Distributed Collaboration in Agile Innovation Processes

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Abstract

Today's turbulent business environment requires companies to come up with novel strategies that enable them to capture business value from digital technologies. To cope with this challenge, companies have started to establish separate business units for the development of digital innovations, termed 'digital innovation labs' (DILs). Agile approaches and practices have been introduced in the innovation processes within DILs, aimed at addressing technology and business uncertainties. Due to the COVID-19 pandemic, companies have been forced to shift from collocated to geographically distributed work arrangements rapidly. However, the impact of working remotely on teams developing digital innovation is largely unexplored. This thesis conducts an exploratory single case study aiming to identify the impact of the geographic distribution of team members on collaboration in the Agile innovation process in the context of DILs. The study focuses on the team level, exploring the experiences of actors that are directly involved in the Agile innovation process. The findings indicate that the distribution of team members affects both positively and negatively the collaboration between team members developing digital innovation within the context of DILs. Several challenges were identified: (1) communication, (2) decision-making, (3) team cohesion, and (4) idea generation. However, benefits were also found: (1) coordination, (2) reachability and availability, (3) efficiency, and (4) knowledge sharing. This study contributes to the innovation management literature by uncovering the dynamics that emerge within teams developing digital innovations when members work geographically distributed. Moreover, this thesis adds to a growing body of literature on Innovation Labs by offering new insights on how team members collaborate within DILs. The thesis also shares practical implications, providing innovation managers with insights regarding the consequences that a distributed setting might have for teams developing digital innovations.

Keywords: *Agile Innovation Management, Digital Innovation, Distributed Teams, Innovation Labs, Distributed Collaboration*

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1. INTRODUCTION

The fast-changing digital and economic environment requires firms to adopt new institutional arrangements and practices that enable them to capture business value from digital technologies (Fichman et al., 2014) in order to remain competitive. To cope with this challenge, companies have started to establish separate business units for developing digital innovations, termed 'digital innovation labs' (DILs) (Holotiuk & Beimborn, 2019) that encourage experimentation to facilitate the development of innovative digital products, services, and business models (Hund et al., 2019).

Moreover, the rapid evolution of digital technologies is causing constant shifts in how firms manage digital innovation. Since traditional innovation processes such as 'Stage-Gate' no longer meet the needs of fast-changing customers and business requirements (Fecher et al., 2018), new approaches such as Agile have been introduced in the innovation processes. The basic concept of Agile is that small co-located teams collaborate closely with customers to effectively produce a high-value product through regular iterations (Kettunen, 2009).

Consequently, companies have established in the DILs the ideal physical environment, resources, and methodologies for teams developing digital innovation. The main goal is to foster digital innovation facilitating deep co-located collaboration in order to speed up innovation cycles, enhance problem-solving and responsiveness to change that is required to tackle the challenges introduced by digital innovation. A primary component of DILs is that it is located in a physical space, which is equipped with open working spaces and tools that stimulate creativity and collaboration among team members (Fecher et al., 2018).

However, the practices and dynamics that have traditionally taken place in DILs have been disrupted due to the COVID-19 pandemic that forced companies to rapidly shift from collocated to geographically distributed work arrangements. Nevertheless, a more flexible workplace model and hybrid arrangements are expected to persist even after the pandemic (Teevan, Jaime, Brent Hecht, and Sonia Jaffe, eds., 2021).

What traditionally took place in collocated settings has now to be distributed across time and space due to the pandemic. Consequently, existing work practices are threatened as distributed teams can not collaborate the same way as traditional face-to-face teams, which clearly has implications for the way teams collaborate in the Agile innovation process. While Agile practices demand close collaboration and face-to-face communication between team members, in distributed environments, teams must adopt digital platforms to communicate and collaborate (Person et al., 2012), which might present several challenges for teams developing innovation. Accordingly, “employers have found during the pandemic that although some tasks can be done remotely in a crisis, they are much more effectively done in

person. These activities include [...] work that benefits from collaboration, such as innovation, problem-solving and creativity" (McKinsey Institute, 2020).

The geographical distribution of team members is particularly challenging in the context of DILs. First, the physical environment of DILs is considered one of the main drivers of DILs' effectiveness. As teams have to move all their activities to a digital environment, their performance might be affected. Second, DILs are separate units fully dedicated to developing digital innovation, which demands deeper collaboration and interaction among team members due to the complexity, novelty, and high pace of innovation cycles characterized by digital innovation. Third, Agile innovation practices (e.g., face-to-face daily meetings) that were effective in the collocated work environment of the DILs are no longer possible in distributed settings. Given these distinctive aspects, DILs provide a rich setting that serves as the context for this study.

Moreover, participants of DILs play a critical role in innovation performance (Fecher et al., 2018); therefore, the collaboration and interaction among team members, innovation coaches, and managers may have a substantial influence on the overall effectiveness of DILs. However, little research has attempted to understand the work routines, forms of collaboration (Holotiuk, 2020), and participants' perspectives (Fecher et al., 2018) of the DILs.

Extant literature on DILs has mainly focused on the structure, organizational design (Holotiuk, 2020), benefits and effectiveness (Magadley & Birdi 2009; Lewis & Moultrie 2005) of DILs. However, work routines, forms of collaboration (e.g., Agile approaches, design thinking) (Holotiuk, 2020), and participants' perspectives (Fecher et al., 2018) of DILs have been largely unexplored. As DILs are a promising approach to foster digital innovation in today's turbulent business environment, scholars stress the need for further research that considers more aspects of DILs in order to deepen the understanding of this emerging phenomenon (Fecher et al., 2018; Holotiuk & Beimborn, 2019; Holotiuk, 2020).

Previous studies reveal numerous possible issues that may arise when teams work remotely (C. B. Gibson & Gibbs, 2006). Lahiri (2010) reports that a low degree of distribution is associated with a high quality of innovation. Distributed teams also experience higher levels of task and interpersonal conflict compared to co-located teams (Cramton, 2001; Hinds & Mortensen, 2005). Moreover, there is a negative relation between team distribution and innovation (C. B. Gibson & Gibbs, 2006). Consequently, geographic dispersion of team members might create communication and collaboration difficulties, which in turn hinder teams ability to generate innovative solutions (C. B. Gibson & Gibbs, 2006; C. Gibson & Vermeulen, 2003).

This is a critical issue as communication and collaboration among team members are considered essential for successful digital innovation, which "depends on how actors come to

understand, share with others, and then modify their understandings of innovation outcomes, processes, and related markets" (Nambisan et al., 2017, p. 229). However, there is limited research on the impact of distributed teams on innovation.

Furthermore, "while both innovation and agility are considered key for a firm's performance in today's turbulent environments, their interplay, i.e., the use of agility in the innovation process, is largely unexplored" (Brand et al., 2021, p. 158). Only a few studies have explored Agile innovation outside software development processes (Brand et al., 2021).

In order to address this gap in the literature, this thesis aims to identify the impact of the geographic distribution of team members on collaboration in the Agile innovation process in the context of DILs. The study focuses on the team level, exploring the experiences of actors that are directly involved in the agile innovation process. Considering the increasing adoption of Agile methods in the innovation process and the fact that geographical dispersion of team members might hinder the factors that drive innovation success, such as communication and collaboration during the innovation process, this study aims to answer the following research question:

What is the impact of team distribution on collaboration in the Agile innovation process within the context of digital innovation labs?

To answer this research question, an exploratory single case study was conducted in order to explore the lived experiences and perceptions of team members developing digital innovation regarding collaboration in a distributed setting within a DIL. This research took place at the digital innovation lab of an international bank, where new digital initiatives are developed, and minimal viable companies are launched and further scaled.

This research contributes to the theory on innovation management by shedding light on the dynamics that emerge within teams developing digital innovations when team members work geographically distributed. Additionally, this study contributes to the emerging literature on Agile innovation management by providing a deeper understanding of the challenges and benefits for collaboration that emerge in Agile innovation processes developed by distributed teams. Moreover, this thesis contributes to the emerging literature on Innovation Labs by shedding light on the participants' perspective of the DILs. Identifying the dynamics, rituals and processes that emerge with the separation of team members of a digital innovation lab and its impact on collaboration contributes to the understanding of this emerging phenomenon. Finally, this research provides innovation managers with insights regarding the consequences that a distributed setting might have for teams developing digital innovations.

2. LITERATURE REVIEW

2.1 Digital Innovation Management

In today's turbulent business environment, companies need to come up with novel strategies that help them effectively harvest the benefits and face the challenges created by the rapid pace of digital technologies in order to remain competitive. As a result, organizations are becoming more interested in adopting digital innovations for developing new products and services, improving business processes, and creating new business models (Legner et al., 2017; Nambisan et al., 2017; Wiesböck & Hess, 2019).

According to Fichman et al. (2014), digital innovation is defined as a "product, process, or business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied in or enabled by IT" (p. 334). Previous literature has broadly defined three categories of innovation: product and service innovation, process innovation, and business model innovation (Fichman et al., 2014; Teece, 2010; Wiesböck & Hess, 2019). However, some researchers have suggested that the boundaries between the different types of innovations are increasingly becoming blurred (Fichman et al., 2014).

Lusch and Nambisan (2015) propose a service-dominant logic perspective of innovation that expands the existing division between service and product innovation to focus on what they call service innovation, defined as “the rebundling of diverse resources that create novel resources that are beneficial (i.e., value experiencing) to some actors in a given context; this almost always involves a network of actors, including the beneficiary (e.g., the customer)” (p. 161).

The rapid diffusion and adoption of digital technologies has radically transformed the nature, processes, and outcomes of innovation, creating a significant shift between traditional innovation and digital innovation. This transformation can be explained by understanding the unique characteristics of digital artifacts proposed by Yoo et al. (2010). First, once analog information is digitized, it assumes the same (digital) form, which means that any digital content (e.g., music, images) can be stored, analyzed, and processed by the same technologies (Yoo et al., 2010) in a fast way and at reduced distribution cost.

Second, digital artifacts are malleable and reprogrammable (Yoo et al., 2010; Zittrain, 2008). As a consequence, digital innovations are in continuous transformation. Their functionalities, scope, and value become dynamic even after the innovation is launched (Nambisan et al., 2017). This allows other actors to expand the functionalities of the product or service (Lyytinen et al., 2016; Nambisan et al., 2017). Consequently, innovation outcomes become unpredictable and dynamic (Nambisan et al., 2017).

Third, digital technologies have a self-referential nature, which means that digital technology is both the result of and the tool for creating digital technologies (Yoo et al.,

2010). This virtuous circle accelerates the creation and diffusion of digital products and services and motivates new innovations to be developed. Moreover, the exponential improvement in price and performance of computing power drastically have made digital technologies more affordable, expanding the opportunities for many actors to participate, which in turn, has democratized innovation (Yoo et al., 2010).

The previously mentioned characteristics create new opportunities for value co-creation between the firm, customers, and external actors, and at the same time, increases levels of product modularity (Fichman et al., 2014; Yoo et al., 2012) what increases the level of complexity to the management of digital innovations (Wiesböck & Hess, 2019) and requires the development of new theories, as Nambisan et al. (2017: 223) suggests "[t]here is a critical need for novel theorizing on digital innovation management that deals more adequately with the rapidly changing nature of innovation processes in a digital world."

Moreover, digital innovations strongly rely on changing needs of customers and other stakeholders (Lyytinen et al., 2016; Nambisan et al., 2017). Accordingly, companies are increasingly involving users and customers in the innovation process to leverage their knowledge and guide the development of products and services. Scholars suggest that involving customers in the innovation process helps speed up the developing processes, reduce uncertainty and reduce investment risk (Carbonell et al., 2009).

Consequently, digital innovation is now expanding beyond organizational boundaries, which creates a shift towards distributed agency of innovation between heterogeneous actors (Nambisan et al., 2017). Through digital infrastructures such as knowledge sharing platforms, social media, digital marketplaces, among others, companies enable internal and external parties to collaboratively engage in the innovation process and to expand their own products with complementary functionalities.

Networks of actors, including customers, suppliers and third party developers collaboratively join the innovation process providing resources or skills in order to co-create value for themselves or for other actors. For example, Apple with its App Store creates an ecosystem that encourages third party developers to add functionalities to the core app, therefore, creates value for both parties. Thus, Apple benefits from the features added to their products and third party developers connect with potential users that are part of the Apple ecosystem.

Digital innovation depends strongly on market requirements and the development and adoption of digital technologies (Wiesböck et al., 2020), introducing a high level of complexity and uncertainty into innovation management. Therefore, companies need to formulate novel business strategies, "practices, processes, and principles that underlie the effective orchestration of digital innovation" (Nambisan et al., 2017, p. 224).

2.2 Digital Innovation Labs

The fast-changing digital and economic environment and the increased distribution of the innovation agency require firms to formulate new institutional arrangements that enable them to capture business value from digital technologies (Fichman et al., 2014). Accordingly, firms may formulate their digital strategy in an interplay between existing and emerging institutional structures and practices, leading to the emergence of novel: (1) digital organizational forms, such as practices, values, arrangements, and digitally-enabled structures (2) digital institutional infrastructures that allow the coordination and interaction of heterogeneous actors (3) digital institutional building blocks such as sets of technologies or modules that can be connected and disconnected to existing systems (Hinings et al., 2018).

Hence, in order to harvest the intended benefits offered by digital technologies, firms have to make significant changes in the organization (Fichman et al., 2014), which is particularly challenging for large companies that find it difficult to keep up with a high-paced changing environment (Holotiuk & Beimborn, 2019). As a response, companies are starting to create separate business units dedicated to the development of digital innovations, termed 'digital innovation labs' (DILs) (Holotiuk & Beimborn, 2019).

DILs provide a flexible organizational design that allows companies to better respond and adapt to the rapid evolution of technologies by promoting the organizational and individual learning ability that is required to timely identify promising business opportunities and develop innovative digital solutions (Fecher et al., 2018) that brings business value. In a DIL, small co-located teams work closely together with the goal of developing novel digital products, services and business models. Teams normally work following an Agile approach intending to carry out constant experiments to quickly validate ideas and solutions with customers in order to effectively produce a high-value product or service.

DILs create an appropriate environment that encourages creativity, experimentation (Hund et al., 2019), and flexibility, addressing the demand for agility to tackle the challenges of the rapid diffusion of digital technologies and increased customer expectations. DILs are "separated from the firm's remaining organization in many terms such as location, mindset, collaboration, and communication, while still remaining connected through the transfer of knowledge, exchange mechanisms, and people moving between the new and 'old' units" (Holotiuk & Beimborn, 2019).

Scholars have identified four main components of DILs: physical space (Magadley & Birdi, 2009), resources (Memon et al., 2018), facilitation (Memon et al., 2018), and participants (Fecher et al., 2018). First, the physical space of DILs is equipped with open

working spaces and tools that stimulate creativity and collaboration among team members. (Fecher et al., 2018). Second, DILs facilitate technical and financial resources to develop digital products and services. Third, DILs provide trained coaches who guide the participants through the innovation process and ensure that innovation methodologies (e.g., Agile, Design Thinking) are correctly implemented. Fourth, participants are temporarily moved from the operational part of the firm to the DIL in order to influence their creative behaviour. People are organized in small cross-functional teams and guided through the innovation process with the goal of effectively delivering an innovation (Fecher et al., 2018).

Accordingly, Fecher et al. (2018) suggest that the interplay between those four components (physical space, resources, facilitation, and participants) define the overall effectiveness of DILs. Notably, participants must be considered the core of DILs since they strongly influence the DIL innovation performance. Therefore, the collaboration and interaction among team members, coaches, and managers may have a substantial influence on the overall effectiveness of DILs. However, little literature has focused on participant's dynamics within the DILs.

As participants are drawn away from their usual workplace, they are exposed to an unfamiliar environment, mindset, working methods, and culture aiming at increasing their creative thinking. Innovative methodologies such as Agile, Lean Startup, and Design Thinking are introduced in the innovation process in order to quickly respond and adapt to unpredictable market changes, faster innovation cycles, and increased customer expectations. Within DILs, innovative products, services, and business models are developed with both "an external (e.g., exploring innovations) and internal focus (e.g., improving the existing business with innovation)" (Holotiuk & Beimborn 2019, p. 6). Accordingly, the ultimate goal of the DILs is to transfer the outcomes created during the innovation process into the operational parts of the organization (Holotiuk & Beimborn, 2019) in order to create business value.

Given that DILs are relatively a new phenomenon, little research has been developed in that respect. Extant literature on DILs has mainly focused on the structure, organizational design (Holotiuk, 2020), and benefits and effectiveness (Magadley & Birdi 2009; Lewis & Moultrie 2005) of DILs. Furthermore, as DILs are a promising approach to foster digital innovation in today's turbulent business environment, scholars stress the need for further research that considers more aspects of DILs in order to deepen the understanding of this emerging phenomenon (Fecher et al., 2018; Holotiuk & Beimborn, 2019; Holotiuk, 2020).

Moreover, in the context of DIL, the introduction of methodologies such as Agile, Design Thinking and Lean startup in the innovation process creates a new environment, culture and collaborative practices (Holotiuk 2020) within teams. However, the participants' perspectives (Fecher et al., 2018) the work routines, and forms of collaboration (e.g., Agile

approaches, design thinking) (Holotiuk, 2020) that emerge in the DILs are largely unexplored in existing academic research. In order to address this gap in the literature, this thesis aims to identify the dynamics, rituals and practices that emerge with the separation of team members in the context of DILs.

2.3 Agile Innovation Process

Innovation processes have evolved from linear to systemic or non-linear models (Dershin, 2010), leading to increased complexity levels (Brem & Voigt, 2009). Moreover, the rapid evolution of digital technologies has significantly reshaped the innovation process that is considerably different from previous analog processes (Nylén & Holmström, 2015). First, the digitalization of the innovation processes has blurred the boundaries between the different innovation phases, creating a greater overlap in their time frame (Nambisan et al., 2017). Second, the increasingly distributed character of innovation generates higher levels of unpredictability and less control over the product and service. Third, as digital artifacts are reprogrammable and malleable (Yoo et al., 2010), the pace of innovation increases. Accordingly, firms can develop faster innovation cycles due to the low-cost of experiments.

In order to leverage the opportunities offered by digital technologies, new approaches such as Agile have been introduced in the innovation process. Agile methods have emerged as a response to the rigidity and inflexibility of the traditional software development approach 'waterfall' and the need for dynamic approaches that today's dynamic business and technology environment demands (Hannola et al., 2013; Highsmith & Cockburn, 2001). In 2001, a group of 17 engineers signed the "Manifesto for Agile Software Development" that contends four value statements: (1) individuals and interactions over processes and tools, (2) working software over comprehensive documentation, (3) customer collaboration over contract negotiation, and (4) responding to change over following a plan (Beck et al., 2001).

The basic concept of Agile is that small co-located teams collaborate closely with customers to effectively produce a high-value product through regular iterations (Kettunen, 2009). The expected benefits of implementing Agile methodologies are improved outcomes of software development (SD) processes, better responsiveness to change and uncertainties (Fowler et al., 2001; Jorgensen, 2019), optimal communication, collaboration, and coordination among team members (Mishra & Mishra, 2009), customer integration (Dybå & Dingsøyr, 2008) and speed up product, service and business model innovation (Bouncken et al., 2021).

Today, many organizations are adopting Agile methods mainly in their software development projects. However, companies are increasingly deploying Agile practices in their innovation processes. Accordingly, Hannola et al. (2013) have analysed the similarities and differences between innovation processes and SD processes in order to evaluate the

applicability of the Agile methods for improving the innovation process. They concluded that the innovation process is wider than SD processes as it additionally involves two more phases: (1) the front end of innovation (FEI), which is the earliest phase, when an opportunity is evaluated prior to entering a structured development process (Koen et al., 2001) and (2) commercialization activities. Regardless of those differences, Agile practices positively impact the innovation process "regarding organisational practices, transfer of know-how and knowledge (tacit and explicit), understanding customers' needs, integrating the FFE [fuzzy front end] into the entire innovation process, and improving the communication, collaboration, and coordination of the innovation process" (Hannola et al., 2013, p. 96).

Similarly, Brand et al. (2021) identify that agility is mainly applicable at the early stage of the innovation process - ideation, idea selection, and developing a business case -. This is because the early stage involves higher uncertainty given the strong influence of external factors such as market pull and technology push. Therefore it is essential in determining the innovation success. Consequently, applying agility in the early stage of innovation supports the flexibility to respond to the rapid change in business, technology, and customer demands.

Agile approaches and practices have been introduced in the innovation processes within DILs, aiming at addressing technology and business uncertainties (Brand et al., 2021; Hannola et al., 2013). Due to the current pandemic, DILs have been forced to shift from collocated to geographically distributed work arrangements rapidly. Consequently, distributed teams can not collaborate the same way as traditional face-to-face teams, which clearly has implications on how teams develop innovation. However, the challenges that might arise during the Agile innovation process in DILs when teams work remotely are unexplored. Therefore, this thesis aims to address this gap.

2.4. Distributed collaboration

Technological changes, globalization, and economic volatility have triggered several transformations in work arrangements, leading to the emergence of more flexible, autonomous, and collaborative work practices (Aroles et al., 2019). In this context, distributed work arrangements are increasingly becoming popular nowadays. This trend was dramatically accelerated due to the outbreak of the COVID-19 pandemic that drastically increased the number of companies with their workforce working from home from 4% before the pandemic to 88% (EAE, 2020). However, this trend is expected to continue even in the post-pandemic scenario, where more flexible workplace models and hybrid arrangements are likely to persist (Teevan, Jaime, Brent Hecht, and Sonia Jaffe, eds., 2021).

In distributed work arrangements, a team can be acknowledged by at least three conditions: (1) the members are predominantly physically separated from each other, (2) they cooperate in order to achieve a common goal, and (3) their operational activities are supported by ICT (Bourgault et al., 2008; Bourgault & Daoudi, 2014; Hertel et al., 2005). Recently, hybrid work configurations have emerged that combine some remote work with work in an office or in which some team members are co-located, and others work remotely (Fiol & O'Connor, 2005).

Collaboration within distributed teams developing innovation entails three key dimensions: participation in the decision-making process, communication, and coordination (Bourgault & Daoudi., 2014). First, team members' participation in the decision-making process is a crucial factor for collaboration and team performance (DeLuca & Valacich, 2008; Garland, 2009). Second, communication between members (including its quality) is especially important nowadays due to the new organizational arrangements and higher project complexity, consequently bringing higher levels of uncertainty. The quality of the communication might be influenced by the team's size and the complexity of the task. Third, coordination is the last dimension of collaboration, understood as a mechanism that manages the planned tasks, ensuring that individual work contributes effectively and efficiently to the defined goals (Bourgault & Daoudi, 2014).

Nevertheless, researchers have suggested that in a distributed setting, team members might encounter challenges to effectively collaborate. Particularly, communication and coordination difficulties are encountered when innovation teams work remotely, which might, in turn, hinder the team's ability to generate innovative solutions (C. B. Gibson & Gibbs, 2006; C. Gibson & Vermeulen, 2003). This is crucial, as both communication and collaboration among team members are considered essential for successful innovation (Beaudry, Shiffauerova, 2009).

Furthermore, team members working remotely might face difficulties in building bonds with other colleagues, which hinders collaboration. This is due to the fact that team members who have face-to-face interaction with their colleagues might develop high levels of social connectedness, which in turn facilitates effective idea generation and implementation (Collins & Kolb, 2012), benefits knowledge exchange and helps members in solving conflicts (Hinds & Mortensen 2005). Moreover, a low degree of distribution is associated with a high quality of innovation (Lahiri (2010). Similarly, Gibson & Gibbs (2006) contend that there is a negative relation between team distribution and innovation.

The growing involvement of geographically dispersed team members in the innovation process requires a critical need to understand how teams leverage their knowledge to create novel innovations (Tzabbar & Vestal, 2015). Therefore, companies have to foster a climate of collaboration, which is not an easy task for managers (Bourgault &

Daoudi, 2014) given the fact that in a collaborative situation leaders have to handle additional conditions: (1) diversity of team members skills, work practices, culture, and experience (2) complexity of tasks interdependency (3) refusal to share knowledge and information, and (4) team members limited social interaction (Bourgault & Daoudi, 2014). This combination of emerging conditions increases the complexity of leadership in innovation. However, new opportunities also emerge, as Ibarra and Hansen (2011, p. 74) suggest: “Differences in convictions, cultural values, and operating norms inevitably add complexity to collaborative efforts. Nevertheless, they also make them richer, more innovative, and more valuable. Getting that value is the heart of collaborative leadership”.

Particularly, for teams developing digital innovation, the geographical dispersion of team members might create further tensions as digital innovation teams rely more on close collaboration and have to deal with faster innovation cycles and more complexity in the projects. However, there is limited literature on the impact of distributed teams on innovation. Moreover, the few studies that have explored this relation have not considered the unique characteristics of digital innovations, which might introduce challenges for managing innovation processes.

Furthermore, in the context of DILs, geographical dispersion of team members is particularly challenging. First, the physical environment of DILs is considered one of the main drivers of DILs' effectiveness. As teams have to move all their activities to a digital environment, their performance might be affected. Second, DILs are separate units fully dedicated to developing digital innovation, which demands deeper collaboration and interaction among team members due to the complexity, novelty, and high pace of innovation cycles characterized by digital innovation. Third, Agile innovation practices (e.g., face-to-face daily meetings) that were effective in the collocated work environment of the DILs are no longer possible in distributed settings. Given these distinctive aspects, this research aims to explore the participants' dynamics and challenges that arise in the Agile innovation process within the context of DILs.

3. METHODOLOGY

3.1 Research Design

The aim of this study is to identify the impact of the geographic distribution of team members on collaboration in the Agile innovation process in the context of DILs. The study focuses on the team level, exploring the experiences of actors that are directly involved in the agile innovation process. In order to gain in-depth insights, an exploratory qualitative approach was chosen for this research. "In a qualitative study, you are interested not only in the physical events and behavior taking place but also in how the participants in your study make sense of these and how their understandings influence their behavior" (Maxwell, 2012).

Agile innovation processes are a relatively unexplored topic that has not received comprehensive attention. Thus this study follows an inductive approach, which is appropriate for the aim of building theory for a relatively new topic with little existing literature and empirical evidence.

A single case study was conducted in order to gather data and empirical evidence about the challenges that distributed teams face when following an Agile innovation process. A case study "involves an empirical investigation of a particular contemporary phenomenon within its real-life context, using multiple sources of evidence" (Robson, 2002)

3.2 Research setting

This research was conducted at the digital innovation lab of an international bank, where new digital initiatives are developed and minimal viable companies are launched and further scaled. The digital innovation lab (Hereafter DIL) follows a structured innovation process that combines multiple innovative methodologies such as Agile, lean startup and design thinking. Teams developing innovations at the DIL are guided by trained innovation coaches who help them navigate through all the stages of the innovation process and ensure that Agile practices and methodologies are correctly implemented.

Importantly, the digital innovation labs are intended to have a colocated work setting. However, due to the COVID-19 pandemic, the DIL was forced to move to a distributed setting. For this study, the data was collected during the COVID-19 pandemic, when all team members of the DIL were working remotely.

3.3 Data collection

According to Patton (2002), there are three methods to collect qualitative data: interviews, observations, and documents. This research included both exploratory and in-depth

interviews as the primary source to collect data from the field. In-depth interviews aim to "capture how those being interviewed view their world and capture the complexities of their individual perceptions and experiences" (Patton, 2002, p.348). As a secondary source, archival data about the DIL was consulted in order to gain a background understanding of the organization. The data sources are described in table 1.

Table 1. Overview of Data Sources

Data collection method	Source	Specification
Archival Data	Internal documents of the DIL.	• The manual of the innovation methodology used in the DIL containing the innovation process and innovation methodologies (e.g., design thinking, agile scrum, lean startup) that guides teams developing digital innovations. • A document describing the high level overview of the organization and its innovation approach.
Semi-structured interviews	Interviews with members of the DIL, including: • 4 innovation coaches • 3 designers • 4 initiative leads • 2 staff member	• A total of 13 interviews, with a duration of 9 hours, were conducted through teleconferencing.

The data collection phase started with an exploratory interview that was conducted in order to gain background understanding of the organization. Moreover, archival data was revised, serving as context of the organization's innovation approach and the innovation process, methods and practices team members implement in the DIL. Data gathered from both the exploratory interview and archival documents guided the formulation of the interview guide, which can be found in Appendix B.

Thereafter, twelve in-depth interviews following the interview guide were conducted with various stakeholders of the DIL who hold different roles in the innovation process, including innovation coaches, designers, staff members, and initiative leads. The variety in the participants enabled the researcher to capture different perspectives on the impact of the geographic distribution of team members on collaboration in the Agile innovation process. In Table 2, the overview of the interviews can be found.

Table 2. Overview of interviews

Participant	Role	Date	Duration	Type
1	Staff member	6 April	60 minutes	Exploratory
2	Staff member	21 April	74 minutes	In-depth
3	Innovation coach	22 April	41 minutes	In-depth
4	Innovation coach	28 April	44 minutes	In-depth
5	Designer	28 April	30 minutes	In-depth
6	Designer	30 April	48 minutes	In-depth
7	Initiative lead	3 May	30 minutes	In-depth
8	Initiative lead	3 May	30 minutes	In-depth
9	Innovation coach	5 May	33 minutes	In-depth
10	Initiative lead	5 May	40 minutes	In-depth
11	Designer	12 May	35 minutes	In-depth
12	Initiative lead	24 May	34 minutes	In-depth
13	Innovation coach	26 May	41 minutes	In-depth

3.4 Data analysis

In order to analyze the data, all 12 in-depth interviews were recorded and fully transcribed. During the exploratory interview, extensive notes were taken. Subsequently, the data was uploaded in Atlas.ti to be coded in a structured way. The data was coded inductively, following an open coding approach aiming at detecting common themes (Strauss & Corbin, 1998). The process began with a primary cycle coding, where the transcripts were analyzed and codes were assigned to phrases to capture their meaning, leading to seventeen first-level codes. Codes are phrases that capture a "summative, salient, essence-capturing, and/or evocative attribute for [...] language-based or visual data" (Saldaña, 2009, p. 3).

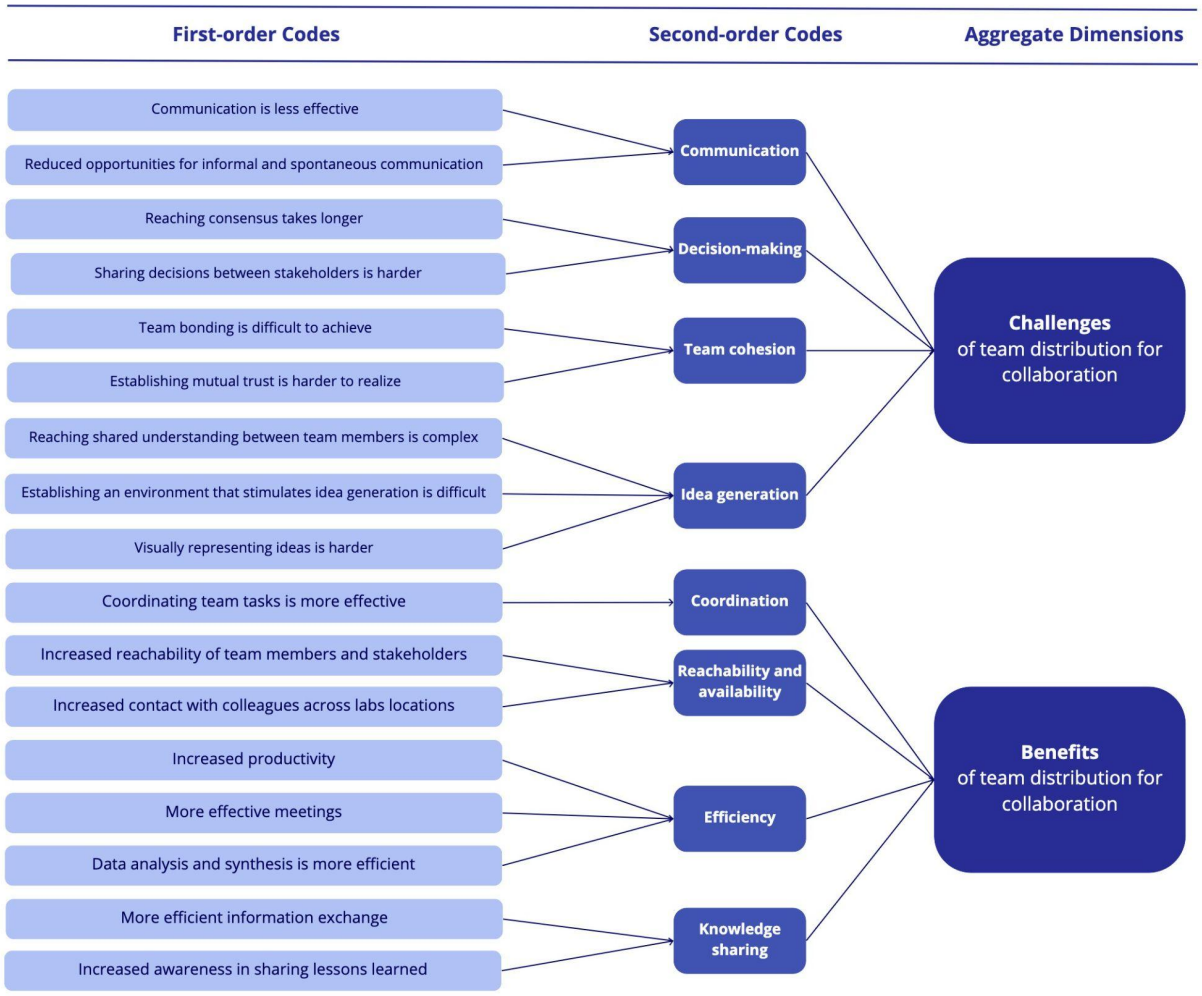
After the primary cycle coding, the second cycle coding was conducted. According to Tracy (2013, p. 194), "in secondary-cycle coding, the researcher critically examines the codes already identified in primary cycles and begins to organize, synthesize, and categorize them into interpretive concepts". In this stage, the first-order codes previously defined were revised looking at relationships between them. Similar codes were grouped into broader categories, leading to eight second-order codes. Lastly, the second-order codes were analyzed and contributed to the emergence of two aggregated dimensions: benefits and challenges of team distribution on collaboration. Table 3 provides an example of the coding process that was performed from raw data from an interview transcript to the resulting first-order codes, second-order codes and aggregate dimensions.

Table 3. Example of the coding process

Raw data	First-order code	Second-order code	Aggregate dimension
"It's much harder to build trust in the online environment. and with that of course, there's less collaboration between team members, the dynamics are more challenging, there's more conflict, which is harder to resolve"	Establishing mutual trust is harder to realize	Team cohesion	Challenges of team distribution for collaboration

Figure 1 presents the identified first order codes, second order codes and aggregated dimensions that will be presented and discussed in the findings and discussion chapters. During the whole coding process, a codebook was created that provides representative quotes to support the data structure, which can be found in Appendix C.

Figure 1. Data structure



4. FINDINGS

This chapter presents the findings of this study. Based on the data analysis, I identified several collaboration challenges and benefits participants experienced in the Agile innovation process when working in a distributed setting. In this chapter, those specific challenges and benefits will be further explained.

4.1 Collaboration Challenges

4.1.1 Communication

Communication between team members is one of the most important factors for effective collaboration within teams developing digital innovation. The Agile innovation process demands dealing with uncertainty and changes associated with creating novel products and services, requiring close and frequent communication among team members to establish alignment and making timely decisions regarding the innovation being developed.

In a distributed setting, members experience several challenges to communicate given the fact that they need to rely on online tools for collaboration, communication and coordination. For instance, the daily face-to-face standups essential to align team tasks and the informal conversations at the coffee machine that offer important moments for serendipitous idea generation, alignment and cooperation moved all to online meetings, transforming teams' practices and dynamics which brings several challenges. From the data analysis, the following communication challenges were identified that might impact collaboration between team members in the Agile innovation process.

Communication is less effective

Many participants found communication with their team members to be less effective in a distributed setting compared with face to face interactions. Some suggested that it takes longer for teams to 'be on the same page' when communication is purely online.

> *"So communication is fragmented, interrupted, misperceived. And therefore, it takes a longer time to achieve the results you want to achieve compared to when you are in the same room and people are all at the same thing, the same part of the page" Participant 3, Innovation coach*

Consequently, there is a lack of visual cues in online communication, making it more difficult for individuals to interpret the behaviour, feeling and attitude of their team members, increasing the risk of misunderstandings and misinterpretations.

"It's very difficult to interpret how you feel, how the other person feels the whole thing, because you can have the freedom to turn your camera off, you can just like have your voice there, and we don't see the body languages about those kinds of things" Participant 11, Designer

“but overall, I think you definitely miss seeing each other face to face because there is always some, some something lost in translation when working via screen" Participant 9, Innovation coach

Moreover, team members reported communication to be particularly challenging in situations when complex topics need to be discussed and analyzed. Likewise, members reported that in a remote setting, it is harder to explain and discuss different points of views and to define the expected outcome that they want to achieve as a team.

"To work remotely is yeah, it's difficult also if you really want to have thorough discussions. Now we have quite a few discussions on the value proposition and what the first-order solution should be and what the roadmap should be. I really wonder, yeah, if it would have been face to face, it would have been much easier. Now we struggle with putting comments in documents. And yeah, it's difficult". Participant 10, Initiative Lead

Another challenge for communication mentioned by some participants was a *decreased attention span* which hinders the ability of teams to have focus conversations. One of the primary reasons why members experienced this challenge is that online meetings demand high levels of visual concentration, which can be exhausting for people, affecting their ability to pay attention. Another reason suggested by some participants is that in an online setting, it is more challenging to switch between tasks and contexts, which could distract them and, therefore, make it difficult to focus on a certain task.

"So attention for me is a challenging thing. Keeping attention has become more difficult. And even though people can be listening, they could be doing other things and that really affects the other people because the respect isn't the same for the outcome of the meeting. So for me, I have to really keep checking, so in a real facilitation room, drifting away who is sitting with folded hands[...]. But now I have to keep my eyes very awake" Participant 6, Designer

And it's really hard to focus on the screen to try and read through all the expressions, and when you lose all that you're very tired, at the end, which is also not good. So I think there's just like, it takes way more energy to really communicate clearly in this setting" Participant 4, Innovation coach

Reduced opportunities for informal and spontaneous communication

In a physical DIL, workspaces are open, aiming at stimulating collaboration among team members. However, with the move to a distributed setting, all interactions between team members need to be scheduled, resulting in reduced opportunities for spontaneous interactions and informal conversations, which might therefore hinder teams ability to create bonds and build trust, which is crucial for collaboration, as will be discussed later.

"So let's say that that informal part where you just jump by or ask someone or just be physically at a standup or something you really need to proactively put those in your calendar and really start blocking those and then let's say weekly meetings with some of the initiative leads and also get to know with all the team members of a team really take time for that" Participant 13, Innovation coach

Particularly, as mentioned by some participants, there was a reduction of the time spent on social talk during meetings caused by the team's dynamics and practices that introduced more structure to the meetings seeking to improve efficiency.

"We all just want to quickly focus on the task when we are on call when we actually have human contact on the call. We have, I don't know half an hour, one hour. Now I find that we are all very strict. Okay, if a meeting is for half an hour, we have to squish all of this stuff in half an hour and then bye, see you. While before it was very much like let's go coffee, let's have a chat. I just I don't know maybe that's just my style of working but I missed that a lot" Participant 2, Staff member

A further aspect mentioned by participants is that in a physical setting it is easier to receive feedback from team members, provide and ask for advice.

"If I have an issue with finishing a document, I just make up something now. And now I really have to give [my colleague] a call, or I have to schedule a meeting to ask her to help me. But normally, if you sit next to each other, you just say: shall we have tea? Or can you help me here?. So it's less spontaneous. It's less intuitive, it's more functional now. So it impacts [collaboration] quite a lot" Participant 10, Initiative Lead

4.1.2 Decision-making process

Teams developing digital innovation need to deal with constant changes in customer requirements and product specifications. This process demands team members to interpret technological and market knowledge and take decisions accordingly to define the technical and strategic components of the product or service being developed. Decisions need to be taken quickly in order to respond to the short innovation cycles and changing insights from

customers. In a distributed environment, team members face challenges to effectively make collective decisions as online communication introduces risks of misunderstandings and misinterpretations, affecting their ability to share, discuss and assess diverse points of view regarding the innovation being developed.

Furthermore, the Agile innovation process is an iterative process that demands teams to learn, readjust their goals and take complex decisions based on customer demands, technological changes and business context. Therefore, the decision-making process is more challenging in the early stages of the innovation process as team members need to deal with higher levels of uncertainty due to the novelty of the product or service being developed. The findings suggest that team members experienced the following challenges in the decision-making process that might impact collaboration.

Reaching consensus takes longer

As agile innovation teams are self-organized, teams usually make sure that all team members share their opinions and that their contributions are further discussed and developed. As an initiative lead mentioned, *“We try and we also really try to be conscious that everybody speaks up and that we listen to each other”*. However, some participants reported challenges to effectively communicating and presenting their ideas in a distributed setting. Others also suggested that understanding and discussing various points of views takes longer in a distributed setting, making it harder to reach collective decisions.

"There is this initiative, which they need to finalize, what kind of products they want to start with. And what is their long-term vision for this product. And there are just three people and these three people cannot agree on anything" Participant 4, Innovation coach

Sharing decisions between stakeholders is harder

A further aspect related to the decision-making process that some participants mentioned was that in a distributed setting, some of the team decisions that have been taken could not be communicated to the whole team and relevant stakeholders. For instance, a participant explained that in the physical DIL, he could observe what teams were doing, so he was up to date with teams' processes and decisions without the need to ask about updates.

"People forget to get back with a decision, myself forgetting to decide something or to communicate on it. And like I referred to earlier keeping up to date with decisions. So sometimes the entrepreneurs in the team, they decide something between meetings, but I'm not with them all the time. So by the second meeting, I'm like, I'm supposed to (do this). And they will do like, same to me all the way (disgusted). I would be like guys, we're on the same team. It was less prominent because they would be 10 meters away. So I can actually see

what they're doing. And they can see kind of what I'm doing. And if there's a new client (walking) in, obviously, I'm going to be like, Hey, are you doing an interview? What's up?" Participant 6, Designer

4.1.3 Team cohesion

In the physical environment of a DIL, team members work very closely and interact regularly through scheduled and unscheduled meetings, which facilitates social cohesion and the development of a collective identity, norms and rituals. In contrast, in a distributed setting, team members have reduced opportunities for informal interactions, making it hard for them to build team cohesion and mutual trust that is essential to facilitate knowledge sharing, idea generation and creating a shared understanding. When team cohesion is low, members might be unwilling to share information with their team members, express their ideas and ask for feedback, which constrains collaboration. The results of this study suggest that the geographic distribution of team members hinders a teams ability to establish team cohesion, affecting collaboration in the Agile innovation process. The following challenges for team cohesion were found from the data analysis.

Team bonding is difficult to achieve

One of the most commonly mentioned issues is that developing team bonding is more challenging to achieve in a distributed setting due to the lack of face-to-face interactions between team members. In the physical environment of digital innovation labs, offices are open, aiming at stimulating close collaboration and interaction between members, which offers them the opportunity to easily get to know each other and develop relationships with their colleagues. However, with the move to remote work, most of the interactions between team members became task-related as they needed to be scheduled, leaving almost no room for informal and spontaneous conversations, which adversely affected teams ability to establish bonds.

"So that that is something I do have, well I struggled with a little bit and how do you make sure you build a tight-knit team whilst working from home" Participant 9, Innovation coach

Many participants reported that creating team bonds took significantly more time for team members that havent met their colleagues physically compared with teams that worked together in the physical DIL An innovation coach described her experience as follows:

"As a coach, what I saw is that the teams who already had a structured way of working set up, were well transitioned, very smoothly. There is still disruption to their work. I also had

a team for example, that started completely remote. So they never met in real life as a team and with them, it was quite difficult to create a structure for working to create team bonds. That is something that took a few months, six, a good six months to build the team" Participant 3, Innovation coach

It is worth noting that some participants reported that even though they are not allowed to go to the physical DIL at the moment, they have planned face-to-face meetings with some of their team members in different places such as coworkings, a park or even at their home. They have done it with different purposes such as getting to know each other, solving conflicts or discussing complex topics related to the innovative solution they are developing.

"So I've met [a colleague] once and basically, we met illegally because I just visited her place. But of course, it's very difficult to start as a team when you've never met before. And so we had quite some challenges along the way also, to be a good well functioning team. Because it's difficult to really get to know each other, to understand your drivers to so that that's, that's really difficult" Participant 10, Initiative lead

Establishing mutual trust is harder to realize

Some participants emphasized that due to the lack of face-to-face interactions with their colleagues, it is more challenging to establish mutual trust. With the move to remote work, members have found it difficult to replace the spontaneous conversations that happened in the physical DIL during lunch, in the hallway or at the water cooler, which are considered important for building the social connections that are in fact needed to establish trust.

"So you can do everything that you want and, and you try to do everything to the best of your abilities. But in the end, at the end of the day, there's nothing like just seeing each other, going out for beer and building up that trust level" Participant 9, Innovation coach

Moreover, according to some participants, the lack of trust hampers idea generation as team members may be unwilling to openly share their opinion and ideas within the team.

"When we need to untap several person's minds. Such as co-creation activities. That is sometimes not about the knowledge itself that you extracted. But it's more about the trust that you build. And those trust only happens in physical space [...]" Participant 5, Designer

Reaching shared understanding between team members is complex

A further aspect found in this study is that the physical separation of team members makes it harder for teams to develop shared understanding. Team members might have different interpretations of concepts, work procedures, processes and team goals, for which is required to get ‘all on the same page’ in order to be able to effectively collaborate and coordinate

teamwork. For example, a participant explained how within the DIL, team members have different interpretations and ways to apply Agile practices, which means that they are not on the same start point.

Consequently, participants also mentioned that achieving shared understanding between team members usually took longer in a distributed setting, often causing unnecessary iterations and requiring more extended time frames to achieve specific goals.

“And then getting into the same starting point remotely is, yeah, takes a few iterations, it takes about three to five times longer than in a physical setting. So the same understanding of work, and how to go about work" Participant 3, Innovation coach

"They keep on creating a document, they write things down, then they comment on it. And then someone, instead of just writing on, creates another document. And they comment on that document and yeah (...), they are not on the same page, they don't have an agreement of the things and how we go about it" Participant 4, Innovation coach

Team members could have a different understanding of concepts without noticing it, making it harder for them to hold complex discussions and reach collective decisions regarding the innovation they are developing.

"And things like language come into play, different definitions. And so for the design team, the challenge was to get on the same page with regards to language, meaning, how to do the exercise, and how to define and share the work. And because we did not do this in person, I found that it was more difficult for my colleague to communicate what was needed" Participant 6, Designer

4.1.4 Idea generation

The physical environment of a DIL is equipped with analogue tools and open spaces aiming at facilitating the collective generation of ideas. With the transition to remote work, the co-creation activities (e.g., brainstorming) need to move to online meetings. Consequently, teams need to adapt in-person practices and methods to a distributed environment. However, in this study, members reported having little success re-creating these dynamics online as creative sessions needed to be mediated by digital tools, transforming the ways team members interact, collaborate and communicate with each other. Furthermore, the low team cohesion and mutual trust team members experienced with the transition to remote working negatively impacted the idea generation as members might feel less comfortable to freely share their opinions and insights within the team.

Moreover, in the physical environment of a DIL, idea generation does not occur solely

during co-creation activities. On the contrary, informal conversations and interactions offer opportunities for team members to exchange and connect different insights that may lead to the generation of innovative ideas. In the online setting, these opportunities are minimal, reducing a team's ability to generate ideas. From the data analysis, some creativity challenges were identified that might impact collaboration in the agile innovation process. In the following section, each of the challenges will be elaborated on.

Establishing an environment that stimulates idea generation is difficult

The majority of the participants found creative activities as the most challenging ones to perform in a distributed setting. Some acknowledge that creative work may not be suitable for a distributed setting, suggesting that people *"cannot be that creative in a digital tool"* as Participant 5 states.

Participants suggested that even though the DIL implemented several digital tools to facilitate the performance of creative ideas in a distributed setting, what is missing and hard to replace is the energy that is transmitted when people are together in the same room.

"However, I do really miss there's just something very valuable with doing co-creation and being in the same room so I can feel the feedback, the energy, the tones, the expressions, especially when people want to be creative. And it's really a beautiful moment when somebody comes out of the shell. And it's way more difficult for me to get to that point online" Participant 6, Designer

Many participants perceived that a tendency of seeking to increase efficiency arose when teams moved to a remote setting, hampering idea generation. Teams tended to introduce so much structure in the co-creation sessions. Some described the sessions to be rigid and mechanical, which in turn reduced teams ability to generate novel ideas.

"I found it challenging to keep that level of openness and creativity. I think when we went to more remote working, it became more transactional and more so how can we be as efficient as possible" Participant 13, Innovation coach

"It doesn't matter, the tool but they still are still very mechanical, it's still like. Now, let's use post-its it's not the same as when you're in a face to face setting, it somehow feels much more like we are in the high school and we have a project rather than like, actually disrupting the industry in this kind of stuff" Participant 4, Innovation coach

Moreover, some participants reported that the increased time spent behind the screen makes them feel fatigued, which in turn affects their ability to engage in creative activities.

“By the time that we have another meeting we don’t have energy or people are stressed for also be creative” Participant 4, Innovation coach

“The biggest challenge is to actually have like a non-structured space so like, we have the planning sessions, a lot of alignments, a lot of updates but the moment of like, you know team members can come together to share their insights and the creativity aspect of working together is very hard online because online means scheduling another meeting” Participant 4, Innovation coach

Visually representing ideas is harder

One of the most commonly mentioned challenges for performing creative work was the lack of physical tools (e.g., whiteboards) to visually represent ideas. The physical infrastructure of DILs is equipped with low-tech supporting tools (e.g., whiteboards, sticky notes) aiming at facilitating group work and the articulation of ideas. With the move to a distributed setting, members needed to rely on digital tools to perform creative work. However, many participants mentioned that when working remotely, the practice of drawing aiding to explain certain ideas is less frequently performed or not existing at this moment.

"I feel personally that I have to work with one hand behind my back. And because what I used to do, I used to walk to the whiteboard and sketch my thoughts on the whiteboard. So that's really what I miss" Participant 7, Initiative lead

"You used to draw a lot on whiteboards when you had a physical meeting, and that's something which for example, I haven't really done that much since we went virtual" Participant 13, Innovation coach

Without the aid of physical whiteboards during co-creation activities, employees struggled to explain and discuss their ideas with their team members, a process that took longer compared to the situation when they were together in the same room.

"I really miss drawing on a whiteboard for quite some sessions. If you're all at the screen, and nobody has the whiteboard, and it's especially if you have a small screen or the technology doesn't really work, etc. that creative part and to do those things together, those could take so long" Participant 13, Innovation coach

"I use a touchscreen and Microsoft whiteboard. But that didn't work that well. Because it also requires the other person to have a whiteboard or touchscreen" Participant 7, Initiative Lead

Furthermore, some suggested that the digital whiteboards are not as efficient given the limitation of screen size and digital devices, which makes it difficult to visualize and capture the ideas that are being generated in brainstorming sessions. Similarly, many reported their preference to use physical tools for creative work.

"For me, the more creative work where you really want to make use of physical tools, paper that that is most important" Participant 10, Initiative Lead

Regarding visualization, a participant explained how she struggles to visualize on a screen the canvases (e.g., business model canvas, value proposition canvas) that are used in the innovation process.

"Some of [the canvases] are really designed to be plotted and to physically work with them. It's it's not really, yeah, it's so nice to look at the total canvas instead of zooming in on only a part" Participant 10, Initiative Lead

4.2 Collaboration Benefits

4.2.1 Coordination

In a physical DIL, coordination of team tasks is done both during spring planning in the presence of the whole team and during unscheduled meetings or conversations between some of the team members. When decisions or updates are discussed in the absence of some members, people might forget to inform the whole team, which could create misalignments. In contrast, teams working remotely use digital tools (e.g., *Trello*) that help them collaboratively manage and visualize their workflow. All team members have access to the same information, being able to update their progress and allocate tasks to their team members, which increases coordination efficiency. From the data analysis, the following coordination benefits were identified that impact collaboration in the Agile innovation process.

Coordinating team tasks is more effective

Several participants argued that the coordination of work was more efficient when working remotely than in a collocated setting. Moreover, according to some members, the implementation of digital tools to coordinate work also improved their Agile way of working as it was easier for team members to manage the backlogs and clearly define and allocate work. Consequently, the adoption of online tools in the coordination process, introduced more transparency and facilitated task monitoring, task alignment and task accomplishment.

"[Coordination] is usually is rather simple because like if you do make a planning on Trello, then you have very clearly assigned people to do things and clear tasks" Participant 4, Innovation coach

"I think [the Agile way of working] actually only increased, Because these digital tools like Trello, or now we have the backlog in MS. Teams, they are so great in working with that, it actually makes it very easy" Participant 9, Innovation coach

4.2.2 Reachability and availability

With the deployment and adoption of digital tools for communication, participants perceived establishing connections with team members, stakeholders and clients to be more efficient than in the physical environment of the DIL, where interactions were more organic, unstructured and limited to a specific location. Given the fact that in a distributed setting, everyone is remote, team members have the opportunity to connect to internal and external stakeholders regardless of their geographic location, which, as suggested in the findings, brought the following benefits for collaboration in the innovation process.

Increased reachability of team members and stakeholders

With the move to remote work, members needed to rely on online tools to communicate with their team members. As everyone was online, some members experienced a feeling of proximity and found establishing connections with their team members to be more efficient compared with working at the physical DIL.

"Most of the time of the day people are behind their screens, it's very easy to get ahold of people. Usually, back in the days in the office, you had to search for people or they were out or they were on different floors. But now everyone's behind a laptop. And unless you are, I don't know, in another meeting, or you're in a separate appointment, then it's very easy to get ahold people" Participant 9, Innovation coach

A further aspect mentioned by participants is that since all the interactions moved to online platforms, it became more efficient to establish connections with stakeholders and clients since people are easily available to have a call, which requires less coordination efforts than a face-to-face meeting.

"So it's also like, it's much easier also to reach out to people to schedule MS calls, for example, like, if before for a client interview, sometimes you just needed a full day of your working day, because you want to see them face to face, and all that now is just like, a half an hour call" Participant 4, Innovation coach

Increased contact with colleagues across labs locations

An interesting finding was that with the move to remote work, some team members expanded their network given the increased reachability to people regardless of their physical location. This was particularly beneficial to contact colleagues across labs locations which in turn facilitated collaboration beyond geographic boundaries. Participant 2 suggested that with the move to remote work, "[the digital innovation] labs became truly global".

"When we became fully digital when the corona hit [...] that was the moment when we also connected more closely to Singapore, to the Singapore lab. So we became truly global. I mean, we always said, yeah, we have labs in London and Singapore, but we were never really in touch. While now we are basically on equal ground, because we're all sitting behind the laptops. So we are very much in contact" Participant 2, Staff member

Similarly, some participants experienced increased contact with colleagues among lab locations as well as improved communication.

"I think it's also easier to, at least I've noticed like when I work with Singapore with some teams, it's a lot easier than it used to be. Cross country or cross-continent, that's a lot easier" Participant 13, Innovation coach

4.2.3 Efficiency

In a remote setting, all interactions between team members need to be scheduled, increasing the meeting load and time spent on screens. Members experienced digital exhaustion and, as a response, developed work practices and norms intending to reduce the time spent in online meetings. Teams introduced more structure to the meetings, setting clear outputs for each meeting, defining detailed agendas in advance and reducing the time spent on social talk. Consequently, team members developed a productivity-focus mindset to manage their time, leading to the following efficiency benefits for collaboration in the innovation process.

Increased productivity

There is a strong agreement that team distribution seems to increase productivity. Some participants mentioned that working online has facilitated teams to stick to timelines which therefore has increased team performance and task efficiency. One of the main reasons leading to this improvement, as reported by some participants, was that with the move to remote work, members collectively developed work practices and norms seeking to increase productivity. Moreover, participants also suggested that being remotely allowed them to be more focused as they did not have the distractions that they usually have in the physical DIL.

However, regarding the impact of distributed work on effectiveness, there were different opinions held. Some mentioned that the quality of the work they produce might have increased.

"I think the quality of the of the work that people are doing it actually either stayed the same or have increased because they work more effectively somehow" Participant 9, Innovation coach

In contrast, some pointed out that the dynamic that emerged within teams on being more focused on effectiveness could distract them from the goal they want to achieve since they could forget to validate if they are in the right direction. Participant 13 described that teams could be very productive in getting things done while at the same time be ineffective if they are not doing what should be done, which might hinder the effective realisation of the project's purpose.

"I feel that maybe you're very effective, and you're going very fast, but you might be going to the right. Whereas Oh, oops, we forgot to see that there was a step and we had to go left. So you're still very effective going really fast in the wrong direction. Whereas I think it is, you really need to stop now and then to really think, oh, are we still on the right course? Are there new things that we might need to see?" Participant 13, Innovation coach

More effective meetings

With the shift to a distributed work setting, teams developed different rules and practices in order to adapt to this new way of working. For instance, participants described that they gave more structure to their meetings by setting an agenda in advance or defining clear outputs for each meeting, which seems to have increased meeting effectiveness.

"We're also more efficient in getting more out of the meeting with a stretched agenda and with making sure that we define the next steps in the meeting. So in that sense, I think we've improved. We've improved how we deal with meetings" Participant 7, Initiative lead

Data analysis and synthesis is more efficient

Some participants suggested that the implementation of digital tools to facilitate co-creation activities in a distributed setting offered more possibilities to data analysis. As an example, in the physical DIL, teams used whiteboards, post-its and markets to facilitate brainstorming and ideation sessions. With the move to an online space, the data that is generated is instantly digitized and can be easily re-organized and analyzed, which makes data analysis and synthesis more efficient.

“Everything becomes efficient because everything you've raised on is on a post-it on Miro. So basically, it's pretty fast to do analysis. Hence, once you subscribe to Miro, you will instantly see that it becomes more efficient. And you get to talk about data in a more effective way and focus way." Participant 5, Designer

4.2.4 Knowledge sharing

In agile innovation teams, members need to share information and knowledge constantly. In a physical setting, these activities occur during both scheduled and unscheduled activities. With the move to a distributed setting, the DIL established a digital repository equally accessible for all teams. Members developed new practices to document, store and share information within and between teams, fostering knowledge sharing and bringing the following benefits for collaboration.

More efficient information exchange

With the transition to remote work, the DIL deployed *Microsoft Teams* as the main channel for collaboration and communication. Particularly, the DIL created a repository where important documents were uploaded, making them available for all team members, which was previously spread into different channels. As a result of having a centralized repository of information, team members reported greater access to updated information which therefore allowed a more efficient information exchange.

“[We]moved all of the important documents and all the important communication to one place, which is Teams. That's to have like a single source of truth for the labs. So if you come there, you can be sure that people will be active there, and they will help you there. Because in the past, we had all kinds of different websites and sources and outdated information" Participant 2, Staff member

"Everybody can actually pull information from themselves. So making information more accessible for people" Participant 5, Designer

A further aspect mentioned by participants is that having a structured and updated digital repository improved collaboration within and between teams. Moreover, some members perceived increased opportunities to capture, document and share knowledge.

“And I think you capture more and also sharing it and I think with a lot of the opportunities that you now have in Teams and in recording meetings, etc. That is easier” Participant 13, Innovation coach

Increased awareness in sharing lessons learned

Concerning knowledge sharing, the findings also reveal that teams developed practices to encourage members and initiatives to share lessons learned within and between teams. At the team level, some members created learning spaces intending to be more aware of lessons learned and reflective about areas for improvement, which used to be more informal and less conscious in the physical environment.

"I have incorporated some like discussions or our stand-ups are a bit longer to also share with more on the content side of things like what we have learned […]. So creating this kind of like learning spaces, this was not part of it before, because it used to happen very naturally in this kind of face to face environment" Participant 4, Innovation coach

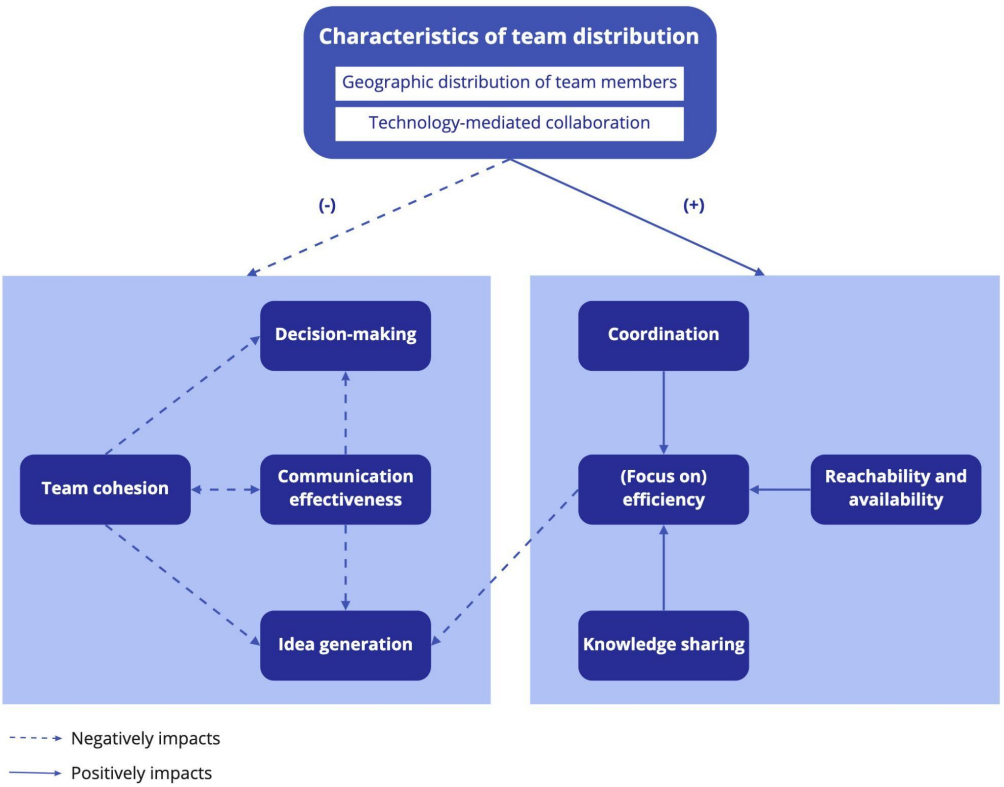
"All the initiatives are communicated at least leads are communicating way more and know each other and are also willing to share way more and in a more structured way as well" Participant 2

5. DISCUSSION AND CONCLUSIONS

In the previous chapter, the results of this study were presented. In this section, those findings will be further explained in light of prior literature in order to answer the research question of this study: *What is the impact of team distribution on collaboration in the Agile innovation process within the context of digital innovation labs?*

To answer the research question, the following model illustrated in Figure 2 was proposed in order to visualize the key categories and patterns that emerged from the data analysis.

Figure 2. Visualization of Integrated Findings



From the data analysis, it was found that the distribution of team members affects both positively and negatively the collaboration between team members developing digital innovation within a DIL. On the one hand, several challenges were identified: (1) communication, (2) decision-making, (3) idea generation, and (4) team building. On the other hand, benefits were also found (1) coordination, (2) knowledge sharing, (3) efficiency, and (4) reachability and availability. In this chapter, the challenges and benefits that emerged from the data analysis and their interconnection will be further explained.

5.1 Challenges of team distribution for collaboration

The results of this study indicate that an Agile innovation team encounters communication challenges when working remotely, which directly affects collaboration. Given the fact that in a distributed setting, team members rely on online platforms to enable communication, they don't have the same information richness that face-to-face communication enables (Greenberg et al., 2007), which might lead to ineffective communication. In fact, the results of this study suggest that the lack of visual cues makes it more difficult for members to interpret the behaviour, feeling, and attitude of their team members during collaborative activities performed online, increasing the risk of misunderstandings and misinterpretations between team members during the Agile innovation process.

The findings suggest that communication is particularly challenging in situations when team members have to discuss and analyze complex and interconnected aspects of the digital innovation being developed. This finding is consistent with Bourgault & Daoudi (2014), who argue that the quality of the communication might be influenced by the complexity of the task and the team's size. Moreover, this study further demonstrates that communication is a key factor for collaboration within teams developing innovations. This is similar to the observation of Beaudry & Shiffauerova (2009), who suggest that communication and collaboration among team members are considered essential for successful innovation. The findings expand on this understanding by uncovering how communication influences other dimensions of collaboration such as team cohesion, idea generation and decision making.

Regarding idea generation, the lack of informal interactions between team members results in fewer opportunities for spontaneous conversations, which are essential in generating innovative insights. In fact, the findings suggest that the challenge of ineffective communication caused by the separation of team members may hinder the team's ability to generate novel ideas. This is consistent with previous research that has identified that geographic dispersion of team members might create communication difficulties, which in turn hinder the teams' ability to generate innovative solutions (C. B. Gibson & Gibbs, 2006; C. Gibson & Vermeulen, 2003). In addition, this research extends this notion by understanding the underlying reasons that contribute to the emergence of the challenge of idea generation. The findings suggest that the lack of physical tools during co-creation sessions, the reduced opportunities for informal and spontaneous interaction between team members, and the tendency to seek to increase efficiency negatively impacts idea generation.

The findings further demonstrate that the high meeting load and time spent on the screen caused by a distributed work setting places high demands of concentration and focus on individuals leading members to feel fatigued and distracted, which might in turn, affect

their ability to generate ideas.

Additionally, the findings suggest that the physical separation between members poses problems for the team cohesiveness. Given the fact that distributed teams have reduced opportunities for informal communication with their team members, their ability to create bonds might be hindered, which challenges collaboration between team members. In a distributed setting, most of the interactions between team members are task-related as they need to be scheduled in an online meeting, leaving almost no room for spontaneous conversations. Those informal interactions are considered fundamental for building the social connections and professional respect necessary to establish trust between team members (*Greenberg 2007)*, which is needed to facilitate collaboration between team members.

Furthermore, the results of this study demostrate that the difficulty in establishing mutual trust adversely impacts creativity as team members may feel less comfortable and willing to openly share their opinion and ideas within the team. For instance, during co-creation sessions, team members found it more difficult to generate ideas and motivate their teammates to engage in deeper discussions. This finding is consistent with Collins & Kolb (2012) who suggest that team members who have face-to-face interaction with their colleagues might develop high levels of social connectedness, which facilitates effective idea generation and implementation (Collins & Kolb, 2012). Similarly, Keyzerman (2003) suggests that mutual trust in a team improves creativity and innovation outcomes.

Moreover, the challenge to establish mutual trust seems to be impeding the team's ability to reach shared understanding. Team members might be unaware when they have a different interpretation of concepts, work procedures and team goals, which can hinder collaboration. When this misalignment occurs, it can make it more difficult for teams to hold complex discussions and reach collective decisions, which might affect the decision-making process. Similarly, Batra et al., (2017) argue that in Agile teams, shared understanding is an important aspect to reduce misconceptions and uncertainties regarding the software product that is being developed. This study further demonstrates that in a distributed setting, shared understanding is more difficult to achieve given the increased risk of misunderstanding and the reduced face-to-face interactions between team members, which in turn might affect decision-making in the Agile innovation process.

Furthermore, the results of this study suggest that the geographic distribution of team members hampers teams ability to effectively reach collective decisions. In the Agile innovation process, team members have to deal with constant iterations and a high pace of innovation cycles, which demands teams to make quick decisions. This process is more complex in a distributed setting, given the challenges team members face to effectively communicate and reach shared understanding, as it was previously discussed. Consequently,

distributed teams find it more difficult to generate, explain and discuss a wide diversity of opinions and ideas that need to be further assessed in order to make a decision. Moreover, the results of this study suggest that decision making is more challenging in the early stages of the innovation process given the higher levels of uncertainty of the solution being developed.

Previous research has identified the involvement of team members in the decision-making process as a crucial aspect of collaboration. Without it, team members are just coordinating and exchanging information (Czajkowski 2016). Similarly, Bourgault & Daoudi (2014) define participation in the decision-making process as one dimension of collaboration that is essential in innovative projects involving distributed teams. The results of this study corroborate these observations and add to that by further suggesting the aspects that might negatively impact the decision-making process in a distributed setting: ineffective communication and the lack of shared understanding.

5.2 Agile practices foster coordination in the Agile innovation process

The results of this study indicate that the use of Agile practices in the innovation process facilitates coordination of work when team members work geographically separated. Moreover, the findings suggest that the implementation of digital tools (e.g., *Trello*) to visualize and collaboratively manage workflow might improve the team's Agile way of working, as it can be smoother for members to manage the backlogs and clearly define and allocate work. This is similar to the findings of Hannola et al., (2013), who argue that Agile practices improve coordination of the innovation process. However, the authors argue that besides coordination, Agile practices also favours collaboration and coordination of the innovation process, which differs from the results of this study. This might be the case since the present study explored these dynamics in a distributed setting instead of a collocated one.

5.3 The Efficiency Paradox

With the move to a remote setting, a collective tendency of seeking to increase efficiency arose, which produced contradictory outcomes and unintended consequences. On the one hand, team members experienced increased productivity. On the other hand, the efficiency-oriented dynamic hindered idea generation. Team members struggled to create an environment that fosters generation and exchange of ideas as online team sessions became structured and somehow rigid.

Moreover, the increased structure introduced for online meetings reduced the opportunities for informal conversations between team members. This is critical since, as

explained earlier, informal interactions are essential for building bonds within teams and presents opportunities for team members to generate, connect and share novel ideas.

5.4 Theoretical Implications

This research contributes to the theory on innovation management by shedding light on the dynamics that emerge within teams developing digital innovations when members work geographically distributed. Little has been explored in the literature regarding the impact of distributed teams on innovation. Moreover, the few studies that have examined this relation have not considered the unique characteristics of digital innovation. This study addresses this research gap by empirically studying the development of digital innovations in a real-life context. The findings demonstrate that the dimensions of collaboration in distributed innovation teams (coordination, communication and participation in the decision-making process) suggested by Bourgault & Daoudi (2014) are also applicable on teams developing digital innovation. However, this research expands this understanding by identifying additional dimensions of collaboration: knowledge sharing, team cohesion and idea generation. Furthermore, this study has uncovered the interlinks between those dimensions and their impact on the Agile innovation process.

Consequently, the findings suggest that collaboration in the Agile innovation process is impacted both positively and negatively by the geographic distribution of team members. This study identified that decision making, communication, creativity, and team cohesion might be hindered by team distribution, which negatively impacts collaboration in the innovation process. Moreover, this study suggests that team separation fosters knowledge sharing, reachability, efficiency and coordination, which benefits collaboration in the innovation process. Identifying these challenges and benefits and how they are related to the development of digital innovations is a contribution to the innovation management literature.

These findings conflict with prior research (C. B. Gibson & Gibbs, 2006; C. Gibson & Vermeulen, 2003) that have identified coordination challenges in innovation teams working remotely. In contrast, this research suggests that team distribution facilitates coordination between team members developing innovation.

Furthermore, while other researchers have studied collaboration in distributed Agile teams, it has been mainly in the context of software development. However, little has been studied about Agile in the context of digital innovation (Brand et al., 2021). The findings expand on work related to the applicability of the Agile methods for improving the innovation process (Hannola et al., 2013) by uncovering how teams developing innovations adopt Agile practices to manage their work in a distributed setting.

This research provides insights on the use of agility in the innovation process from a human perspective. The findings suggest that in a distributed setting, Agile work practices facilitate coordination in the innovation process. It was found that agile practices and methods are equally used throughout all innovation phases, which conflicts with the findings of Brand et al. (2021), who identify that agility is mainly applicable at the early stage of the innovation process. Moreover, this study contributes to the emerging literature on Agile innovation management by providing a deeper understanding of the challenges and benefits that emerge in Agile innovation processes developed by distributed teams.

Additionally, these findings contribute to recent calls for empirical research on DIL (Fecher et al., 2018; Holotiuk & Beimborn, 2019; Holotiuk, 2020). More specifically, this study addresses the call for research to understand the participants' perspectives of DILs (Fecher et al., 2018), including work routines and forms of collaboration (Holotiuk, 2020). Therefore, this thesis contributes to the emerging literature on innovation labs by identifying the dynamics, rituals and processes that emerge with the separation of team members of a digital innovation lab and its impact on collaboration. At the same time, to the best of the author's knowledge, this is the first study to provide an empirical understanding of DILs in a distributed work context.

5.5 Managerial Implications

Based on the empirical results, this research provides innovation managers with insights regarding the consequences that a distributed setting might have for teams developing digital innovations. Given the fact that this study was conducted in the context of a digital innovation lab, the findings might be most valuable for organizations who already have an innovation lab or plan to do so. However, organizations developing digital innovations with an Agile approach may also find these insights useful.

Moreover, innovation managers may exploit the findings of this study to inform themselves on the benefits that a distributed work setting might bring them. Additionally, the collaboration challenges and underlying reasons presented in this study can be used as a reference to address the collaboration challenges that managers face in day-to-day practice.

The findings suggest that innovation managers should become aware how agile innovation teams function in a distributed work setting. In doing so, managers may intervene more effectively in the functioning of teams, providing the right support so that teams can better perform the activities involved in the innovation process.

5.6 Limitations and avenues for future research

Although this study has delivered novel insights from both a theoretical and practical perspective, as with any study, it suffers from several limitations, which presents avenues of research that are worthy of further pursuit. First, this thesis performed an exploratory case study in order to explore the lived experiences and perceptions of team members developing digital innovation regarding collaboration in a distributed setting within a DIL. However, the fact that the study has been limited to the context of a single DIL indicates that further research is needed in order to validate the findings.

Future studies might replicate this research in the context of other DIL to validate the findings presented in this study, which would help to improve the generalizability of this research. It would be valuable, as well, to conduct a multiple case study in multiple innovation labs in order to reveal whether the findings are similar for different cases. Moreover, future research could examine industries other than the financial sector given the fact that individual attitudes may differ between industries. Therefore, further studies might examine whether the results can be generalized across different industries and contexts.

Second, this research conducted an exploratory case study in order to generate new insights into the impact of the geographic distribution of team members on collaboration in the Agile innovation process. Therefore the interconnection between concepts has been described by findings from qualitative research methods, meaning that the results have not been statistically tested. Consequently, there is room for future research to test the proposed theory through quantitative studies.

Third, a promising avenue for future research could explore the impact of distributed collaboration in a hybrid work setting. Given the fact that due to the COVID-19 pandemic, companies are increasingly adopting a more flexible and hybrid work arrangement, it would be valuable to understand if team members that work in a combined collocated and distributed setting experience the same challenges as distributed teams or if this work setting creates additional challenges instead.

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APPENDICES

Appendix A: Overview of the participants

Participant	Role	Date	Duration
1	Staff member	6 April	60 minutes
2	Staff member	21 April	74 minutes
3	Innovation coach	22 April	41 minutes
4	Innovation coach	28 April	44 minutes
5	Designer	28 April	30 minutes
6	Designer	30 April	48 minutes
7	Initiative lead	3 May	30 minutes
8	Initiative lead	3 May	30 minutes
9	Innovation coach	5 May	33 minutes
10	Initiative lead	5 May	40 minutes
11	Designer	12 May	35 minutes
12	Initiative lead	24 May	34 minutes
13	Innovation coach	26 May	41 minutes

Appendix B: Interview Guide

Pre-introduction

- Express gratitude for participation
- Ask approval for recording the interview
- Emphasize confidentiality
- Explain aim of the study

Background questions

- Can you tell me a little bit about yourself: your background and your role within the digital innovation lab?
- What daily activities does this role involve?
- For how long have you been working at the digital innovation lab?
- Could you tell me a bit about the initiatives you are currently coaching? *(only for innovation coaches and staff members)*
- How do you support or collaborate with the initiatives? *(only for innovation coaches and staff members)*
- Can you explain what this initiative is about? *(only for initiative leads)*
- In what phase of the innovation process is your initiative currently? *(only for initiative leads)*
- Could you tell me more about the team you are part of?

Questions related to the structured innovation process of the digital innovation labs

- How have you experienced guiding the initiatives through the innovation process since you are working remotely? *(only for innovation coaches)*
- How have you experienced working remotely according to the innovation process of the digital innovation labs? *(only for initiative leads)*
- What are some of the challenges that you, as an innovation coach have faced, remotely guiding the initiatives through the innovation process? *(only for innovation coaches)*
- Why do you think these challenges appear?
- Would you say that working remotely has affected the way teams develop innovations at the digital innovation labs? If yes, why?
- What Agile/scrum practices does your team employ?
- Have you experienced any challenges to work in an Agile way since you are working remotely?

Collaboration

A. Communication

- How do you communicate with your team members? In what frequency? Through which channels?
- Have you/your team established ground rules, routines or practices to facilitate remote collaboration?
  Do you think they are helpful?
- Have you experienced challenges to communicate with your team members since you are working remotely? What could be improved?
- Could you walk me through the most recent situation in which your team experienced difficulties collaborating in a remote setting? and explain things that happened?
- Can you tell me how working remotely has affected the way you collaborate with your team members? (did it change?)

B. Decision making

- How do you experience situations when your team needs to make decisions regarding the product/service you are developing when working remotely?
- To what extent are suggestions and contributions of your team members further discussed and developed when working remotely?
- How are team members reaching consensus working remotely?

C. Coordination

- How are tasks usually delegated/divided in your team? Who is responsible for dividing?
- How are the priorities set?
- How do you monitor the progress of your team?
- Have you/your team experienced issues in coordinating work since you are working remotely? What kind of issues?

Closing

- Is there anything you would like to add to this interview?
- Do you have any questions for me?
- Thank you for your time and effort for this interview. As mentioned before, I ensure that this interview will be kept confidential.

Appendix C: Codebook

Aggregate dimensions	Second order codes	First order codes	Illustrative Quotes
Challenges of team distribution for collaboration	Communication	Communication is less effective	"So communication is fragmented, interrupted, misperceived. And therefore, it takes a longer time to achieve the results you want to achieve compared to when you are in the same room and people are all at the same thing, the same part of the page" ""I think when you do it online, there are even more misunderstandings, because I cannot see the micro-expressions, or you cannot feel like how the person is sitting when they talk"
		Reduced opportunities for informal and spontaneous communication	"If I have an issue with finishing a document, I just make up something now. And now I really have to give her a call, or I have to schedule a meeting to ask her to help me. But normally, if you sit next to each other, you just say: shall we have a tea? Or can you help me here or?. So it's less spontaneous. It's less intuitive, it's more functional now. So it impacts [collaboration] quite a lot"
	Decision-making	Reaching consensus takes longer	""I think [decision making] does take longer. Because especially if you need to agree on something. And then if there's a lot of people, and then you come up with, you need to capture it and write it down and then provide input, etc. And then maybe we should work a bit more on it and then come back" ""[Decision making is]more difficult, because the risk that you do not fully understand each other is a bit bigger. So and also, yeah, because the time that we have together is so limited"
		Sharing decisions between stakeholders is harder	"People forget to get back with a decision, myself forgetting to decide something or to communicate on it"
	Team cohesion	Team bonding is difficult to achieve	"So that that is something I do have, well I struggled with a little bit and how do you make sure you build a tight-knit team whilst working from home"

		Establishing mutual trust is harder to realize	"it's much harder to build trust in the online environment. and with that of course, there's less collaboration between team members, the dynamics are more challenging, there's more conflict, which is harder to resolve" "There are way more personal issues within the teams. Because it's much harder to build trust in the online environment. and with that of course, there's less collaboration between team members, the dynamics are more challenging, there's more conflict, which is harder to resolve"
		Reaching shared understanding between team members is complex	“And then getting into the same starting point remotely is, yeah, takes a few iterations, it takes about three to five times longer than in a physical setting. So the same understanding of work, and how to go about work" "They keep on creating a document, they write things down, then they comment on it. And then someone, instead of just writing on, creates another document. And they comment on that document and yeah (...), they are not on the same page, they don't have an agreement of the things and how we go about it"
	Idea generation	Establishing an environment that stimulates idea generation is difficult	“The main one is really like how to how to enable the creative discussions, and like the deeper content discussions, Because we do a lot of alignments, a lot of updates, a lot of plannings, but then like, then we miss the creative part” “I found it challenging to keep that level of openness and creativity. I think when we went to more remote working, it became more transactional and more so how can we be as efficient as possible”
		Visually representing ideas is harder	"I really miss drawing on a whiteboard for quite some sessions. If you're all at the screen, and nobody has the whiteboard, and it's especially if you have a small screen or the technology doesn't really work, etc. that creative part and to do those things together, those could take so long"
Benefits of team distribution for	Coordination	Coordinating team tasks is more effective	"[Coordination] is usually is rather simple because like if you do make a planning on Trello, then you have very clearly assigned people to do things and clear tasks"

collaboration			“Some of the things are easier. So for example, like tracking on the Trello board and this kind of stuff, it's actually easier because then it is just much simpler online, and everyone is online”
	Reachability and availability	Increased reachability of team members and stakeholders	"It is just easier to reach out to stakeholders, to have these meetings planned, that is more efficient" "Most of the time of the day people are behind their screens, it's very easy to get ahold of people. Usually, back in the days in the office, you had to search for people or they were out or they were on different floors. But now everyone's behind a laptop. And unless you are, I don't know, in another meeting, or you're in a separate appointment, then it's very easy to get ahold people"
		Increased contact with colleagues across labs locations	"I think it's also easier to, at least I've noticed like when I work with Singapore with some teams, it's a lot easier than it used to be. Cross country or cross-continent, that's a lot easier"
	Efficiency	Increased productivity	"Now we are more efficient, more effective"
		More effective meetings	"We're also more efficient in getting more out of the meeting with a stretched agenda and with making sure that we define the next steps in the meeting. So in that sense, I think we've improved. We've improved how we deal with meetings"
		Data analysis and synthesis is more efficient	“Everything becomes efficient, because everything you've raised on is on a post-it on Miro. So basically, it's pretty fast to do analysis. Hence, once you subscribe to Miro, you will instantly see that it becomes more efficient. And you get to talk about data in a more effective way and focus way."
	Knowledge sharing	More efficient information exchange	“And I think you capture more and also sharing it and I think with a lot of the opportunities that you now have in Teams and in recording meetings, etc. That is easier” "Everybody can actually pull information from themselves. So making information more accessible for people"
		Increased awareness in sharing lessons learned	"I have incorporated some like discussions or our stand-ups are a bit longer to also share with more on the content side of things like what we have learned [...]. So creating this kind of like learning spaces,

			this was not part of it before, because it used to happen very naturally in this kind of face to face environment" “All the initiatives are communicated at least leads are communicating way more and know each other and are also willing to share way more and in a more structured way as well”