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Manage or Being Managed? Towards a Dual Perspective on Boundary Management in Digital Innovation Teams

Selina Mayer
Hasso Plattner Institute, selina.mayer@hpi.de

Martin Schwemmle
Hasso Plattner Institute, martin.schwemmle@hpi.de

MANAGE OR BEING MANAGED? TOWARDS A DUAL PERSPECTIVE ON BOUNDARY MANAGEMENT IN DIGITAL INNOVATION TEAMS

Research Paper

Selina Mayer, Hasso Plattner Institute, University of Potsdam, Potsdam, Germany, selina.mayer@hpi.de

Martin Schwemmle, Hasso Plattner Institute, University of Potsdam, Potsdam, Germany, martin.schwemmle@hpi.de

Abstract

To achieve better and faster digital innovations, organizations rely on self-managing teams. Boundary management refers to activities that bridge boundaries between different entities. It can foster the effectiveness of self-managing teams, especially in highly digitized working contexts, since virtual collaboration fosters fluid team boundaries. Prior work considers external leaders as responsible for boundary management. However, the increased relevance of self-managing teams also raises the question of how team members can engage in boundary management and how their behaviors relate to leaders' behaviors. Conducting a qualitative multiple case study with 27 digital innovation workers from three different industries, we identified four categories of boundary management behaviors that self-managing digital innovation teams engage in: fostering psychological safety*,* exploring through experimentation*,* building networks*, and* acting with autonomy*. As we demonstrate, these team behaviors complement existing leader behaviors and suggest a dual perspective of boundary management in digital innovation teams.*

Keywords: Boundary Management, Digital Innovation, Agile Working, Self-Management

1 Introduction

Self-managing teams are important for leveraging opportunities of digital transformation and innovation, such as to accelerate production and to innovate products, processes, and business models (Lanzolla *et al.*, 2020; Marion and Fixson, 2020; Nambisan *et al.*, 2017; Schwarzmüller *et al.*, 2018; Vial, 2019). The growing use of digital technologies further increases the relevance of self-managing teams, since "digital transformation increases employees' influence in organizations," giving them immediate access to all information and providing a basis for their own decision-making (Schwarzmüller et al. 2018). Virtual collaboration, for example, requires more self-management than face-to-face teamwork (Martins et al. 2004). Moreover, digital innovation teams often rely on agile development or Design Thinking (Raabe *et al.*, 2020; Ravichandran, 2018) to allow faster development cycles and the quick adoption of changes (Hoda and Murugesan 2016). These work practices need teams that manage themselves, for example the agile manifesto states that "The best architectures, requirements, and designs emerge from self-organizing teams" (Fowler and Highsmith, 2001, p. 32).

A key factor in ensuring the effectiveness of self-managing teams is boundary management (Ancona 1990; Marrone 2010). Boundary management refers to bridging entities, such as the boundaries between a team and other teams and between a team and the organization (Druskat and Wheeler,

2003). Boundary management is of particular relevance to digital innovation teams, as large organizations often position these teams outside the corporate structure to give them flexibility and freedom, but at the same time need to ensure that they remain in regular contact with the rest of the organization, whether to access existing knowledge or bring their new solutions to the existing structures (Barthel *et al.*, 2020; Hund, Holotiuk, *et al.*, 2019; Yoo *et al.*, 2012). The term 'boundary management' covers all the activities that bridge the boundaries between the innovation team and the rest of the organization, as well as those within the team, i.e., between team members.

Research usually considers boundary management to be a leadership task, and found that leaders who engage in boundary management can increase the effectiveness of self-managing teams (Cortellazzo *et al.*, 2019; Druskat and Wheeler, 2003). In addition, some studies found positive effects of team member behaviors for boundary management (Marrone, Tesluk, and Carson, 2007; Marrone, 2010). However, these studies suffer from two major shortcoming. First, prior research has investigated team member boundary management in teams without a formal leader (Carson *et al.*, 2007), ignoring the fact, that many self-managing teams often still have a formal leader due to the structural conditions of hierarchical organizations. This overlooks teams who work in the paradoxical tension of being self-managing, e.g. "members working collaboratively to make team decisions such as hiring, firing, scheduling, and determing operating procedures" (Tata and Prasad, 2004, p. 250) and still having a formal leader. Not much is known how members manage their boundaries in these teams.

And second, they do not examine the intersections between the team behaviors and the behaviors of its leader. While some researchers have indicated first insights on the importance of team members' behaviours for boundary management (Marrone, 2010; Marrone *et al.*, 2007), others emphasize the importance of leaders' boundary management behaviours (Druskat and Wheeler, 2003). Current research lacks knowledge about team members' management behaviours in agile and autonomous teams and how they relate to the leaders behaviours.

To extend research on the boundary management of self-managing teams, we raise the following two questions: *How do members of self-managing teams in digital innovation work manage their boundaries?* And, *how do boundary management behaviors of team members relate to the boundary management behaviors of leaders?* To answer these questions, we conducted 27 interviews with innovation team members of digital innovation projects. Based on the qualitative analysis of our interview data, we demonstrate four categories of behaviors that self-managing teams use to manage their boundaries when working on digital innovations—*fostering psychological safety*, *exploring through experimentation*, *building networks*, and *acting with autonomy*. Comparing these team member behaviors to effective leader behaviors from boundary management research, we found that they complement each other so that certain boundary management tasks can be taken on by the members of self-managing teams, whereas others are still handled by the leaders (Druskat and Wheeler, 2003).

With this paper, we provide an understanding of how self-managing teams engage in boundary management, and how these behaviors can complement leaders' boundary managing behaviors. Our results imply that self-managing innovation teams not only bring value to the organization with innovation outcomes, but they can further support organizations in transforming their culture towards more autonomy, which is highly needed for mastering digital transformationThis is a heading 2 style paragraph.

2 Theoretical Background

2.1 Boundary Management

Bounday management describes the active effort to manage boundaries within an organization, in other words, "bridg[ing] disconnected parties" (Marrone, 2010, p. 911). Traditionally, boundary management focused on activities that connect the team to external entities. Externally-focused boundary management activities include gathering information from relevant experts, the coordination of tasks with stakeholders or partners external to the team, representing the team within and outside

the organization, and building political awareness (Ancona and Caldwell, 1992). More recent research also considers team-focused activities as boundary management. Such behaviors refer to bridging boundaries between team members, and include conflict management, trust building and task coordination between team members (Marrone, 2010; Somech and Khalaili, 2014). Building on the current state of research, we consider boundary management as including bridges between multiple entities, both internal and external to the team. In particular, boundary management involves bridging between (1) individual teams members, (2) two or more teams, (3) the team and the broader organization, and (4) the team and entities outside the organization. It can involve, for example, conflict or task management as internal boundary management, and information gathering as external boundary management.

Research has found positive effects of boundary management on team performance (Gladstein, 1984; Mathieu *et al.*, 2008), innovation activities (Hargadon, 2002; Somech and Khalaili, 2014), and effective team work in interdisciplinary collaboration (Benoliel and Somech, 2015). Managing boundaries also plays a crucial role in the implementation and use of information systems (Levina and Vaast, 2005), as it contributes to the succes of digital innovation (Barrett *et al.*, 2012; Fleming and Waguespack, 2007).

Both leaders and team members can manage boundaries (e.g. Druskat and Wheeler, 2003; Marrone, 2010). In particular, and although it may sound paradoxical, leadership can be a crucial success factor for the boundary management of self-managing teams (Druskat and Wheeler, 2003). Research has found four categories of boundary-management activities that leaders that support self-managing teams engage in: *relating*, *scouting*, *persuading*, and *empowering* (Benoliel and Somech, 2015; Druskat and Wheeler, 2003, 2004; Fleming and Waguespack, 2007; Mathieu *et al.*, 2008). Leaders' boundary management behaviors can be both external and internal. For example, *persuading* involves both external behaviors, such as acquiring support from outside the organizations (e.g. from experts or suppliers), and internal behaviors, such as influencing team members to follow the corporate goals and needs (Druskat and Wheeler, 2003, 2004).

Further research focusses on the importance of team members' behaviors for boundary management (Marrone, 2010; Marrone *et al.*, 2007). While the team members' behaviors can have a positive influence on team performance, the resulting role overload can also negatively influence team viability (Marrone *et al.*, 2007). This overload can especially occur in digital innovation work, as research shows that fast-paced and complex environments can provoke role overload in individual team members, because they are "facing simultaneous and often conflicting pressures" (Marrone *et al.*, 2007, p. 1423).

2.2 Digital Innovation Teams and their Need for Boundary Management

Two main arguments suggest examining the behaviors of digital innovation teams from a boundary management perspective. First, innovation work requires innovation teams to manage various entities (Audenaert *et al.*, 2017). Digital innovation teams often already rely on self-management, which "brings decision-making authority to the level of operational problems and uncertainties and, thus, increases the speed and accuracy of problem solving" (Tata and Prasad, 2004, p. 250). Hence, boundary management can serve as a mechanism of digital innovation management, which refers to "the practices, processes, and principles that underlie the effective orchestration of digital innovation." (Nambisan *et al.*, 2017, p. 224). Second, boundary management is unique as it can deal with the fluid boundaries that are typical for digital innovation teams or digital innovation units (Barthel *et al.*, 2020; Hund, Drechsler, *et al.*, 2019; Raabe *et al.*, 2020). Such teams increasingly work together virtually and involve freelancers or team members that join the team for only a limited time. Furthermore, these units are often set up as external exploration units, creating the need to bridging the gap to the organization in order to leverage the created knowledge (Hund, Holotiuk, *et al.*, 2019; Yoo *et al.*, 2012). These dynamics make the exact boundaries of such teams more fluid and complex, so that it is hard to determine who is 'in' and 'out' of the team (Mortensen and Haas, 2018). Other than self-management, which focuses on specific behaviors within a team, boundary management captures both

behaviors within and outside the team (Marrone, 2010), making it particularly suitable to describing the behaviors of digital innovation teams with their fluid, complex, and dynamic boundaries.

3 Method

To study how digital innovation teams engage in boundary management activities, we adopted a qualitative research design. Research on digital innovation teams, especially in dedicated innovation units, is still an emergent field (Frey *et al.*, 2020; Hund, Drechsler, *et al.*, 2019). Little is known about boundary management practices in digital innovation teams, which is why we follow an inductive approach to derive insights from real life situations (Eisenhardt, 1989; Yin, 2011). This procedure is also suggested by the grounded theory approach (Corbin and Strauss, 1990). In particular, we draw on multiple cases to detect rather subtle effects, but are still able to capture a broad spectrum of the phenomenon by including multiple firms with different contexts (Mikalef *et al.*, 2020; Yin, 2011).

We opted for multiple cases with single units, treating each interview partner as one case to include a range of practitioners with a variety of contexts (Yin, 2011). This approach has been proven as a valid research strategy within the IS community, especially when the topic of interest is rather emerging and interview partners are rare (Mikalef *et al.*, 2020; Schneider and Kokshagina, 2020). The emergence of the field and the limitation of experts in this context limits the possibilities for a case study with multiple interview partners per case.

3.1 Data Collection

To study how team members of digital innovation teams engage in boundary management behaviors, we relied on 27 in-depth interviews with experienced practitioners from three different industries: finance, healthcare, and insurance. The interviews were conducted between March 2020 and January 2021 via online calls, recorded, and transcribed with permission, resulting in 18 hours and 45 minutes of interview recordings and approximately 378 pages of transcripts (Arial 11, 1.5 line spacing). We focused on practitioners within medium sized to large incumbent organizations, excluding consultancies and agencies, as we wanted to ensure a continuous exposure to the same cultural context and working experiences in teams over longer periods of time. Our participants vary in their roles and departments, but are all engaged in digital innovation activities, using agile methods for their work, such as Design Thinking. Table 1 displays details about the roles of our interview partners and their organizations.

In line with the grounded theory approach (Corbin and Strauss, 1990; Coyne, 1997), we applied a theoretical sampling strategy to trace the iterative nature between sampling, data collection, and analysis. We started with a semi-structured guideline that covered three main areas: (1) the current role of and activities for innovation; (2) impact of agile working methods (mainly Design Thinking) on projects and personal working experience (e.g., self-management, team work, collaboration with other entities); and (3) leadership-specific experiences. Over time, we identified the intersection between entities as a relevant topic and adapted the interview guide to include more boundary management-specific topics, such as autonomy and psychological safety. These topics emerged from the data analysis as well as from existing theory.

In addition, we reflected on the emerging topics through data triangulation, matching our interview insights with observations of and discussions with practitioners during multiple occasions, such as innovation workshops or network events (Klein and Myers, 1999). An overview of this secondary data can be found in Table 1.

Primary Data (Interviews: n= 29)									
	Industry	**Role**	**Company Size (in T)**	**Interview length (min.)**		**Industry**	**Role**	**Company Size (in T)**	**Interview length (min.)**
#1	Fin.	UX Manager	>50	57	**#15**	HC	Director Biopharma R&D	>5	40
#2	Fin.	Head of Business Dev. & Innovation Management	>10	36	**#16**	HC	Head of Ethics and Compliance	>10	46
#3	Fin.	Business Dev. & Innovation Manager	>5	60	**#17**	HC	Medical Device Innovation	>5	44
#4	Fin.	Head of Digital Transformation	>10	43	**#18**	HC	Product Owner	>5	35
#5	Fin.	UX Manager	>50	31	**#19**	HC	Senior IT Project Manager	>100	39
#6	Fin.	Senior Project Manager	>10	35	**#20**	Ins.	Project Manager Transactionals	>1	37
#7	Fin.	Senior Project Manager	>50	32	**#21**	Ins.	Executive Assistant	>5	39
#8	Fin.	Innovation Coach	>100	53	**#22**	Ins.	Business Dev. Manager	>5	51
#9	HC	Senior IT Manager	>1	48	**#23**	Ins.	Business Dev. Manager	>50	15
#10	HC	Senior Teamleader IPC & Monitoring	>10	48	**#24**	Ins.	UX Consultant (internal)	>50	38
#11	HC	Agile Lead	>5	46	**#25**	Ins.	UX Consultant (internal)	>50	33
#12	HC	IT Business Relationship Manager	>50	49	**#26**	Ins.	UX Consultant (internal)	>1	35
#13	HC	Innovation Incubator Lead	>5	36	**#27**	Ins.	Product Portfolio Manager & DT Coach	>50	28
#14	HC	Global Head of IT Business Partnering	>1	41					
			Average:	*~32* *~41,5*					

Secondary Data	
Workshop Interactions: n= 11	1-5-day Workshops for Innovation or Leadership (participants were either interviewees and their teams or other teams from the same company)
Network Event Observations: n=3	Written Documents: Presentations (7); Public Statements (3); Cases (2)

Table 1. Collected Data.

4 Results

We identified four categories of boundary managing behaviors emergent in digital innovation teams: *fostering psychological safety*, *exploring through experimentation*, *building networks*, and *acting with autonomy*. The following sections provide details about each of these four behavior categories. First, we describe each category in detail and provide illustrative quotes from our data. We also explain why these behaviors of digital innovation teams are boundary management behaviors. Second, we describe the link between these team member behaviors and the four boundary management behaviors of leaders identified by Druskat and Wheeler (2003): *relating, scouting, persuading,* and *empowering*. As we illustrated in our model illustrated in Figure 2, both leaders and team members engage in boundary management, emphasizing a dual route to effective team management. Both groups engage in internal team-focused and external organization-focused behaviors; these external behaviors also include reaching beyond the organization, such as to outside experts. Third, we illustrate links between the newly identified team member behaviors and highlight the most prominent relationships.

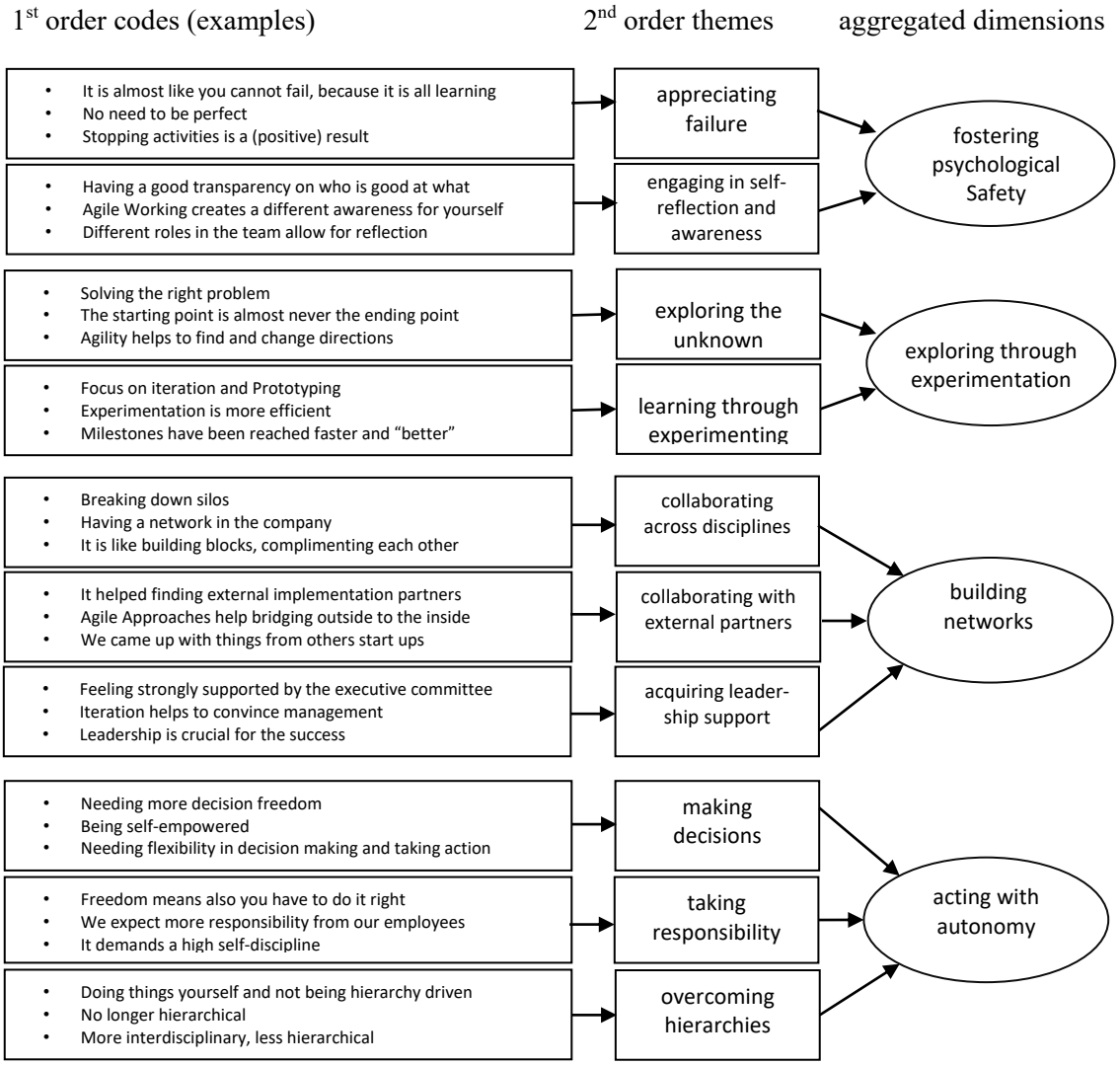

Figure 1. Data Structure

4.1 Fostering Psychological Safety

The practitioners we have interviewed reported a feeling of psychological safety in their teams. Psychological safety is defined as "a shared belief that the team is safe for interpersonal risk taking" and includes a reduction of concern about others' reactions or one's own potential embarrassment, which fosters learning behaviors in the team (Edmondson, 1999, p. 354). Bridging individuals and creating interpersonal trust can be seen as an internal boundary management behavior within teams.

We found two behaviors underlying *fostering psychological safety*: *appreciating failure* and *engaging in self-reflection and awareness*. Concerning *appreciating failure*, the definition of psychological safety indicates being open to failure as the basis to taking risks without the fear of negative consequences. One participant described that they were "less self-conscious about failing." (#6.) In addition, appreciating failure allows people to be less perfectionist: "It doesn't have to be perfect; I think that's maybe something that stuck with me long term." (#8). Our second identified factor—*engaging in self-reflection and awareness*—relates more to the learning and development aspect of psychological safety. One participant referred to the variety of tasks and behaviors they engaged in, in

digital innovation work, resulting in higher self-awareness. “You play those different roles. I think that is something that is sort of a self-awareness check that I wouldn't have anticipated (#6).” Another participant described this awareness on a team level: “We had a good transparency of what everyone could do well or was bad at in the team” (#12). Being aware of one’s strength and weaknesses is a necessary first step to allow an improvement in these skills, for oneself but also for the other team members. Allowing and consequently appreciating this awareness and reflection in addition to an open failure culture allows teams to create a psychologically safe environment based on trust and respect. It enables risk taking, which is often crucial, especially in explorative and innovative contexts, where results are generally unpredictable.

The process of fostering psychological safety is per definition a ‘shared belief’ in the team and among its members and thus is a boundary managing behavior, which bridges the boundary between different individuals. As an illustration, prior research identified psychological safety as a potential key construct for understanding how teams are bounded together and called for further investigation into psychological safety in the context of boundary management (Mortensen and Haas, 2018). In line with this study, recent research on boundary management emphasizes the need to consider team-focused behaviors, such as between team members on the individual level (Marrone, 2010; Somech and Khalaili, 2014).

4.2 Exploring through Experimentation

Exploring through experimentation was our second category of self-management behaviors in digital innovation teams. We identified two behaviors for this category: *learning through experimenting* as an internal boundary management behavior, and *exploring the unknown* as an external boundary management behavior.

As a behavior enacted mainly within the team, *learning through experimenting* allows teams to test their ideas and hypotheses while staying flexible depending on the actual results. “Rather, they say we'll just try it out now. And it's an experiment. And then let's see what comes out of it.” (#17). One participant pointed out that “certain milestones were reached faster” (#2), indicating a direct connection between this iterative approach and the pace of performance achieved by the team.

Illustrating *exploring the unknown*, one participant described the importance of investing time in exploration in order to target the right problem. Teams often found that taking time to investigate a topic upfront instead of creating immediate solutions reveals a different underlying problem than expected. “We're creating x, and do a bit more work and research, invest some time upfront to make sure we're solving the right problem. I think almost every time we discover, ‘oh, it's actually not x, it’s something different’.” (#6). Another team member described how exploration means deciding, time and again, what direction to take next, as the next steps depend on the current results. “I find a starting point and say, ‘I actually wanted to go there’, you looked there and said, ‘go in this direction now’. I go to the edge and say ‘okay, something is happening, keep walking’, and it's actually much more interesting.” (#3). This means that *exploring the unknown* is an important way for teams to find the most relevant and interesting information outside and bring it into the team. Therefore, this behavior bridges boundaries between different teams, between the team and the broader organization, and between teams and entities outside of the organizations.

Exploring through experimentation is a boundary management behavior that combines the more externally oriented exploration behaviors, due to its exploratory nature. Research has identified general information search as one key behavioral category for boundary management (Marrone, 2010) alongside the more internal behaviors of *learning through experimenting*. While *exploring the unknown* clearly entails the gathering of information, *learning through experimenting* offers a view on how the team can actually leverage this gathered information internally. Therefore, we consider *exploring through experimentation* to be a boundary management activity.

4.3 Building Networks

Self-managing team members build networks over time. We identified three behaviors underlying *building networks*: *collaborating across disciplines* as an internal boundary management behavior and *collaborating with external partners* and *acquiring leadership support* as external boundary management behaviors.

First, as an example for *collaborating across disciplines*, one participant described having a larger and more diverse network after working with agile approaches in a digital innovation project. “In the end, there were more people I could call upon.” (#6). Overall, bridging silos through *collaborating across disciplines* seems to have a great impact, especially in large organizations, where different people work on similar or even the same topic without knowing it. “This networking was a very, very big aspect. The fact that we invited people from different areas who, as it turns out, end up working on similar topics without the other person knowing.” (#1). Second, participants also described more contacts outside their team’s boundary, including contacts within and outside the own organization. In one case, the interviewee’s team came up with a promising idea, but opted for a partnership with an external start-up instead of entering a rather difficult internal development process, showcasing *collaborating with external partners* behavior. "We had the idea ourselves, so it might not be so bad if another company comes up with a solution for building something like this [...] The solution exists, although not from us, but from another start-up. They basically took up the idea, and we could have done that just with big difficulties ourselves via product development." (#3). And third, we found *acquiring leadership support* to be an essential factor for digital innovation teams. We discovered that working with agile approaches allowed our interview partners to bring leadership support more constantly into their own network. Interviewees reported that they suddenly have access to managers normally “too high up” in the hierarchy, hence *acquiring leadership support*. While on the one hand, the agile way of working seems to be helpful to obtain higher management support, on the other, self-managing teams seem to need leadership support to work to their fullest potential. “It is important [to have] somebody from [our Executive]; I think you need that in order to champion both the thought process and the embracing of failure.” (#6).

The representation of the team to the outside is a key component of boundary management, including especially the relationship to people higher up in the hierarchy (Marrone, 2010). Overall, *building networks* includes the interaction with a diverse set of colleagues, with higher management, and with external experts, offering the situational context to frequently act as a team’s representative, including bridges to multiple entities.

4.4 Acting With Autonomy

Prior research defines autonomy as "the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out." (Hackman and Oldham, 1975). Hence, it is of no surprise to find autonomy in self-managing teams, and that digital innovation teams need, but also increasingly demand, autonomy in their decision-making. We identified three factors underlying *acting with autonomy*.

First, within their team, team members actively engage in *making decisions*. As one interviewee commented on their team work: “I believe we expect our team to be much more independent, as is normally the case in our company.” (#9). One participant described it as a condition that opened up opportunities: “At the time, I was relatively free to act, and that greatly broadened my scope of possibilities.” (#13). Second, with this freedom comes an expectation to, but also the willingness of *taking responsibility*. Another participant described the awareness of freedom paired with responsibility as having “an incredible amount of power” (#3).

Third, *overcoming hierarchies* emerged as an external boundary management behavior. As most of our interviewees worked in large and incumbent firms, their environment was mostly rather traditional. Yet, engaging in digital innovation fostered a less hierarchical behavior: "If we do that

[i.e., working in an agile manner] in our team, then there are no more hierarchies that somehow restrict the whole thing" (#5).

One branch of boundary management research has specifically focused on self-managing or autonomous teams, demonstrating that boundary management enacted by leaders can positively impact team performance (Druskat and Wheeler, 2003, 2004). In their model, Druskat and Wheeler (2003) describe *empowering,* or the delegation of authority, as key behaviors for boundary management on the leaders' side. Yet, it is necessary for team members, too, to act with autonomy, hence making *acting with autonomy* (incl. overcoming hierarchies) a boundary managing team behavior.

Overall, we found that these four team-member boundary management behaviors are highly interrelated. Feeling psychologically safe in the team is a crucial building block that allows teams to *explor[e] through experimentation*, as it removes the fear of failure and encourages to try things out. Making positive experiences when failing therefore feeds back into *fostering psychological safety*. Having these joint learning experiences while iterating, e.g., engaging in experimentation or exploration, gives team members a common ground, which facilitates rich discussions, including about the various perspectives offered by each team member. Using physical artefacts such as prototypes fosters an understanding for the project contents in the broader organizations, helping the team to acquire leadership support. This creates interactions across hierarchies, supporting the team in *acting with autonomy*. In *acting with autonomy,* we found that all previously named behaviors (*fostering psychological safety*, *exploring through experimentation*, and *building networks*) allow team members to actively seize and optimize the autonomy offered to them.

4.5 The Interplay between Leaders' and Team Members' Boundary Management Behaviors

As the previous sections have illustrated, not only leaders, but also team members of self-managed digital innovation teams engage in boundary management. Our results extend the research on boundary management behaviors of leaders to include team members' behaviors and, as a result, we suggest a dual perspective, illustrated in Figure 2. In this section, we describe this duality in more detail and show how each of the team members' behaviors (visualized as white boxes) can be best supported by leader behaviors (visualized as gray boxes), based on the existing leaders' behavior model of Druskat and Wheeler (2003).

Leaders can best pursue *relating*, i.e., create awareness for the innovation team within and outside the organization, or provide support to establish team trust, while *fostering psychological safety* refers to the corresponding team members behaviors. As psychological safety requires team members' active engagement to create a 'shared belief'(Edmondson, 1999), it cannot be realized solely by the leaders' behavior. Yet, leaders can support *fostering psychological safety* in teams through *relating*, which describes behaviors such as caring for team members and building team trust. Furthermore, the organization-focused element of *relating*—creating social and political awareness in and about the team vis-a-vis the larger organization—seems to be challenging for team-members. Our interviewees described that they are not always invited to or did not have time to attend all the 'right' meetings and committees. Creating awareness in the organization is therefore a strong supporting factor that leaders need to provide.

Leaders who engage in *scouting* seek outside information, and support their teams by systematically investigating problems. Leaders also often socialize in other circles, which gives them more direct access to, for example, suppliers or collaborators, which affords them a perspective that team members don't have. Team behaviors of *exploring through experimenting* can complement leaders' *scouting* by gathering information themselves and by being open to learn from unexpected information provided by experimentation. Thereby, the outcome is not yet clear at the beginning of the exploration process, turning innovation into a learning process (Beckman and Barry, 2007). This openness and on-the-fly adaptation of steps to achieve a certain outcome is key to innovation and best applied within self-

managed teams. Outside leaders can only encourage this mode of exploration, but not explore and learn alone, without their teams.

The leader behavior of *persuading* implies a hierarchy between the person who persuades and those being persuaded. This boundary managing behavior might be particularly supportive when clear directions are needed or externals need to be convinced to collaborate with the team. This behavior is complemented by team behaviors that are characterized by less hierarchical collaboration, as reflected in *building networks*, in particular, when team members meet on the same level to leverage their joint knowledge and skills (Hargadon, 2002). Hence, despite the leader behavior *persuading* implying a connotation of power or power imbalance, our results indicate that the corresponding team behaviors emphasize a collaborative culture that puts all players on a more or less equal level.

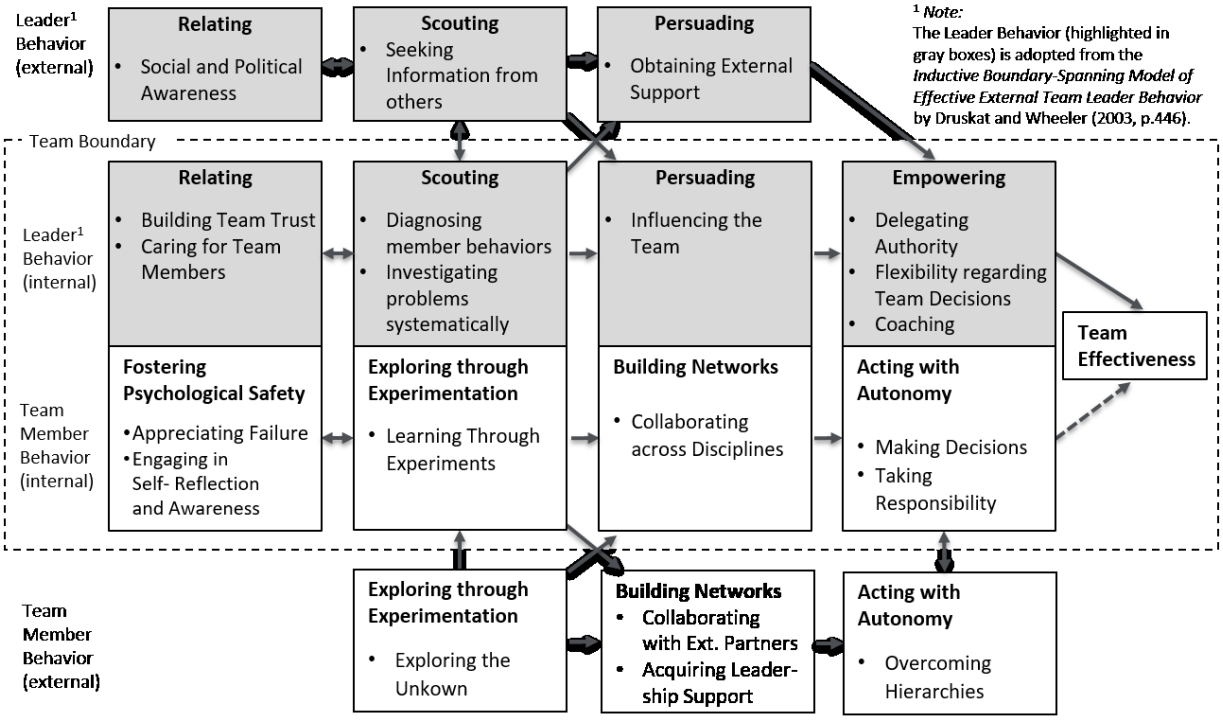

Figure 2. Research model.

Lastly, leaders can *empower* teams by delegating authority. The team behavior of *acting with autonomy* mirrors this empowerment. It moves the responsibility for making decisions from leaders to teams. In this vein, Druskat and Wheeler themselves already noted the importance of distributing power (e.g., giving power to others) over just sharing part of the power (e.g., keeping part of the power to oneself) (Druskat and Wheeler, 2003). "Who decides?" is one guiding question when investigating autonomy in teams (Hackman, 2002, p. 261). The interplay between leaders' *empowering* behavior and employees' *acting with autonomy* behavior provides an answer to this question from a dual perspective.

In essence, the boundary management behaviors of leaders and teams show how a proper distribution of boundary management tasks can reinforce and mutually benefit each other. A team cannot be self-managing when leaders do not empower the team, especially in the context of predominantly hierarchical structures of incumbent organizations. Yet, empowerment without team members' willingness to take on responsibility and make decisions on their own is also not possible. This reciprocal relationship strongly suggests a dual perspective on boundary management.

Overall, prior research demonstrates that boundary management of leaders and team members leads to higher team effectiveness (Druskat and Wheeler, 2003; Mathieu et al., 2008; Rousseau and Aubé, 2010). Whereas effectiveness or performance factors were not the focus of our investigation, we therefore pose based on prior research that the identified boundary management behaviors by team members also affects team effectiveness (indicated with a dashed line in our model).

5 Discussion

To address our two research questions, *How do members of self-managing teams in digital innovation work manage their boundaries?* and *how do boundary management behaviors of team members relate to the boundary management behaviors of leaders?*, we conducted a multiple case study. Understanding how teams manage their boundaries is crucial to support self-managing teams in dealing with the growing complexity and need for flexibility posed by digital innovation work (Hoda and Murugesan, 2016; Marrone, 2010).

Answering our first research question, we found that team members in digital innovation work engage in four categories of internal and external boundary management. We contribute to the discussion of boundary management research by offering a deeper understanding of behaviors at the team level. Overall, it is important to consider the team level as an important level of analysis for topics in the fields of organizational and management research. For example, researchers in the field of organizational ambidexterity have criticized the focus on the organizational level and called for more analysis at the team level (O'Reilly and Tushman, 2013; Raisch *et al.*, 2009).

Referring to our second research question, we demonstrated that team members' boundary management behaviors correspond with and complement leader behaviors, as suggested by prior research. We will further elaborate on this link between team members' and leaders' behaviors as well as on the role of agile approaches for boundary management in digital innovation teams.

5.1 A Dual Perspective on Boundary Management for Digital Innovation

As our results show, boundary management in self-managing teams requires a dual perspective. Managing and leading innovation teams is neither solely a formal leader's task, nor can it be accomplished fully internally by teams alone (Somech, 2006; Somech and Khalaili, 2014). However, a combination of both can complement each other and support a team's effectiveness. We demonstrate a close correspondence between the four categories of team member boundary management behaviors (identified from our data) to the leaders' behaviors (identified in boundary management research) (Druskat and Wheeler, 2003). Prior research on boundary management focused on boundary management behaviors, their antecedents, or expected effects (Marrone *et al.*, 2007), but the question of who should take over boundary management tasks in self-managed teams required further inquiry. Proposing and demonstrating a dual route, i.e., the responsibility of boundary management of both leaders and team members, sheds light on this unsolved issue. For instance, leaders can greatly enhance a team's organizational environment, but collaboration and the required trust, learning, and communication can only be cultivated by team members themselves. Similarly, leaders who delegate decision power also need team members who are willing to take on responsibility, and vice versa.

Moreover, our research contributes to the ongoing debate of balancing the autonomy of teams with their alignment with the organization, which is one key challenge of digitization (Ross *et al.*, 2019). Understanding how team members and leaders can share boundary management can maintain this balance.

5.2 New Ways of Leading for Digital Innovation

In general, our findings contribute to answering the question of what kind of leadership is required for agile team work in the context of digital innovation. Increased virtual collaboration and the rise of self-managing teams point towards a reduced need for formal leadership, since such teams increase their self-management activities (Schwarzmüller *et al.*, 2018). In this vein, management literature has

suggested new forms of leadership, such as rotating leadership, emergent leadership or coaching as a leadership style (Davis and Eisenhardt, 2011; Hanna *et al.*, 2020). At the same time, top level commitment and leaders who create the right context are recognized success factors of innovation teams (Somech, 2006). Bringing these two aspects together, our work shows that a mixture of managing and being managed is best for teams in the context of digital innovation. More specifically, we identified managing social and political awareness in the broader organization as well as the distribution of control as two main behaviors that need to be managed, because teams cannot (yet) enact them in their current structures.

6 Conclusion

This paper contributes to leadership in self-managed teams in the context of digital innovation. In particular, we demonstrate that the important task of boundary management is best handled by leaders that are external to the team and by the team members. Our results provide evidence from interviews with innovation team members and allow to distinguish between boundary management behaviors that should best be handled by leaders (e.g., raising social and political awareness for the team in the organization) and those that are best handled by team members (e.g., engaging in self-reflection and awareness of other team members). We found these behaviors in teams that used agile working approaches for their digital innovation activities, and thus are able to demonstrate that agile working can help to develop team members' boundary management behaviors and, thus, contribute to cultural transformation in organizations towards an effective self-management culture.

6.1 Implications for Theory and Managerial Practice

This paper contributes to theory with two main theoretical implications for the Information Systems community and for the area of innovation and management research. Understanding mechanisms behind self-managing teams are a central topic to the Information Systems community, as self-managed teams are a necessary condition for leveraging positive opportunities for digitization (Cortellazzo *et al.*, 2019; Schwarzmüller *et al.*, 2018). First, our findings extend the existing discourse on boundary management in the Information Systems community, which has so far focused mainly on external behaviors, i.e., focusing on boundaries between the team and the organization (Levina and Vaast, 2005). We extend this discourse by offering insights on how team members can manage their own boundaries internally, a concept well-known to those supporting self-managing teams. We therefore broaden the understanding of boundary management to include processes within teams, allowing further research to draw on psychology literature, in addition to management literature. Second, our dual perspective advances the topic of boundary management by considering the interplay between leaders' and team members' behaviors. The relevance of boundary management holds not only true for digital innovation teams. Since digital transformation and the increasing use of digital technologies affect almost every workplace, more autonomous work modes, agile working approaches, and flatter hierarchies are gaining general acceptance in organizations (Schneider and Kokshagina, 2020; Schwarzmüller *et al.*, 2018). Hence, organizations increasingly require boundary management, including outside of (digital) innovation teams. Therefore, our results are relevant not only for the Information Systems community, but also for the management and innovation research community.

Our results provide implications for both team members and leaders working in the context of digital innovation. We show team members the specific behaviors they can engage in to manage their boundaries and, hence, allow them to initiate activities to actively foster these behaviors. Furthermore, team members can actively make their leaders aware of the type of behaviors that can support them most effectively. The same applies to leaders, whose own behaviors and that of their teams can complement each other, if they understand which of their activities are needed the most and which they can delegate to their teams. Overall, our results underline that boundary management is an important skill for supporting teamwork for digital innovation. This skillset is crucial to the future of work that is especially relevant to innovation units in organizations, and to HR departments.

6.2 Limitations and Further Research

Our work is not without limitations, which provides opportunities for further research. First, we chose a multiple case study design with each interview partner as a single case unit. While this allowed a broader understanding of the phenomenon of interest, it limits the in-depth understanding of, for example, company-specific differences in terms of organizational or cultural contexts. Future research could focus on in-depth studies of single cases or multiple cases with multiple interview partners per case, allowing for a deeper assessment of relevant contextual factors. Alternatively, further research could follow a quantitative approach, and, in addition, allow for a hypothesis-driven understanding of the relationship between distinct boundary management behaviors. Furthermore, we selected agile working teams as an example of self-managed teams. Further research could investigate how results change if self-managed teams work with non-agile methods and further explore how agile working methods can specifically support teams to actively manage their boundaries. Second, we focused on team member behaviors that we related with leader behaviors from existing literature. Future research could assess both team members' and leaders' behaviors from the same teams, as well as consider a multilevel perspective by including the individual, team and organizational level. Finally, boundary management literature suggests a positive influence of boundary management on team effectiveness. The focus of our work was on teams' behaviors and not on examining its link with effectiveness. Further studies could therefore establish a link between leaders' and team members' boundary management behaviors and team effectiveness to shed light on the different influence of these two behaviors.

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