0, innovation network, psychological safety, public private partnerships, teaming

1 | INTRODUCTION

The industrial landscape has changed considerably in recent years. Rapid technological developments, intensifying globalization and changing customer needs have increasingly influenced the industrial sector as a whole as well as individual organizations. Various studies show that in this rapidly changing context, innovation processes are essential to achieving sustainable competition (Dodgson et al., 2008). Influenced by growing technological complexity, specialization and learning processes (Edmondson & Nembhard, 2009), these innovation processes increasingly take place within networks of organizations (Coletti & Landoni, 2018; Edmondson & Harvey, 2016; Majchrzak et al., 2012; Oerlemans, 2007).

The developments addressed above can also be found in the Dutch context. The implementation of Industry 4.0, which began in 2013, is of great importance to the Dutch industry and economy and includes, among other things, the smart industry initiative. Within the smart industry concept, fieldlabs are an example of innovation networks in which several companies and institutions (universities, research organizations and government) work together to develop innovations (Berentsen et al., 2014; Huizinga et al., 2014). Large companies, SMEs, knowledge institutions and research technology organizations (RTO) are examples of organizations that are active in these networks to explore innovations. In recent years, several Dutch fieldlabs have actively focussed on a wide variety of topics (Huizinga et al., 2018), ranging from the deployment of R&D activities to scaling up prototypes for mass production (Stolwijk & Seiffert, 2016).

Studies in the field of innovation indicate that working together effectively in an innovation network can be extremely complex. Differences in organizational structure, culture, and business objectives often complicate coordination and communication between the different parties involved (Edmondson & Nembhard, 2009; Lin & Chen, 2006). Therefore, many studies in the field of innovation management pay extensive attention to coordination and communication mechanisms within innovation networks and to factors that influence effective and efficient coordination and communication (Gargiulo & Sosa, 2016; Tuncdogan et al., 2017).

Edmondson (2012) introduced the concept of 'teaming' as a framework for organizational learning in those situations that lack the advantage of stable teams, such as smart industry fieldlabs. She describes teaming as follows:

> Teaming is a verb. It is a dynamic activity, not a bounded, static entity. It is largely determined by the mindset and practices of teamwork, not by the design and structures of effective teams. Teaming is teamwork on the fly. It involves coordinating and collaborating without the benefit of stable team structures. (p. 13)

Edmondson (2012) claims that 'teaming is the foundation for learning' (p. 31) and is critical in situations such as integrating perspectives from different disciplines, processing complex information and frequently shifting focus. According to Edmondson (2012), speaking up, collaboration, experimentation and reflection are important attributes of teaming.

Several studies suggest that the innovative capacity of an innovation network is heavily affected by its absorptive capacity, which is generally described (Zahra & George, 2002) as the network's ability to acquire, assimilate, transform, and exploit knowledge (Forés & Camisón, 2011; Kostopoulos et al., 2011; Liao et al., 2007; Najafi-Tavani et al., 2018; Zapata-Cantu et al., 2020). Clearly, many different factors have an impact on this absorptive capacity, including inter-organizational factors (e.g., knowledge development and exchange), intra-organizational factors (e.g., structure and communication), administrative factors (e.g., management and competition skills), and the existing knowledge in the network (Volberda et al., 2010).

Despite an impressive number of studies in the field of innovation management, only a few studies (Edmondson & Harvey, 2016; Majchrzak et al., 2012) have addressed how teaming behaviour might affect knowledge integration in innovation networks. Edmondson and Harvey (2016) developed a model describing the complexity of cross-boundary teaming and focussed mainly on the process of how a group of individuals develops into a team. Majchrzak et al. (2012) examined how knowledge is integrated within cross-functional teams and identified five, mainly dialogue practices to co-create a solution. As mentioned before Edmondson (2012), claims that teaming stimulates learning and innovation. In her work around this concept, she focusses highly on psychological safety and leadership; however, the underlying mechanisms how learning and innovation are influenced, are not fully explained. Also, many studies have been done in health care (Edmondson et al., 2016; Nembhard & Edmondson, 2006) and therefore in a different business environment.

It is for this reason that we initiated an empirical study to explore teaming behaviour in innovation networks in more depth. The idea behind this study is that teaming and its underlying interpersonal behaviours, for example, speaking up, collaboration, experimentation and reflection, support learning (Edmondson, 2012). Teaming creates knowledge sharing and team learning, which enhance absorptive capacity (Liao et al., 2007; Sun & Anderson, 2010). The question, however, is how these collaborative relationships are being established and what their impact is on the absorptive capacity of the network in question. In focusing on this central research question, this study is one of the first steps towards gaining a better understanding of teaming behaviour within innovation networks, of the way in which it affects the absorptive capacity and, through that, of the innovative capability of networks.

In the following section, first, the results of a literature study on stakeholders, teaming, absorptive capacity, and innovation networks are presented, after which the methodological approach of the empirical part of our study is described in Section 3. This article draws heavily on three case studies. Three Dutch smart industry fieldlabs were analyzed in depth in order to study how teaming relationships were established and what the impact of these relationships on the absorptive capacity of the network in question was. Section 4 summarizes the results and context of these case studies. Based on an analysis of how teaming behaviour influences the innovation capability of the networks (Section 5), the main research findings will be presented in Section 6. In addition to theoretical conclusions, Section 6 also describes some practical lessons that can be deduced from the study, as well as some suggestions for further research. In doing so, we view the contribution of our study from two perspectives. First, this article aims to advocate the role of teaming behaviour during innovation processes in innovation networks. Notably, this role has not been fully explored, and hardly any articles in the area of innovation management have explicitly addressed this issue. Additionally, some tentative conclusions are drawn on how teaming behaviour might influence the absorptive capacity of innovation networks. In this way, a contribution is made to identifying more profoundly various issues regarding enablers and barriers to innovation within networks.

2 | THEORETICAL AND EMPIRICAL BACKGROUND

The industrial landscape has changed considerably in recent years. Technology, globalization, and changing customer needs have had a significant impact on industry. Moreover, technological developments such as robotics, sensor technology, the internet of things, 3D printing, cyber-physical systems, smart grid technologies, big data, and cloud computing offer great opportunities for developing new products and for a more efficient and effective production process (Huizinga et al., 2014). Clearly, globalization offers several opportunities, such as access to global markets and knowledge, but results in greater competition as well. Another factor which strongly affects industry nowadays consists of changing customer needs. Customers are increasingly willing to pay for innovative, high-quality products and services. Additionally, an increasing need for customization has emerged, resulting in mass manufacturing giving way to flexible production methods (Henning et al., 2013). These developments, often referred to as the Fourth Industrial Revolution, confront industry with a significant challenge to remain globally competitive on price and quality (Huizinga et al., 2014). To respond to this challenge, the Netherlands initiated the smart industry initiative. An important element of this smart industry initiative is the connection of companies, suppliers, systems and customers through networks, which intensifies more vertical integration (Henning et al., 2013; Huizinga et al., 2014).

2.1 | Fieldlabs and stakeholders

One of the initiatives of the smart industry concept is the development of fieldlabs. Within the smart industry initiative, fieldlabs are described as follows: 'practical environments in which companies and knowledge institutions develop, test and implement smart industry solutions' (Stolwijk & Seiffert, 2016). Fieldlabs are not physical labs but organizational networks with a specific innovative activity focus, in which various companies and institutions work together to accomplish an innovation project (Conway & Steward, 2009). Public private partnerships (PPP) have seen a range of definitions (Hodge & Greve, 2017). van Ham and Koppenjan (2001) saw it as the cooperation between public-private actors in which they jointly develop products and services and share risks, costs and resources. In this sense, fieldlabs can also be viewed as public private partnerships.

Within a smart industry fieldlab, several stakeholders with often diverse interests collaborate. Stakeholders can be identified and classified in many different ways, and there are many different types of stakeholders (Mitchell et al., 1997). In this study, we apply Freeman's classical definition of stakeholders (Freeman, 2010, p. 53): 'A stakeholder is any individual, group, organization or institution who can affect or is affected by the achievement of an organisations purpose'. We took the smart industry fieldlab as the level of analysis, and stakeholders are defined as the external stakeholders in the parent organizations (see Figure 1). Research shows that the implementation of strategic projects improves when stakeholders mutually agree on the vision, strategy, and values of an organization or fieldlab (O'Reilly et al., 2010). However, stakeholder cohesion may also lead to inertia and resistance to change (Minoja et al., 2010). Depending on stakeholder interest and cohesion, stakeholders may employ different strategies to influence the project team to safeguard their interests. Research performed in the area of construction projects addresses several strategies to increase salience of projects (Nguyen et al., 2019). Aaltonen et al. (2008) found eight strategies: resource building, direct and indirect withholding, conflict escalation, credibility, coalition-building, direct action and communication. Clearly, some of these stakeholder salience-shaping strategies (Aaltonen et al., 2008)—such as direct and indirect withholding and coalition-building—can exert direct pressure on the project and possibly also on the project team (Nguyen et al., 2019).

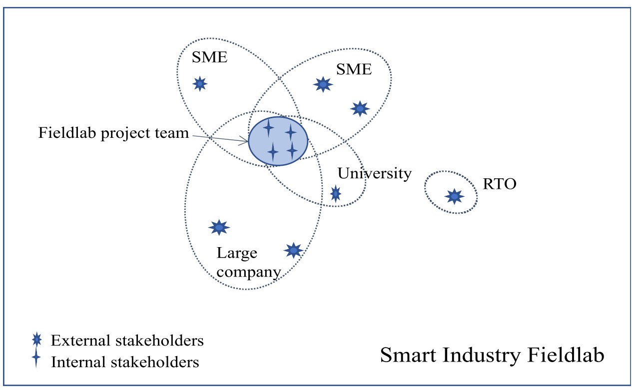

FIGURE 1 The composition of a typical smart industry fieldlab [Colour figure can be viewed at wileyonlinelibrary.com]

2.2 | Psychological safety and teaming

Collaboration in innovation networks entails not only technical but interpersonal challenges as well. Teams often work together for a relatively short period, which means that there is little time to build trust and assess individual competencies (Edmondson & Nembhard, 2009). Stimulating collaboration and developing psychological safety are generally regarded as important success factors in achieving productive collaboration (Edmondson, 2012). In addition to Edmondson and Nembhard (2009), several studies indicate that joint knowledge creation in innovation teams is enhanced by cognitive and motivating factors, including group efficacy, social cohesion, learning climate, cognitive distance, and power distribution (Du Chatenier et al., 2009). Edmondson defines psychological safety as a 'taken-for-granted belief about how others will respond when you ask a question, seek feedback, admit a mistake, or propose a possibly wacky idea' (Edmondson, 2012, p. 119). While collaborating in an innovation project, project members may take risks by proposing new ideas, which when implemented could lead to organizational failure. Developing and implementing new ideas can therefore be risky for project members (Javed et al., 2017). A psychologically safe environment encourages employees to voice their opinion (Morrison, 2011) and suggest new ideas (Javed et al., 2017). Edmondson (2012) argues that a psychologically safe environment affects knowledge development and innovation performance by stimulating people to speak up, collaborate, experiment and reflect. Edmondson introduces the concept of 'teaming' in an effort to model collaboration and learning in a multidisciplinary innovation environment.

Collaboration is important in developing new products (Adnan et al., 2017). In order to develop and commercialize new products, collaboration in a network of companies and institutions is important for gaining access to marketing expertise, production facilities, operational knowledge and funds (Adnan et al., 2017). Working together also has its challenges. Due to the different motivations that companies, institutions and people have, harmonizing goals is not always easy (Ren et al., 2008).

Learning and executing at the same time is central to the concept of teaming. In these learning processes, experimentation and reflection play an important role (Edmondson, 2012). Team learning requires interactive cycles of communication, decision, action and reflection (Edmondson, 2012). Reflection can take place on data from experiments, decisions, plans and process changes. It is most effective when it occurs at all stages of the collaborative process: before, during and after experiments or activities (Edmondson et al., 2001). Group reflection differs from individual reflection as it takes place in consultation, either formally or informally. Reflective teams regularly wonder, 'What have we learned?' (Edmondson et al., 2001).

2.3 | Absorptive capacity and the relationship with teaming

Cohen and Levinthal (1990) originally introduced the concept of absorptive capacity in 1990. They argued that the absorptive capacity of an organization depends on the absorptive capacity of the individuals working in that organization. It is generally assumed that absorptive capacity increases the speed, size and frequency of innovations, which also has an effect on absorptive capacity itself (Van den Bosch et al., 1999). In our research, the study of Zahra and George (2002) is used as a starting point. They defined absorptive capacity as 'a set of organisational routines and strategic processes by which firms acquire, assimilate, transform, and exploit knowledge for the purpose of value creation' (Zahra & George, 2002, p. 186). The absorptive capacity of an innovation network is influenced by a large number of factors, such as knowledge sharing (Kostopoulos et al., 2011; Liao et al., 2010), and organizational learning processes (Sun & Anderson, 2010). Sun and Anderson (2010) have developed this further by linking the absorptive capacity elements of Zahra and George with the attributes of the seminal 4I (intuition, interpretation, integration, and institutionalization) organizational learning framework of Crossan et al. (1999). Edmondson, (2012, p. 43) argues: 'Teaming and its associated interpersonal behaviours support organizational learning'. The question, however is how teaming can be linked to the concepts of organizational learning and absorptive capacity.

Open communication enables teams to incorporate multiple perspectives and sharing personal knowledge. Edmondson, (2012, p53) suggests that this requires speaking up hence 'asking questions; seeking feedback; talking about errors; asking for help; offering suggestions; and discussing problems, mistakes, and concerns'. In this context, speaking up refers to an interpersonal behaviour (Edmondson, 2012) that enables shared insights from open conversation. This is fundamental in any teaming activity (Edmondson, 2012).

Acquisition is the capability of identifying and acquiring externally generated knowledge, and bridges individual and group levels (Zahra & George, 2002). Sun and Anderson (2010) suggest that this capability is influenced by the socio-psychological processes of intuition and interpretation. Intuition is largely an individual-level process; however, interpretation takes place on a group level (Crossan et al., 1999), when team members collaborate, share knowledge and seek input and feedback. This suggests that acquisition is influenced by the collaboration processes of teaming.

Assimilation is the capability of analysing, interpreting, and understanding external sources of knowledge (Zahra & George, 2002). This capability initially takes place on a group level. When external sources are novel and frame-breaking, for instance in innovation projects, group dialogue is critical (Sun & Anderson, 2010). Edmondson (2012) argues that the teaming reflection process relies on frequent and pragmatic team dialogue. We therefore assume that assimilation is influenced by the reflection processes of teaming, such as team dialogue and questioning.

Sun and Anderson (2010) suggest that integration influences transformation by combining existing knowledge with newly acquired knowledge. This transformation requires conversation, interaction, and shared practice (Crossan et al., 1999), which can be accomplished through (sandpit) experimentation (Sun et al., 2005; Sun & Anderson, 2010). Also, ambidextrous leadership—a style that combines both transactional and transformational styles of leadership—is needed to manage possibly conflicting views (Sun & Anderson, 2010). Moreover, Edmondson, (2017, p. 51) states that 'leadership has an important role to play in helping people engaged in extreme teaming overcome the personal and technical challenges they face'. We therefore argue that the teaming process of experimentation influences transformation.

Table 1 presents an overview of the teaming attributes collaboration, reflection and experimentation and how they relate to dimensions of absorptive capacity and organizational learning. Because most fieldlabs are still in the development phase, in our research we focused on acquisition, assimilation and transformation.

Despite the knowledge generated by existing studies, many gaps still exist in our understanding of teaming processes within innovation networks. Interestingly, only a few studies have addressed the question of how collaboration on an operational level in innovation networks is affected by the interests of different stakeholders. Kazadi et al. (2016), for instance, focus intensively on co-creation and not in detail on how collaboration takes place. Moreover, only a limited number of empirical studies have looked at how collaboration on an operational level affects the absorptive capacity of innovation networks. Some studies focus on knowledge integration in cross-functional teams (Majchrzak et al., 2012). Others shed light on improving the teaming effectiveness of cross-boundary teaming (Edmondson & Harvey, 2016). Undoubtedly, having a clear understanding of the mechanisms behind collaboration in innovation networks can be helpful to strategic and tactical decision-making on innovation processes. This understanding can also be beneficial for managers, who can use it to influence the effectiveness of innovation processes.

The purpose of this study is to deepen our understanding of how stakeholders influence teaming in practical settings and how this affects the absorptive capacity of innovation networks. The 'teaming' construct of Edmondson (2012) was taken as a starting point for our study. Based on the literature study summarized above, a research model was developed, which served as a guideline for the empirical part of our research (see Figure 2). This research model is rooted in the idea that individual stakeholders may have different interests in innovation. Depending on the interests of and cohesion between

TABLE 1 Relationship between absorptive capacity, organizational learning and teaming

Absorptive capacity	Organizational learning 4I model	Teaming
Acquisition Capability to identify and acquire externally generated knowledge.	**Intuition** Recognition of the pattern and/or possibilities inherent in a personal stream of experience. *Requires:* • decision-making • ***Knowledge sharing*** Level: Individual and group	**Collaboration** A collaborative mindset and behaviours, both within and outside a given unit of teaming, to drive the process. *Requires:* • coordinating actions • ***Knowledge and resource sharing*** • seeking input and feedback
Assimilation Capability to analyze, process, interpret, and understand the information obtained from external sources.	**Interpretation** Explaining, through words and/or actions, an insight or idea to one's self and to others. *Requires:* • ***Dialogue*** in teamwork • team composition • supportive environment Level: Group	**Reflection** Explicit observations, questions, and discussions of processes and outcomes. *Requires:* • ***Dialogue*** in teamwork (often, quick and pragmatic) • More a behavioural tendency or personal behaviour than a formal process
Transformation Capability to develop and refine the routines that facilitate combining existing knowledge and newly acquired and assimilated knowledge.	**Integration** Process of developing shared understanding among individuals. *Requires:* • ***Experimenting*** • leadership Level: Group and organization	***Experimentation*** A tentative, iterative approach to action that recognizes the novelty and uncertainty inherent in every interaction between individuals. *Requires:* • ***Experimenting*** • idea testing
Ref: Zahra and George (2002)	Ref: Crossan et al. (1999); Sun and Anderson (2010)	Ref: Edmondson (2012)

the stakeholders involved, some stakeholders may employ salience-shaping strategies to try to influence the project's outcome. This might affect psychological safety and teaming attributes such as speaking up, experimentation and reflection. It is assumed here that these teaming attributes influence the acquisition, assimilation and transformation of knowledge and ultimately have an impact on the absorptive capacity of innovation networks.

The research model depicted in Figure 2 was used to analyze the complex dynamics of stakeholders and how these affect the absorptive capacity of innovation networks. In doing so, our empirical study was centred around the following three research questions:

- Do stakeholders influence teaming behaviour within a fieldlab, and what kind of salience-shaping strategies do they use?
- How and in what way do organizational relationships and attributes of the stakeholders involved affect teaming behaviour on an operational level?
- How does operational teaming behaviour affect the absorptive capacity of the innovation network?

In researching these questions, this study aims to reveal the underlying mechanisms which hinder or stimulate the absorptive capacity of innovation projects on an operational level.

3 | RESEARCH DESIGN

The research questions addressed above are of a 'how and why' nature and have therefore been investigated using a multiple explanatory case study by applying the design of Yin (2009). Multiple case studies have several advantages: they form a stronger base for theory building (Yin, 2009) and enable a broader exploration of research questions. Multiple case studies also offer the ability to compare findings and hence identify specific findings of a single case (Eisenhardt & Graebner, 2007). Therefore, multiple-case research typically delivers more robust, generalisable, and testable results than single-case research (Eisenhardt & Graebner, 2007). The case study design (Figure 3) was based on the multiple case study design of Yin (2009).

Although the research model was used as a guideline during the case studies, it was assumed that the interaction between the characteristics of the teaming relationships and absorptive capacity is probably more complicated than Figure 2 suggests. For that reason, one of the case study's objectives was to contribute to the understanding of the underlying teaming behaviours and their impact on the absorptive capacity of innovation networks.

3.1 | Sampling

After the literature review was conducted, five cases (fieldlabs) from the smart industry initiative in Dutch industry (Huizinga et al., 2014) were examined. The cases were selected based on project topic, stakeholder variety, and availability. To be able to compare the results, we selected technical projects with different types of stakeholders. Half of our requests for research cooperation were rejected. After some interviews, the number of cases was reduced to three (Table 2). Two cases did not meet the selection criteria regarding project topic and the availability of multiple interviews. The three cases offered the

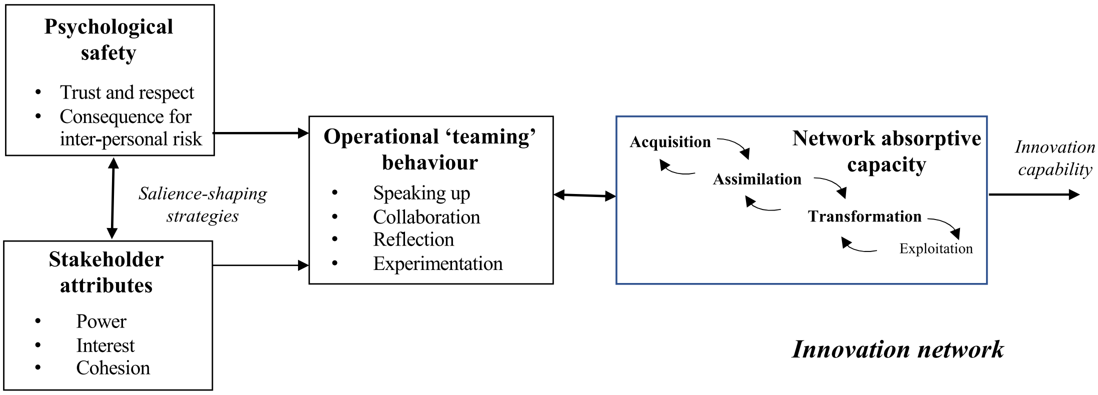

FIGURE 2 Research model [Colour figure can be viewed at wileyonlinelibrary.com]

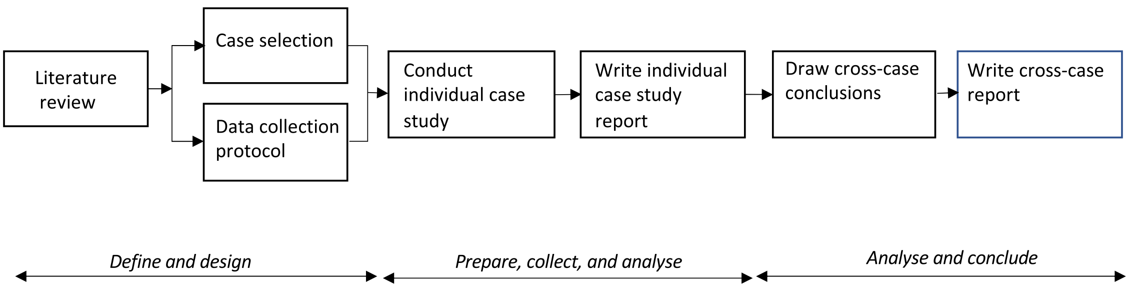

FIGURE 3 Case study design [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 2 Project characteristics

Characteristic	Case A	Case B	Case C
Initiative	Smart industry	Smart industry	Smart industry
Funding	50% government and 50% company/ institution	50% government and 50% company/ institution	50% government and 50% company/ institution
Initiator/project owner	Company FL	Company YD	Company SH
Duration (years)	>10	1.5	0.5
Complexity	Average	High (many dependent sub-projects)	Low
Project status	Design finalized	Development	Development
Innovation type	Product innovation	Product innovation	Process innovation
Project aim	Design of construction part	Design means of transport	Integration of artificial intelligence (AI) in robotics system
Companies/ institutions	One large technical company, one RTO, and one SME	Five SMEs and a university	One large technical company, one SME, and a university
Team members	4	4	4
Stakeholders	3	2	3

opportunity to explore a variety of innovation networks, both in terms of lead time and technical background.

Clearly, selecting interview respondents is also an essential step in the research process. We used purposive sampling (Blumberg et al., 2014) based on the following criteria: are the selected interviewees representative of the population in terms of role and parent organization, do they have insight into and an understanding of the research topic, and are they willing to be interviewed? Participants were selected by the project team leader and the researcher. For cases A and C, all team members and stakeholders were interviewed. For case B, six out of nine participants were interviewed. Unavailability and unwillingness as a result of tensions between some stakeholders were reasons why not all participants were willing to participate. Details and the number of the interviews held can be found in Appendix B.

3.2 | Data collection

Several strategies were used to collect data. For each case, at least six interviews were conducted with stakeholders, project leaders, and project members. These interviews were conducted in a semi-structured manner, which made it possible to ask more in-depth questions about relevant topics in order to obtain detailed information. The interviews were aimed at obtaining a deeper understanding of collaboration mechanisms and the factors influencing the process of teaming. Interviewing is an efficient way of obtaining rich information, but a disadvantage might be that interviewees are biassed when answering these questions (Eisenhardt & Graebner, 2007). In order to neutralize these prejudices as much as possible, information was obtained from various viewpoints.

Based on the research model, information was collected about the influence of individual stakeholders (power, cohesion), the degree of teaming (psychological safety, speaking up, collaboration, experimenting and reflecting) and the resulting absorptive capacity (acquisition, assimilation and transformation). From the research model indicators were derived for the theoretical variables. These indicators form the link between information needs and the interview questions (Emans, 2002). The interview questions were derived from the indicators and sub-questions (Appendix A). Additionally, available questionnaires on for instance psychological safety were used to supplement the interviews (Edmondson, 1999; Garvin et al., 2008; Nembhard & Edmondson, 2006).

During the interviews, unforeseen topics were discussed, such as ‘the stakeholder as leader’ and the ‘innovation project organisation’. The semi-structured interviews offered the opportunity to include these new insights in subsequent interviews. A total of 21 interviews with respondents representing various viewpoints were conducted during several rounds. Moreover, project documentation—such as project meetings, project proposals and project evaluations—was studied extensively. Each recorded interview lasted about 60 min and was transcribed within 5 days.

3.3 | Analysis

The multiple-case analysis was carried out according to the steps of Miles et al. (2014): data reduction, data visualization and conclusion. The analysis was supported by a Computer Assisted Qualitative Data Analysis System (CAQDAS), Atlas.ti. The first data reduction was performed through coding after analysing individual cases. For this first coding, the theoretical variables of the research model—such as power, importance and experimentation—were used. During the process of coding and writing case summaries, analytical memos were used to document insights, new ideas and future directions for the research (Friese, 2014; Miles et al., 2014). New codes were added based on these new insights to describe the emerging themes. During the interviews, it became clear that project-management-related topics played a role. It also became clear that in many cases, stakeholders were very supportive and involved. Consequently, these codes were added. After the individual case reports, a cross-case analysis was performed, from which conclusions were drawn.

3.4 | Validity and reliability

In order to test the quality of the research design, three checks proposed by Yin (2009) have been used: construct validity, internal validity and reliability. Construct validity is strengthened by translating the research model into correct, measurable units (Yin, 2009). Theoretical variables from the research model and research questions were translated via indicators into interview questions. The chain of evidence was secured by storing all information—such as interview recordings, transcripts, memos and coding—in the database of the CAQDAS. Additionally, meetings with fieldlab members were organized to test the research findings. Triangulation of the various viewpoints further strengthened the construct validity.

The data analysis was structured by using encodings of the transcribed interviews. To improve research reliability, interview questions, transcripts, coding and memos were fully documented. As mentioned earlier, the research was supported by a CAQDAS, in which all documents, memos, comments and literature research (Pope, 2016) were stored and which was used to analyze the data further.

4 | RESULTS

This section describes the results of the various cases examined. In all cases, there is one company which owns the final product that is being developed. For this research, we refer to this company as the ‘project owner’ (Table 3). The findings show many similarities between the three fieldlabs. Therefore, a general description of each case is given first, explaining the project objective, organization, and company type. Then, the cross-case results are presented, followed by a summary of the individual cases.

4.1 | Description of the individual cases

4.1.1 | Case A

Fieldlab A is a partnership between two companies and one research technology organization (RTO). Company FL produces parts for a transport device that requires above-average strength. Weight plays an important role, and the project's aim is therefore to replace the steel parts with a composite material, which is considerably lighter,

TABLE 3 Summary of case findings

Variable	Case A	Case B	Case C
Stakeholder influence			
Project general	• stakeholders collaborate actively and are involved • great confidence and trust through many years of collaboration	• after project definition, two exploration projects were added • great confidence and trust between most companies and institutions. Less confidence and trust between added companies and the original project	• project owner actively leads the project • confidence and trust between all stakeholders despite the recent collaboration
Power	• not observed	• partly as a result of added projects: Withholding strategies	• not observed
Interest	• significant: New products and knowledge	• significant: New products and knowledge	• significant: New knowledge, operational efficiency, and service offerings
Cohesion	• high cohesion among stakeholders	• medium, due to added projects	• high cohesion among stakeholders
Teaming			
Psychological safety	• high	• medium, due to added projects	• high
Speaking up	• honest, direct conversation including asking questions and discussion of problems	• honest, direct conversation including asking questions and discussion of problems except for the added projects	• honest, direct conversation including asking questions and discussion of problems
Collaboration	• good sharing of resources and knowledge. Collaboration at multiple levels	• good sharing of resources and knowledge in the main project. Average collaboration with participants of one added sub-project	• good sharing of resources and knowledge. Collaboration at multiple levels
Reflection	• mostly technical: Design reviews, workshops, and after braiding experiments	• mostly technical: After material and modelling experiments	• frequent technical reflection after small experiments and trials, but also reflection on planning activities
Experimentation	• mathematical modelling • strength testing of materials	• mathematical modelling • strength testing of materials	• mathematical modelling • artificial intelligence experiments
Absorptive capacity			
Acquisition	• good and quick exchange of ideas, resources, and knowledge, also outside the project	• good and quick exchange of ideas, resources, and knowledge, also outside the project • limited sharing of knowledge and resources for added projects	• good and quick exchange of ideas, resources, and knowledge
Assimilation	• new insights through design reviews, dialogue, and consultation	• new insights through dialogue, validation, and consultation • limited dialogue for the added projects	• new insights through dialogue and consultation
Transformation	• machine construction, braiding techniques, and new designs • mathematical models	• new materials • control systems • mathematical models • limited for the added projects	• mathematical models • artificial intelligence knowledge
Network absorptive capacity	• high	• high	• high
Business results			
Project owner	• validated and product tested in practice	• end product not ready yet	• end product not ready yet
Other participants	• new customers in other industry • extension of services	• not yet	• extension of services

has a shorter delivery time, and can be manufactured at lower cost. Organization NN is an RTO with considerable expertise in the design of composites. The braiding process of fibres is the primary expertise of company ES, an SME company. This braiding is essential in manufacturing composite material. At the moment, the project is in its final stages.

4.1.2 | Case B

Fieldlab B is one of the pilot projects in a Dutch region that aims to increase employment. B is a collaborative project of several SMEs and two universities. The project has been underway for about 2 years and aims at developing a self-moving transport device. Fieldlab B is divided into three sub-projects. The self-moving sub-project plays an essential role in modelling the behaviour of the transport device. Four companies and one university cooperate on this model: design company YD, modelling and simulation consultancy firm MS, and university HS. Control systems are provided by construction company JW. The second sub-project encompasses the design of sustainable materials, manufactured from recycled material, which can also be recycled at the end of product life. This sub-project is carried out by a lecturer from the University of Applied Sciences (HS) and some students. The material properties affect the behavioural modelling of the transport device, and these sub-projects are therefore interrelated. The last sub-project concerns the autonomous moving ability of the transport device. The majority of participants perceived the first two sub-projects as technically complicated. Therefore, the autonomous moving sub-project was not included in the project scope. However, participants were allowed to explore the autonomous moving sub-project as part of the fieldlab, which created some friction and affected collaboration within the project team. Six interviews were conducted in total, focusing on the original project definition. Because of the tension, there was no opportunity to conduct interviews regarding the 'autonomous moving' part of the project.

4.1.3 | Case C

In case C, two companies and one university work together to optimize a robotic system in SH's manufacturing process. The robot takes parts from a supply belt and assembles them on a consumer product. If the robot cannot grab the part because of its position, the supply belt vibrates until the part's position is adjusted in such a way that the assembly can be resumed. There are many robots in series on an assembly line, all of which put together different parts of the product. The capacity of the entire system depends to a large extent on the position of the parts. This innovation project aims to optimize capacity with the help of artificial intelligence (machine learning) so that the robot is able to assemble continuously. The project is divided into two sub-projects: one concerns the ability to selectively control the supply belt—carried out by company IA—and the other consists of the machine learning part, carried out by the university. This fieldlab is still in an early stage.

4.2 | Cross-case findings

4.2.1 | Stakeholders

The findings concerning stakeholder influence are very similar across all cases. Most stakeholders had a significant commercial interest (see Appendix B). For 70% of the stakeholders, the interest is strategic, such as developing new products, new technology, or new services. One stakeholder was particularly interested in improving operational efficiency, while the participating university was mainly interested in offering students an internship. Not surprisingly, knowledge development was mentioned in all cases as an important objective. A technology consultancy company described it as follows:

> 'A lot of modelling power is available in software these days which is for sale for every company, we therefore need to invest in knowledge to stay ahead of these software packages' (modelling engineer in case B).

Interests were well aligned at the beginning of the projects, which made the cohesion in the majority of innovation networks high. In case A, one of the stakeholders emphasized that the lack of business competition between the companies and institutions was an important factor for the high cohesion and collaboration levels.

> 'Yes, I think that is one of the reasons why collaboration is going well. We have a common goal, while the aim of each of us is different. So, we all want to get something different out of it, and that allows us to share freely.' (R&D director in case A)

All innovation projects are divided into sub-projects and subsidized separately. The stakeholders of the individual companies and institutions are individually responsible for meeting their part of the project. Furthermore, stakeholders actively work together, are highly involved, and have often been in a relationship for a long time. In case A, for example, stakeholders had a significant influence on the project result because of their substantial knowledge and interest. In case B, two sub-projects were added later on in the project. Insufficient sub-project integration into the main project resulted in withholding strategies and a deterioration in trust and collaboration.

> 'He said: that's not part of the project, I won't do that if you don't pay me for it.' (project leader in case B)

This did not take place in the other projects.

4.2.2 | Psychological safety and collaboration

The findings around teaming are also very similar. The elements of Edmondson's (2012) teaming elements—speaking up, collaboration, experimenting and reflection—were found in all cases. Psychological safety was high in almost all fieldlabs, as was the safety to 'speak up'. Project members indicated that subjects such as project problems, technical problems, and results of experiments were openly discussed in formal team meetings and in an informal setting. In some cases, interviewees were even surprised that there were questions about psychological safety.

'Psychological safety or the extent you feel safe within the team is not a problem at all.' (several project members in case B)

In case A, a design problem with considerable financial consequences was openly discussed between stakeholders and project members. In case C, project members indicated that they collaborated in a self-steering, open environment, which was also observed during one of the team meetings.

'In one of the projects, we had the problem that a particular concept of making tools didn't work. We discovered the problem late in the process. The painful thing was that we ended up having a non-working solution, and we faced the choice of stopping or finding additional funding and time. In consultation, we decided to approach the funder, explain the problem, and we finally got extra time and money to achieve a successful project end. While only one of the partners had this problem, we finally came up with a compromise to find a solution for all.' (project leader in case A)

In case B, however, insecurity was observed as a result of commercial pressure due to the late integration of one of the sub-projects. This had a significant effect on 'speaking up' and on collaboration within the network. Because of this tension, team members of the sub-project in question were not willing to be interviewed.

Different forms of collaboration were found between stakeholders, team members, and their home organizations. In all cases, the entire project was divided into smaller sub-projects. Collaboration between project members mainly took place in those sub-projects, but also occurred between staff members of the parent organization. Team members had to cross several boundaries, such as distance, status, and knowledge boundaries (Edmondson & Harvey, 2016). The knowledge boundary was mentioned several times as being the most difficult boundary to cross. In particular, when sophisticated technology is being used and the required knowledge is very specific, collaboration was often limited to conversations 'around the interface'. One of the team members expressed it in this way:

'There's quite a distinct split between the two tasks. We have the structural solution and the fluid dynamics solution. And what we are most involved in is creating an interface between the geometry and pressure' (engineer in case B)

In other words, this is where one field of expertise passes into another. In those cases where the work was very complicated and the knowledge gap could not be bridged, support was sought from colleagues within the parent company who were knowledgeable in that area of expertise. The sharing of resources such as knowledge, production facilities and financial support was visible in all cases. For instance, in case A, a braiding machine was exchanged between company ES and the RTO and in case C, machine learning training was offered to the SME company working on the robotic system.

Look, on a course like this, you get to know the whole system. Every action is explained, and you have to imitate it. Here you just get thrown into a project, and you have to figure things out yourself. I now know precisely how that controller works, and I didn't know that before the course. That has paid off a lot. (AI project member in case C)

During the validation phase, in which different parts of the innovation project were tested and adjusted, collaboration intensified. Many interviewees regarded this as the most complicated phase. In two cases (A and C), the difference between stakeholders and project team members was virtually undetectable, and activities were done jointly. This may have been due to the small size of the participating company (combined roles) or to the technical knowledge of the stakeholders, or both. The time that participants spent on the project varied between one and 2 days per week. As a consequence, innovation work had to be incorporated into daily responsibilities. This priority balancing was an important factor that hampered the progress of several innovation projects. However, because of the slack built into the project, it did not lead to any serious problems.

4.2.3 | Teaming elements and absorptive capacity

Most interviewees cited the development of knowledge by acquisition as one of the most important aspects of an innovation project. We encountered several forms of acquisition, such as giving mutual presentations on the results of experiments and the direct exchange of knowledge between project members, but also with the parent organization to fill a gap in knowledge. In case B, the machine learning course bridged the lack of knowledge among participants. A good relationship and cooperation were frequently mentioned as important factors for significant knowledge sharing. In a number of cases (cases B and C), it was indicated that acquisition improved as the collaboration progressed, which improved the relationship between participants.

All cases can be characterized as technical projects. During our research, we found that in this technical environment, a lot of experimenting takes place, which was essential in transforming results of these experiments into new insights and ideas. In case A, a great deal of experimentation took place with different materials and shapes to be able to incorporate the experience gained in the experiments into the final design. In case C, many experiments focused on the robot control system. The duration of these experiments was usually very short, and therefore technical reflection was done simultaneously. Experiments were also executed in case B during and after the development of numeric models to compare calculated results with reality. We found that almost all experiments were rather well documented.

> 'I'm a chemist myself, so experimenting is in my blood, of course. Experimentation takes place in every project. Indeed, that relationship between those two systems that you just mentioned, there has been a lot of experimenting there, because there you have to adjust two systems, back together again.' (chemical engineer in case B)

Reflection on technical matters such as experiments, design reviews, and workshops were very common in most cases and stimulated the assimilation of knowledge. In case A, structured reflecting took place in the form of design reviews or workshops, which led to a better analysis and understanding of the current design.

> 'For example, in product development projects, program reviews are essential. In innovation projects, the focus is more on design reviews, design workshops, or test results.' (project leader in case A)

During the development of new materials in case B, scientific literature was often used after experiments to enable participants to interpret the results. Reflecting took place in a structured and unstructured way during and immediately after small experiments and various encounters between team members. Reflecting on project progress only emerged in case C, and reflection on team collaboration did not take place in any of the fieldlabs investigated.

4.2.4 | The leadership role of stakeholders

In some cases, the leadership role of stakeholders is worth mentioning. The interviews revealed that stakeholders, in the role of supervisor, ranged from remote involvement (case C)—where the project status was only discussed with their own employees—to highly involved (case A and B), in which stakeholders were very substantively involved. We have not found a transactional leadership style in any of the cases. In case A, the role of stakeholders was participatory, supportive, and structuring. Executives were actively involved in braiding and machining the construction parts, which had a significant effect on the technical solutions chosen.

> 'That's A2's idea. He said, we're going to test the composite, and we're going to drill holes in the structure. All the fear we had of cutting through the fibres, he has put it aside.' (engineer in case A)

4.2.5 | Emerging theme

Although business results were not a part of this research project, they were regularly mentioned in the interviews. In some cases, insights led to new, secondary products or services early on in the project. The project owner or initiating party often has to wait for the entire project to be completed. Companies or institutions that work on sub-projects, however, can develop knowledge during the project that can be transformed into additional products or services which can be offered to new customers, sometimes from another branch. In one case, one of the companies was able to supply products to the automotive industry because they acquired knowledge on how to produce following stricter standards and regulations. Partners may, therefore, not only benefit from the final product but also from early products or services. In cases A and C, individual participants achieved significant business results as a consequence of participating in the innovation network. In case B, this had not taken place yet.

> 'Thanks to that project, we were able to bring in other projects, so that was very beneficial.' (director in case A)

> 'Through this project, we have become an interesting service partner for SH and other companies. A new market has emerged.' (CEO in case C)

The results from the interviews and document reviews are summarized in Table 3.

5 | DISCUSSION

Several studies indicate that working on innovation projects in a multi-company environment can be very complex because the interests, organizations, resources, and knowledge of different companies and institutions need to be integrated (Edmondson & Nembhard, 2009; Lin & Chen, 2006). While general studies on teaming and teaming behaviour suggest that innovation capacity within networks is influenced by how teams are formed and operate (Kang & Lee, 2017), relatively little is known about how, and under what conditions, teaming behaviour actually influences the absorptive capacity of innovation networks. In order to obtain a more in-depth understanding of how teaming behaviour affects the absorptive capacity of innovation networks, three Dutch smart industry fieldlabs were analysed in order to study how teaming relationships were established and what the impact of these relationships on the innovation capability of the network in question was. In doing so, the teaming model of Edmondson (2012) was taken as a starting point.

5.1 | Stakeholders salience strategies

Previous research in the area of implementing Enterprise Resource Planning (ERP) systems indicates that not all stakeholders approach projects in a unified way. Moreover, in many cases, stakeholders might have strongly contrasting views on whether the project helps or hinders the interests of the organizations involved in the ERP project (Boonstra, 2006). There are some indications that depending on their interests and cohesion, stakeholders may employ different strategies to influence the project team to safeguard their interests (Boonstra, 2006). Also, in the construction project domain, adverse salience strategies from different stakeholders were reported (Oppong et al., 2017). In our research, however, these influencing strategies were hardly found. Almost all stakeholders were supportive and actively involved in the innovation project. We observed only withholding strategies in case B in a sub-project that was added to the project later, and that was not sufficiently aligned between companies and institutions. There may be several reasons why the exercise of power in our cases was limited. First, it is interesting to notice that during the project definition phase, the interests of the various stakeholders were well balanced, which strongly contributed to the alignment of interests. Second, all participating members received individual (government) funding for their sub-projects and—given the significant individual interests combined with interdependencies among the parties—they seemed to work together more actively to realize project outcomes. Finally, long-lasting relationships and the resulting trust might play a role as well. This was also found in various public private partnerships publications (Carbonara & Pellegrino, 2020; Eaton et al., 2006; Liu & Wang, 2018). Although not surprisingly and in line with stakeholder theory, our study indicates that teaming behaviour and more particularly, influencing strategies between stakeholders involved in innovation networks, is heavily affected by the degree of alignment of interests, and long-term character of established relationships. Moreover, creating a proper balance between the individual interests of the participating stakeholders and the mutual interests of the parties involved in the innovation project apparently affects the absence of destructive teaming behaviour in terms of exercising power, political behaviour and the existence of distrust.

5.2 | Providing a psychologically safe environment

Edmondson (2012) states that psychological safety is a prerequisite for teaming. According to previous research, an unsafe psychological environment is common in many organizations (Edmondson, 2012; Milliken et al., 2003). In our study, however, this was not found: none of the interviewees felt reluctant to speak up about technical matters or project progress. Previous research on psychological safety (Edmondson, 2004), conducted in an industrial environment, offers possible additional explanations as to why psychological safety was perceived to be high in the networks studied. According to the study of Edmondson, leadership behaviour, trust, and a supporting organizational context affect psychological safety. In two of the networks studied, the leading stakeholders were highly involved in finding solutions which is in line with previous research that suggested that inclusive leadership (openness, availability, and accessibility) is associated with psychological safety and innovative work behaviour (Carmeli et al., 2010; Javed et al., 2017). Additional, mutual trust was found in all cases, often due to the longstanding relationships between the partners involved. Practice fields (Senge, 1994) can contribute to psychological safety as well because they also give the message to the team that 'first time right' is not always possible (Edmondson, 2004). Experiments, which can be seen as practice fields, were an essential part of all innovation projects in the cases studied. Finally, the interviews revealed that in all fieldlabs, technical support was widely available from several parts of the partnering organizations, and time pressure to realize the innovation project was almost absent. Clearly, creating slack can be an efficient strategy to deal with uncertainties, complexity and interdependences as well (Boer & During, 2001) and in doing so, might contribute to a psychologically safe environment. Our study suggests that this resulted in supportive stakeholder behaviour which minimized conflicts and re-enforced the existence of a psychologically safe environment.

5.3 | Influence of leadership

In almost all networks studied, the stimulating leadership role of stakeholders was noticeable, which clearly had an effect on teaming behaviour. In particular, stakeholders who initiated the innovation project were very open, approachable and involved, and the interviews revealed that this open and supportive type of leadership had a stimulating effect on the members and on teaming behaviour in the networks. The results of our case studies are therefore in line with previous studies suggesting that leadership is an important predictor of innovation and learning, as leaders have a considerable influence on introducing new ideas and have the ability to stimulate innovations. Moreover, our study follows the study of Stoker et al. (2001) who suggest a relation between consultative and considerate leadership, and team characteristics like potency or team spirit and innovativeness. Stakeholders who initiated the innovation projects in the networks studied can be characterized as inclusive leaders (Carmeli et al., 2010; Javed et al., 2017) having a positive effect on psychological safety and employee involvement in the innovation projects studied. The stimulating role of dominant stakeholders emerged several times during the semi-structured interviews, and the interviewees, in general, agreed upon the fact that the leadership style significantly stimulated individual and group learning by questioning assumptions and motivating team members to be curious and take 'calculated' risks which contributed to better innovation outcomes.

5.4 | Teaming and absorptive capacity

Following earlier research (Crossan et al., 1999; Sun & Anderson, 2010) and our literature review, an important research objective of our study was to explain the relationships between teaming and absorptive capacity. Both our case analyses, as well as our cross-analysis suggests that teaming behaviour, without doubt, seems to affect the absorptive capacity of an innovation network and that these two concepts are closely related. Clearly, when team members collaborate, share knowledge, and seek input and feedback, the acquisition of externally generated knowledge is stimulated. Reflection and team dialogue further develop the interpretation and

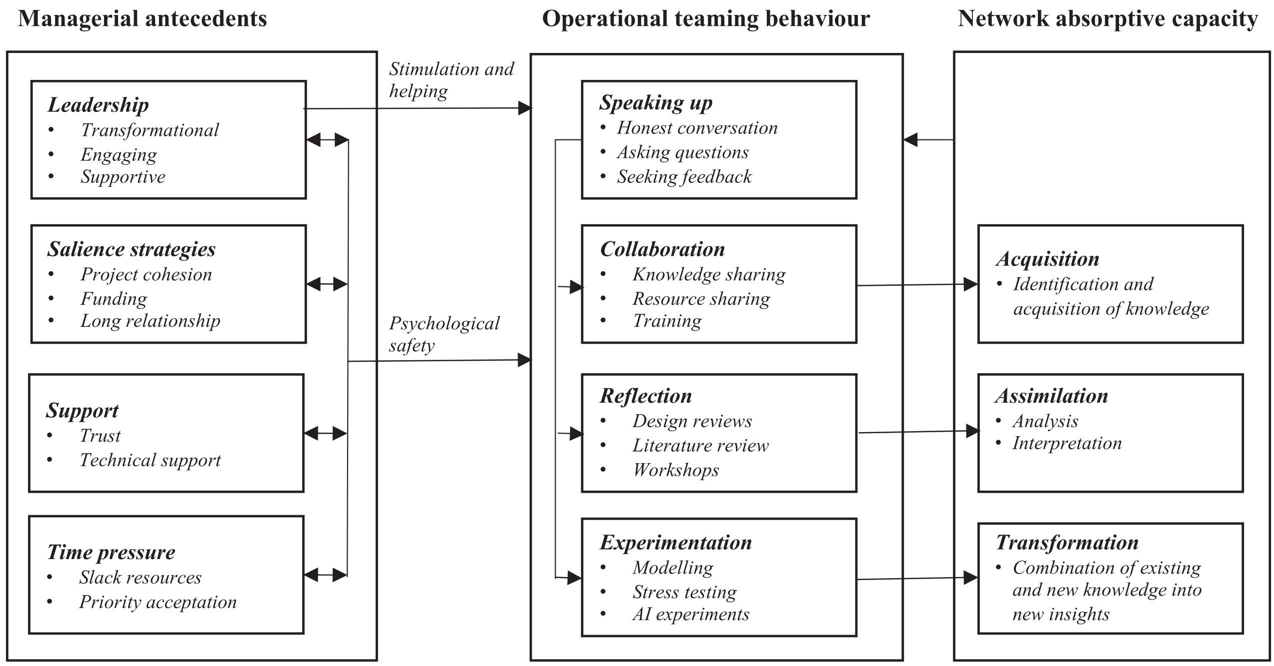

FIGURE 4 Summary of research findings

understanding from this external knowledge, while experimentation transforms the newly acquired knowledge into new solutions. Edmondson argues that 'teaming is the engine of organisational learning' (Edmondson, 2012, p. 14). However, she does not differentiate between individuals, groups and organizations.

In our research, like Morland et al. (2019), we observed learning on an individual, sub-project, project and also parent organization level. As mentioned earlier, all projects are divided into sub-projects, and the learning processes studied developed through a process of sensemaking and reflection between individuals (Brix, 2017; Morland et al., 2019) within the sub-project but at a later stage also occurred within the project team and parent organization. Morland et al. (2019) suggest that the transfer of knowledge between organizational levels is heavily affected by trust. This is in line with the analysis of case B, which revealed that mistrust between the participants in one of the added projects and the original project members, hampered teaming behaviour, which had a significant impact on acquisition, assimilation and transformation of the innovation. In case B, we found eroded and tense relationships, not as a result of in-depth knowledge sharing but as a result of insufficient project integration. As mentioned before, due to knowledge boundaries, some team members in case B decided not to share their knowledge deeply but to discuss the interface between their expertise areas.

Based on the innovation networks studied, our analyses revealed that a complex mix of mechanisms has contributed to the absorptive capacity of the innovation networks. Clearly, one of the dominant mechanisms, which can be considered to be accountable for the project results is linked to teaming behaviour which in itself is positively affected by the leadership style and the psychological safety created in the network. In our case studies, important elements like the longstanding character of the relationships between the stakeholders involved, the well-aligned project objectives of stakeholders, the existence of slack and an open atmosphere of communication re-enforced each other, resulting in a setting which can be characterized by a high degree of psychological safety. Innovation processes in networks of organizations in other words, are not purely technical processes but also processes subjected to social-psychological elements which to a high degree seem to dictate the absorptive capacity of innovation networks.

Figure 4 summarizes the core of the analysis by presenting a model of the most important relationships that emerged from this research.

6 | CONCLUSION

6.1 | Implications for theory

Inspired by the work of Edmondson, this paper focuses on the influence of stakeholders on teaming behaviour within innovation networks and on how this behaviour influences the network's absorptive capacity. To address this research question, a research model (Figure 2) was derived from existing studies on stakeholders, which was subsequently used as a guideline for the empirical part of our study.

Several conclusions can be drawn from this explanatory multiple-case study. First, stakeholders seemed to play a supporting role during the studied phase of the innovation projects. Additionally, no exercise of power was observed in cases where a strong alignment of stakeholder interests (cohesion) existed. Second, influenced by psychological safety, all attributes of teaming behaviour such as speaking up, collaboration, experimentation, and reflection were clearly visible in the studies of the network. Finally, we found that teaming influences the absorptive capacity of innovation networks through several mechanisms. Collaborating influences the acquisition of knowledge; dialogue and reflections influence the assimilation of that knowledge; and experimentation influences transformation.

Recent literature about the relationship between teaming behaviour and absorptive capacity in public private partnerships projects is limited. Liu and Wang (2018) identified critical factors for improving knowledge transfer processes in public private partnerships projects such as articulating knowledge, the experience of public private partnerships teams and incentives and rewards. Lascaux (2019) studied the differences in partner absorptive capacity and how this affects the distribution of innovative outcomes. Finally, Scott (2003) suggests that research partnerships expand a firm's absorptive capacity and highlights the importance of investment in absorptive capacity. This study contributes to the literature by providing a comprehensive model of how teaming behaviour in an innovation network influences absorptive capacity. This paper also discusses the main factors that determine why stakeholder influence in smart industry fieldlabs is limited. Finally, the research contributes by exploring teaming behaviour on an operational level in a smart industry fieldlab environment.

6.2 | Implications for practice

Following from the above-mentioned conclusions, at least four management implications are worth mentioning:

1. Perhaps not a new implication but in line with stakeholder theory we suggest to properly discuss and balance the various interests of all parties at the start of the project. In this way, the exercise of power—which results from different perspectives on ends and means—may be prevented during the development phase.
2. Absorptive capacity affects the innovative capability of a company or network. Our research shows that the elements of teaming affect absorptive capacity. Executives who encourage teaming by creating a psychologically safe environment and who stimulate collaborating, experimenting, and reflecting enhance the innovative ability of their organization.
3. Knowledge development takes place during the development phase of an innovation project. In the course of the project, this knowledge development can already offer opportunities to develop new products or services that are independent of the main aim of the innovation project. Significant business results can occur if during the project the acquired knowledge development is assessed for offering new possibilities.
4. In line with Boer and During (2001): Operational pressure from the participating companies and a restricted time availability of team members in general have an impact on the innovation project. Changing priorities and unforeseen circumstances in many cases can have a negative effect on collaboration and project duration, and it is therefore useful to build in slack resources such as time.

6.3 | Limitations and further research

This research has provided more insight into the influence of stakeholders on teaming and absorptive capacity. However, it is recognized that this is a first step in understanding and modelling teaming within an industrial, network-based innovation project. Further research is needed in several areas.

This study indicates that stakeholders' exercise of power might be more prominent during the project definition. It is also likely that at the end of the project, during validation, conflicts of interest between stakeholders arise. The different phases of a project and its associated interests may have an impact on the exercise of power and on teaming. In this research, we have not been able to pay attention to this aspect. Research on the influence of stakeholders during all phases of a network-based innovation project is useful for gaining a deeper understanding of the functioning of an innovation project.

Furthermore, the analysis of the case studies suggests that leadership affects teaming and psychological safety. To date, leadership and the relationship between different dimensions of absorptive capacity and innovation have received limited attention (Darwish et al., 2020). Much research has been done on leadership; however, the research done by Edmondson (Edmondson et al., 2016; Nembhard & Edmondson, 2006) for instance is often conducted in a setting that continuously collaborates on innovation, such as healthcare. Since industrial innovation networks often collaborate in a discontinuous way, further research seems justified, in particular on whether infrequent collaboration has an effect on psychological safety, teaming behaviours and absorptive capacity.

As mentioned before, this research is predominantly based on the traverse approach to knowledge integration (Majchrzak et al., 2015). We were unfortunately unable to test and validate the critique of this approach. Knowledge integration is a critical aspect in an innovation network that warrants more research.

Finally, the findings of our research are based on three industrial case studies and may be applicable to other industrial innovation networks as well. An in-depth survey study is necessary, however, to prove that the patterns that emerged from this research are generalizable.

More insight into the earlier-mentioned mechanisms that play a role in innovation networks will hopefully help organizations make projects, such as smart industry fieldlabs, function more effectively.

ORCID

Arnold Hoosbeek https://orcid.org/0000-0002-5138-322X

REFERENCES

Aaltonen, K., Jaakko, K., & Tuomas, O. (2008). Stakeholder salience in global projects. *International Journal of Project Management*, *26*, 509–516. https://doi.org/10.1016/j.ijproman.2008.05.004

Adnan, Z., Abdullah, H. S., Ahmad, J., & Johari, J. (2017). Unveiling the incidence of interfirm collaboration: Evidence from research and development companies in Malaysia. *Gadjah Mada International Journal of Business*, *19*(2), 123–144. https://doi.org/10.22146/gamaijb.12541

Berentsen, W., Buiting, K., Huizinga, G., Kolk, T., Smit, R., Bouws, T., … Grosfeld, T. (2014). Actieagenda Smart Industry. In *Dutch industry fit for the future*. Retrieved from. http://www.smartindustry.nl

Blumberg, B., Cooper, D. R., & Schindler, P. S. (2014). *Business research methods* (4th ed.). London, England: McGraw-Hill Education.

Boer, H., & During, W. E. (2001). Innovation, what innovation? A comparison between product, process and organizational innovation. *International Journal of Technology Management*, *22*, 83–107. https://doi.org/10.1504/IJTM.2001.002956

Boonstra, A. (2006). Interpreting an ERP-implementation project from a stakeholder perspective. *International Journal of Project Management*, *24*(1), 38–52. https://doi.org/10.1016/j.ijproman.2005.06.003

Brix, J. (2017). Exploring knowledge creation processes as a source of organizational learning: A longitudinal case study of a public innovation project. *Scandinavian Journal of Management*, *33*(2), 113–127. https://doi.org/10.1016/j.scaman.2017.05.001

Carbonara, N., & Pellegrino, R. (2020). The role of public private partnerships in fostering innovation. *Construction Management and Economics*, *38*(2), 140–156. https://doi.org/10.1080/01446193.2019.1610184

Carmeli, A., Reiter-Palmon, R., & Ziv, E. (2010). Inclusive leadership and employee involvement in creative tasks in the workplace: The mediating role of psychological safety. *Creativity Research Journal*, *22*(3), 250–260. https://doi.org/10.1080/10400419.2010.504654

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, *35*(1), 128–152. https://doi.org/10.2307/2393553

Coletti, M., & Landoni, P. (2018). Collaborations for innovation: A meta-study of relevant typologies, governance and policies. *Economics of Innovation and New Technology*, *27*(5–6), 493–509. https://doi.org/10.1080/10438599.2017.1376166

Conway, S., & Steward, F. (2009). *Managing and shaping innovation* (1st ed.). Oxford, England: Oxford University Press.

Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, *24*, 522–537. https://doi.org/10.5465/amr.1999.2202135

Darwish, T. K., Zeng, J., Rezaei Zadeh, M., & Haak-Saheem, W. (2020). Organizational learning of absorptive capacity and innovation: Does leadership matter? *European Management Review*, *17*(1), 83–100. https://doi.org/10.1111/emre.12320

Dodgson, M., Gann, D., & Salter, A. (2008). *The management of technological innovation*. Oxford, England: Oxford University Press.

Du Chatenier, E., Verstegen, J. A. A. M., Biemans, H. J. A., Mulder, M., & Omta, O. (2009). The challenges of collaborative knowledge creation in open innovation teams. *Human Resource Development Review*, *8*(3), 350–381. https://doi.org/10.1177/1534484309338265

Eaton, D., Akbiyikli, R., & Dickinson, M. (2006). An evaluation of the stimulants and impediments to innovation within PFI/PPP projects. *Construction Innovation*, *6*(2), 63–67. https://doi.org/10.1108/14714170610710668

Edmondson, A. C. (1999). Psychological safety and learning behavior in work Teanns. *Administrative Science Quarterly*, *44*(June), 350–383. https://doi.org/10.2307/2666999

Edmondson, A. C. (2004). Psychological safety, trust, and learning in organizations: A group-level lens. In R. M. Kramer & K. S. Cook (Eds.), *Trust and distrust in organizations: Dilemmas and approaches (pp. 239–272)*. JSTOR

Edmondson, A. C. (2012). *Teaming: How organizations learn, innovate, and compete in the knowledge economy* (1st ed.). San Francisco, CA: Jossey-Bass.

Edmondson, A. C. (2017). *Extreme teaming, lessons in complex, cross-sector leadership* (1st ed.). Bingley, England: Emerald Publishing Ltd.. https://doi.org/10.1108/9781786354495

Edmondson, A. C., & Harvey, J. F. (2016). Cross-boundary teaming for innovation: Integrating research on teams and knowledge in organizations. *Human Resource Management Review*, *28*, 347–360. https://doi.org/10.1016/j.hrmr.2017.03.002

Edmondson, A. C., & Nembhard, I. M. (2009). Product development and learning in project teams: The challenges are the benefits. *Journal of Product Innovation Management*, *26*(2), 123–138. https://doi.org/10.1111/j.1540-5885.2009.00341.x

Edmondson, A. C., Bohmer, R. M., & Pisano, G. P. (2001). Disrupted routines: Team learning and new technology implementation in hospitals. *Administrative Science Quarterly*, *46*, 685–716. https://doi.org/10.2307/3094828

Edmondson, A. C., Higgins, M., Singer, S., & Weiner, J. (2016). Understanding psychological safety in health care and education organizations: A comparative perspective. *Research in Human Development*, *13*(1), 65–83. https://doi.org/10.1080/15427609.2016.1141280

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges diverse. *Academy of Management Journal*, *50*(1), 25–32. https://doi.org/10.5465/amj.2007.24160888

Emans, B. (2002). *Interviewen*. Groningen, Netherlands: Wolters Noordhoff.

Forés, B., & Camisón, C. (2011). The complementary effect of internal learning capacity and absorptive capacity on performance: The mediating role of innovation capacity. *International Journal of Technology Management*, *55*, 56–81. https://doi.org/10.1504/IJTM.2011.041680

Freeman, E. R. (2010). *Strategic management: A stakeholder approach*. Cambridge, England: Cambridge University Press. https://doi.org/10.1017/CBO9781139192675

Friese, S. (2014). *Qualitative data analysis with Atlas.Ti* (1st ed.). London, England: Sage Ltd.

Gargiulo, M., & Sosa, M. E. (2016). Common third parties and coordination disruptions in new product development organizations. *Journal of Product Innovation Management*, *33*(2), 132–140. https://doi.org/10.1111/jpim.12288

Garvin, D., Edmondson, A. C., & Gino, F. (2008). Is yours a learning organization? Harvard Business Review, (March), 1–9.

Henning, K., Wolfgang, W., & Helbig, J. (2013). Recommendations for implementing the strategic initiative INDUSTRIE 4.0. Final Report of the Industrie 4.0 WG, (April), Retreived from: https://www.plattform-i40.de

Hodge, G. A., & Greve, C. (2017). On public–private partnership performance: A contemporary review. *Public Works Management and Policy*, *22*(1), 55–78. https://doi.org/10.1177/1087724X16657830

Huizinga, G., Walison, P., Bouws, T., Kramer, F., van der Beek, H., Tops, P., … Grosfeld, T. (2014). Smart Industry. In *Dutch industry fit for the future*. Retrieved from. http://www.smartindustry.nl

Huizinga, G., Holterman, L., Kist, R., Bouws, T., van der Beek, H., Wattel-Meijers, K., … Mars van der, P. (2018). Smart Industry Implementatieagenda 2019–2021. Retrieved from http://www.smartindustry.nl

Javed, B., Naqvi, S. M. M. R., Khan, A. K., Arjoon, S., & Tayyeb, H. H. (2017). Impact of inclusive leadership on innovative work behavior: The role of psychological safety. *Journal of Management and Organization*, *25*, 117–136.

Kang, M., & Lee, M. J. (2017). Absorptive capacity, knowledge sharing, and innovative behaviour of R&D employees. *Technology Analysis and Strategic Management*, *29*(2), 219–232. https://doi.org/10.1080/09537325.2016.1211265

Kazadi, K., Lievens, A., & Mahr, D. (2016). Stakeholder co-creation during the innovation process: Identifying capabilities for knowledge creation among multiple stakeholders. *Journal of Business Research*, *2*, 525–540. https://doi.org/10.1016/J.JBUSRES.2015.05.009

Kostopoulos, K., Papalexandris, A., Papachroni, M., & Ioannou, G. (2011). Absorptive capacity, innovation, and financial performance. *Journal of Business Research*, *64*, 1335–1343. https://doi.org/10.1016/j.jbusres.2010.12.005

Lascaux, A. (2019). Absorptive capacity, research output sharing, and research output capture in university-industry partnerships. *Scandinavian Journal of Management*, *35*(3), 101045. https://doi.org/10.1016/j.scaman.2019.03.001

Liao, S. H., Fei, W. C., & Chen, C. C. (2007). Knowledge sharing, absorptive capacity, and innovation capability: An empirical study of Taiwan's knowledge-intensive industries. *Journal of Information Science*, *33*, 340–359. https://doi.org/10.1177/0165551506070739

Liao, S. H., Wu, C. C., Hu, D. C., & Tsui, K. A. (2010). Relationships between knowledge acquisition, absorptive capacity and innovation capability: An empirical study on Taiwan's financial and manufacturing industries. *Journal of Information Science*, *36*(1), 19–35. https://doi.org/10.1177/0165551509340362

Lin, B. W., & Chen, C. J. (2006). Fostering product innovation in industry networks: The mediating role of knowledge integration. *International Journal of Human Resource Management*, *17*(1), 155–173. https://doi.org/10.1080/09585190500367472

Liu, T. T., & Wang, Y. C. (2018). Examining critical factors affecting knowledge transfer in public-private partnership (PPP) projects. In Proceedings of the 21st International Symposium on Advancement of Construction Management and Real Estate, 2016 (pp. 727–744).

Majchrzak, A., More, P. H. B., & Faraj, S. (2012). Transcending knowledge differences in cross-functional teams. *Organization Science*, *23*(4), 951–970. https://doi.org/10.1287/orsc.1110.0677

Majchrzak, A., Jarvenpaa, S. L., & Bagherzadeh, M. (2015). A review of interorganizational collaboration dynamics. *Journal of Management*, *41*, 1338–1360. https://doi.org/10.1177/0149206314563399

Miles, M. B., Huberman, M. A., & Saldana, J. (2014). *Qualitative data analysis* (3rd ed.). London, England: Sage Ltd.

Milliken, F. J., Morrison, E. W., & Hewlin, P. F. (2003). An exploratory study of employee silence: Issues that employees don't communicate upward and why. *Journal of Management Studies*, *40*, 1453–1476. https://doi.org/10.1111/1467-6486.00387

Minoja, M., Zollo, M., & Coda, V. (2010). Stakeholder cohesion, innovation, and competitive advantage. *Corporate Governance: The International Journal of Business in Society*, *10*, 395–405. https://doi.org/10.1108/14720701011069632

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review*, *22*, 853–886. https://doi.org/10.5465/amr.1997.9711022105

Morland, K. V., Breslin, D., & Stevenson, F. (2019). Development of a multi-level learning framework. *Learning Organization*, *26*(1), 78–96. https://doi.org/10.1108/TLO-04-2018-0080

Morrison, E. W. (2011). Employee voice behavior: Integration and directions for future research. *The Academy of Management Annals*, *5*(1), 373–412. https://doi.org/10.5465/19416520.2011.574506

Najafi-Tavani, S., Najafi-Tavani, Z., Naudé, P., Oghazi, P., & Zeynaloo, E. (2018). How collaborative innovation networks affect new product performance: Product innovation capability, process innovation capability, and absorptive capacity. *Industrial Marketing Management*, *73*, 193–205. https://doi.org/10.1016/j.indmarman.2018.02.009

Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behaviour*, *27*, 941–966. https://doi.org/10.1002/job.413

Nguyen, T. H. D., Chileshe, N., Rameezdeen, R., & Wood, A. (2019). External stakeholder strategic actions in projects: A multi-case study. *International Journal of Project Management*, *37*(1), 176–191. https://doi.org/10.1016/j.ijproman.2018.12.001

Oerlemans, L. A. G. (2007). *Innovatie en netwerken: Een perfecte match? In Oratie hoogleraar organizational dynamics*. Tilburg, Netherlands: Universiteit van Tilburg.

Oppong, G. D., Chan, A. P. C., & Dansoh, A. (2017). A review of stakeholder management performance attributes in construction projects. *International Journal of Project Management*, *35*(6), 1037–1051. https://doi.org/10.1016/j.ijproman.2017.04.015

O'Reilly, C. A., Caldwell, D. F., Chatman, J. A., Lapiz, M., & Self, W. (2010). How leadership matters: The effects of leaders' alignment on strategy implementation. *Leadership Quarterly*, *21*(1), 104–113. https://doi.org/10.1016/j.leaqua.2009.10.008

Pope, E. (2016). On conducting a literature review with ATLAS.Ti. Retrieved from https://atlasti.com/2016/09/01/litreview/

Ren, Y., Kiesler, S., & Fussell, S. R. (2008). Multiple group coordination in complex and dynamic task environments: Interruptions, coping mechanisms, and technology recommendations. *Journal of Management Information Systems*, *25*(1), 105–130. https://doi.org/10.2753/MIS0742-1222250105

Scott, J. T. (2003). Absorptive capacity and the efficiency of research partnerships. *Technology Analysis and Strategic Management*, *15*(2), 247–253. https://doi.org/10.1080/0953732032000051136

Senge, P. M. (1994). *The fifth discipline: The art & practice of the learning organization*. New York, NY: Doubleday/Currency.

Stoker, J. I., Looise, J. C., Fisscher, O. A. M., & de Jong, R. D. (2001). Leadership and innovation: Relations between leadership, individual characteristics and the functioning of R&D teams. *International Journal of Human Resource Management*, *12*(7), 1141–1151. https://doi.org/10.1080/09585190110068359

Stolwijk, C., & Seiffert, L. (2016). *Fieldlab als aanjager van het innovatie ecosysteem*. Netherlands: TNO Delft.

Sun, P. Y. T., & Anderson, M. H. (2010). An examination of the relationship between absorptive capacity and organizational learning, and a proposed integration. *International Journal of Management Reviews*, *12*(2), 130–150.

Sun, P. Y. T., Scott, J., & McKie, D. (2005). Reframing and engaging with organizational learning constraints. In M. A. Rahim & R. T. Golembiewski (Eds.), *Current topics in management (vol. 10)* (pp. 51–76). Transaction: New Jersey, NJ.

Tuncdogan, A., Boon, A., Mom, T., Van Den Bosch, F., & Volberda, H. (2017). Management teams' regulatory foci and organizational units' exploratory innovation: The mediating role of coordination mechanisms. *Long Range Planning*, *50*, 621–635. https://doi.org/10.1016/j.lrp.2016.11.002

Van den Bosch, F. A. J., Volberda, H. W., & de Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, *10*, 551–568. https://doi.org/10.1287/orsc.10.5.551

van Ham, H., & Koppenjan, J. (2001). Building public private partnerships: Assessing and managing risks in port developmen. *Public Management Review*, *3*, 593–616. https://doi.org/10.1080/14616670110070622

Volberda, H. W., Foss, N. J., & Lyles, M. A. (2010). Absorbing the concept of absorptive capacity: How to realize its potential in the organization field. *Organization Science*, *21*(4), 931–951. https://doi.org/10.1287/orsc.1090.0503

Yin, R. K. (2009). *Case study research design and methods*. London, England: Sage Ltd.

Zahra, S. A., & George, G. (2002). Absorptive capacity: A review reconceptualization and extension. *Academy of Management Review*, *27*, 185–203. https://doi.org/10.5465/amr.2002.6587995

Zapata-Cantu, L., Rialp, J., & Rodríguez, A. O. (2020). Relative absorptive capacity as a booster of innovation in an automotive cluster. *Competitiveness Review*, *30*, 175–193. https://doi.org/10.1108/CR-12-2018-0086

AUTHOR BIOGRAPHIES

Arnold Hoosbeek holds a BSc in Marine Engineering and an MSc in Business Administration from the University of Groningen. Most of his career he has spent in Operations and Engineering leadership functions within Shell. Also, as an internal consultant, he took part in several international restructuring projects. Currently, he advises industrial companies on topics such as Innovation, Continues improvement, Management control and Operations strategy.

Jan de Vries studied Business Administration (MSc, PhD) at the University of Groningen. Although a keen interest in all parts of Operations Management, the research expertise of Jan de Vries strongly relates to the organizational embedding of planning and control systems. During the last fifteen years, Jan de Vries conducted studies in the area of Enterprise Resource planning, Inventory management, and the application of Operations Management concepts within a Service context (especially Healthcare). Jan de Vries is furthermore actively involved in the teaching of MBA courses on Operations Management, both nationally as well as internationally.

How to cite this article: Hoosbeek A, de Vries J. Stakeholder influence on teaming and absorptive capacity in innovation networks. *Creat Innov Manag*. 2021;30:632–650. https://doi.org/10.1111/caim.12448

APPENDIX A: INTERVIEW PROTOCOL

General questions

- Can you give a short introduction of your organization?
- What is your role in the organization and in the fieldlab?
- Have you had a long-term working relationship with the participants in the fieldlab?
- Can you describe your relationship with the project members in the project team?
- How do you keep up to date with the progress of the fieldlab?
- How do you see your role within the fieldlab?

Stakeholder questions

Interest

- Why is the fieldlab important to you, and what do you hope to get out of it?
- How would you estimate the risks of collaborating in this fieldlab?
- Is the project team aware of your interests?

Cohesion

- Can you briefly indicate the interest of each stakeholder to participate in this project?
- Are the interests of the various stakeholders sufficiently balanced?
- What has been your involvement in determining the objective of this project?
- What is the effect of the degree of cohesion?

Power

- If we oversee all stakeholders, how important are they regarding e.g. resources, authority, external influence, alternatives?
- How do you defend your interests within the fieldlab?
- What is the target of your salience-shaping strategies, the steering group, the project team or another group?

Teaming questions

Stakeholder involvement from the perspective of the project team

- Can you say something about the involvement of the various stakeholders?

Psychological safety

- Is it easy, to speak up about what is on your mind?
- If you make a mistake on this team, is it often held against you?
- Do people value others unique skills and talents?
- It is safe to take a risk on this team?
- It is difficult to ask other members of this team for help?
- No one on this team would deliberately act in a way that undermines my efforts.

Speaking up

- What is considered more important within the team, (a) free exchange of ideas or (b) progress of improvement?
- Suppose you do not agree with the team on approach or problems within the team, do you feel free to say that and make it negotiable?
- Working with members of this team are your unique skills and talents valued and utilized?
- How free you feel about collaborating in this team?

Collaboration

- Can you say something about the form of collaboration?
- Has the collaboration changed during the project?
- How are knowledge, experience, and resources shared within the project team?
- How are decisions made?

Experimentation

- Which description suits your project best: we quickly try something out to see whether it works, or we wait until we have all facts above the table before we try anything?
- Can you indicate what kind of experiments are being carried out?
- Can you indicate how you have learned from these experiments?
- Can you indicate how 'speaking up' affected experimentation within the team?

Reflection

- Are there moments in the collaboration process which require reflection?
- Can you say something about how that reflection takes?
- Can you indicate how 'speaking up' affected reflection within the team?

Absorptive capacity questions

Absorptive capacity

- Is the project team able to get the necessary knowledge from the (direct) network?
- Is the knowledge we just spoke about sufficiently analyzed and understood by the project team (assimilation)?
- Has the project team been sufficiently able to combine this knowledge and to transform it into being used within the project?
- Has the ACAP improved during the course of the project?
- What has influenced acquisition, assimilation and transformation?

APPENDIX B: DETAILS OF ALL INTERVIEWS HELD

Case	Interviewee	Company	Position	Role	Interest	Interview type	Interview duration (min)	Interview date	Interview place
Case A	A1	ES	Director	Member		Face-to-face	65	23-04-18	Sittard
	A2	FL	R&D director	Stakeholder	Commercial	Face-to-face	67	23-04-18	Helmond
	A3	FL	Engineer	Project leader		Face-to-face	65	12-03-18	Helmond
	A4	NN	Tech director	Stakeholder	Commercial	Face-to-face	45	25-04-18	Marknesse
	A5	ES	Engineer	Member		Face-to-face	52	23-04-18	Sittard
	A6	NN	Engineer	Member		Face-to-face	59	25-04-18	Marknesse
	A7	ES	CEO	Stakeholder	Commercial	Face-to-face	20	23-04-18	Sittard
Case B	B1	YD	Director	Stakeholder	Commercial	Face-to-face	62	01-05-18	Wageningen
	B2	NM	Consultant	Project leader		Face-to-face	100	26-04-18	Groningen
	B3	YD	Engineer	Member		Face-to-face	58	01-05-18	Wageningen
	B4	UV	Chem. Engineer	Member		Face-to-face	53	20-04-18	Groningen
	B5	MS	Engineer	Member		Face-to-face	70	02-05-18	Hengelo
	B6	JW	Director	Stakeholder	Commercial	Face-to-face	55	11-06-18	Workum
	B2	NM	Consultant	Project leader		Telecon	40	17-06-20	—
Case C	C1	SH	Engineer	Member		Face-to-face	71	22-03-18	Drachten
	C2	SH	Engineer	Project leader		Face-to-face	51	28-05-18	Drachten
	C3	SH	Tech team leader	Stakeholder	Commercial	Face-to-face	48	22-03-18	Drachten
	C4	UV	Student (AI)	Member		Face-to-face	52	22-03-18	Drachten
	C4	UV	Student (AI)	Member		Telecon	17	29-05-18	—
	C5	IA	Engineer	Member		Face-to-face	47	22-03-18	Drachten
	C6	IA	CEO	Stakeholder	Commercial	Face-to-face	45	22-05-18	Oosterwolde
	C7	UV	Sr lecturer	Stakeholder	Education	Face-to-face	53	20-04-18	Leeuwarden