Journal of the Association for Information Systems (2024) **25**(3), 738-780
doi: 10.17705/1jais.00885

RESEARCH ARTICLE

ISSN 1536-9323

Mechanisms for Achieving Ambidexterity in the Context of Digital Transformation: Insights from Digital Innovation Labs

Friedrich Holotiuk,[1] Daniel Beimborn,[2] Axel Hund[3]

[1]Frankfurt School of Finance & Management, Germany, research@holotiuk.de
[2]University of Bamberg, Germany, daniel.beimborn@uni-bamberg.de
[3]University of Bamberg / Neu-Ulm University of Applied Sciences, Germany, axel.hund@uni-bamberg.de

Abstract

Digital transformation alters companies' core value-defining activities. Companies must establish new work practices and change the work environment to create new value propositions leveraging digital technologies. Specifically, to maximize their investments in digital transformation while remaining competitive, they must achieve ambidexterity, which is the capability to balance exploration and exploitation flexibly. More and more companies strive to achieve ambidexterity by establishing digital innovation labs (DILs), where employees explore the opportunities afforded through digital technologies and ensure their successful integration into the main organization. This study analyzes data collected from nine DILs, examining how companies utilize them to achieve organizational ambidexterity. Our analysis reveals a nuanced view on the conceptualization of ambidexterity and how it helps in digital transformation: (1) DILs contribute mainly by transferring employees temporarily from the main organization to the DIL and back. Recombining mechanisms of different theoretical forms of ambidexterity addresses typical issues and tensions stemming from leveraging digital technologies in innovation activities. (2) We find that implementing ambidexterity through organizational design features of DILs provides a successful basis for digital transformation by creating innovations that complement companies' value propositions with digital technologies.

Keywords: Digital Transformation, Value Proposition, Digital Innovation Labs, Organizational Design, Ambidexterity Mechanisms, Digital Innovation

Matthew Jones was the accepting senior editor. This research article was submitted on September 06, 2020 and underwent three revisions.

1 Introduction

In recent years, most companies have started leveraging digital technologies to innovate their products, processes, and business models (Fichman et al., 2014; Vial, 2019). This in turn leads to the transformation of significant parts of the company, such as its identity (Wessel et al., 2021), organization (Hanelt et al., 2021), and enterprise IT architecture (Ross et al., 2019). Due to the novelty and disruptive potential of digital technologies, existing organizational designs are often insufficient to facilitate both the exploration and exploitation of their innovation potentials (Yoo et al., 2012). The interconnectedness and dynamic evolution of these technologies are highly complex, creating tensions regarding goals and priorities, and increasing the management challenges associated with achieving sustainable digital innovation (Montealegre et al., 2019). In this context, managers must manage paradoxical situations where short-term improvements and long-term impacts need to be balanced (Gregory et al., 2015), and companies must address competing concerns, such as acquiring new skills while maintaining existing skills or fostering internal collaboration while simultaneously

engaging with external partners (Svahn et al., 2017). In the past, a firm's competitive advantage was primarily operational in nature. Today, organizational designs must include the contributions of multiple parties leveraging multisided platforms or ecosystems (Tan et al., 2015), requiring companies to "balance the demands of multiple parties as well as the respective frames of reference that guide their perception of what is considered right and wrong" (Vial, 2019, p. 20). Following Vial (2019) and Wessel et al. (2021), we propose adapting organizational designs to leverage the potential of digital technologies and enable successful digital transformation.

Our study examines how companies adapt their organizational designs in novel ways to balance exploration and exploitation, i.e., achieve ambidexterity, and thus contribute to digital transformation (Vial, 2019). The extant literature differentiates between two forms of ambidexterity: structural and contextual. *Structural* ambidexterity balances exploration and exploitation by adopting "dual structures" (Duncan, 1976) while *contextual* ambidexterity achieves this balance by leveraging the contextual features of the organization (Gibson & Birkinshaw, 2004). While these forms have been intensely studied, it is clear that "although near consensus exists on the need for balance, there is considerably less clarity on how this balance can be achieved" (Gupta et al., 2006, p. 697).

Although both forms of ambidexterity offer various advantages, they do not take full advantage of the opportunities provided by digital technology. For example, in structural ambidexterity, the strict structural separation of exploration and exploitation insufficiently supports interconnected and cross-functional innovation utilizing digital technologies. In contextual ambidexterity, simultaneous exploitation and exploration fail to concentrate the ongoing effort and distinct focus on the digital innovation needed for the fast-paced development of digital technologies. Companies aiming to innovate with digital technologies find that achieving "ambidexterity in this context is ... challenging" (Gregory et al., 2015, p. 72)

To overcome the shortcomings of ambidexterity in the context of digital transformation, companies are experimenting with alternative organizational designs, such as distinct locations within the company that allow employees on a temporary base to pursue exploration full-time or part-time, ensuring the fluid exchange of ideas and knowledge between such exploration units and the main organization. The literature discusses attempts to increase innovativeness by bundling the capabilities needed to achieve digital innovation (Nambisan et al., 2017) and to use innovation as a linking mechanism between digital technologies and digital transformation (Hanelt et al., 2021).

To date, scholars have not focused on approaches of using ambidexterity to overcome the challenges of successful digital transformation, reap the benefits of digital transformation, and develop "complementary capabilities and investments as a balance between exploitation and exploration opportunities" (Nwankpa & Datta, 2017, p. 484). To fill this gap, we address the following research question:

RQ: How can companies leverage ambidexterity to support digital transformation?

To answer this question, we take a case study-based approach and analyze the organizational designs and work routines of nine digital innovation labs (DILs) from an organizational ambidexterity perspective. We do this by focusing on two perspectives: (1) How are DILs providing a new approach to achieve *ambidexterity*? (2) How can DILs contribute to companies' *innovation efforts in digital transformation*?

DILs are organizational units separate from their company's main organization that focus on exploration and support the fluid exchange of ideas, knowledge, and insights between themselves and the main organization. Our data unveils important characteristics among them to achieve ambidexterity and innovations for digital transformation: (1) many companies establish DILs to promote digital transformation and temporarily transfer employees full-time to the DIL to balance exploration and exploitation. Temporary transfers ensure close communication, knowledge sharing, and integration with the main organization, which are crucial to fostering sustainable digital innovation. (2) Subsequently, the companies leverage these innovations to create new value propositions and, in turn, accelerate the progress of their digital transformation.

Our findings along the two perspectives show a distinct approach to ambidexterity and how DILs benefit companies seeking to leverage digital technologies in transformation activities. (1) We observe different manifestations of ambidexterity across DILs along two dimensions: the *direction* and the *intensity* of the transfer of employees. Based on this, we distill a set of organizational mechanisms that firms use to realize ambidexterity, thereby recombining aspects from both structural and contextual ambidexterity. (2) Using these mechanisms, we show how this intertwining approach to exploration and exploitation advances our understanding of ambidexterity in the context of digital transformation and why ambidexterity using a transfer of employees can deliver the needed innovations to transform (e.g., create new work routines or digitally augment products and services).

The remainder is structured as follows: First, we introduce the conceptual background for our study. Second, we describe our research methodology. Third, we present our findings on how companies temporarily rotate employees between DILs and the main organization to achieve ambidexterity. Fourth, we conceptualize ambidexterity mechanisms in the context of digital transformation and explain how new organizational designs like DILs leverage digital technologies to redefine companies' value propositions. Finally, we highlight the implications, limitations, and opportunities for future research.

2 Theoretical Background

In this section, we introduce the fundamental concepts of our research framework, as illustrated in Figure 1. This study investigates ambidexterity as an enabler of digital transformation driven by digital innovation, focusing on DILs as an organizational design link between specific mechanisms of ambidexterity and digital transformation. Hence, we address (1) the specific conceptualization of different forms of ambidexterity and their mechanisms to achieve ambidexterity using DILs and (2) how innovation delivered by DILs fuels digital transformation.

2.1 Digital Transformation

Digital transformation "involves using digital technology in order to (re)define a value proposition and to change the identity of the firm" (Wessel et al., 2021, p. 120). Thus, "organizational change [is] triggered and shaped by the widespread diffusion of digital technology" (Hanelt et al., 2021, p. 1188). Vial (2019, p. 121) adds that digital transformation is "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies." Digital transformation can occur across different levels and fundamentally change various core aspects that define a company (Vial, 2019). Digital transformation can influence how people interact with each other, how companies interact with their customers, or how interconnected products create new platform ecosystems. To become or remain an innovation market leader and unlock the full potential of innovation from digital technologies (Hanelt et al., 2021), companies need new technological capabilities to understand better the potential business implications of these technologies and a new organizational design that would allow them to pool and develop the required capabilities for innovation (Nambisan et al., 2017).

2.2 Digital Innovation

Digital innovation is "the creation or adoption, and exploitation of an inherently unbounded, value-adding novelty … through the incorporation of digital technology" (Hund et al., 2021, p. 6). When rethinking existing organizational designs to support digital innovation in the context of digital transformation, the fluent integration of digital technologies into exploration and exploitation efforts is essential (Jansen et al., 2009). Digital technologies offer tremendous innovation potential due to their unique characteristics of homogenized data, reprogrammability, and self-reference (Yoo et al., 2010).

Ambidexterity	March 1991, p. 105	"The basic problem confronting an organization is to engage in sufficient exploitation to ensure its current viability and, at the same time, devote enough energy to exploration to exploration to ensure its future viability"
Digital Innovation	Yoo et al. 2010, p. 725	„We define digital innovation as the carrying out of new combinations of digital and physical components to produce novel products […] digital innovation thus implies a focus on product innovation"
Digital Transformation	Wessel et al. 2021, p. 104	„The idea of using digital technology to improve business outcomes is also what guides most theorizing in the area of DT. […] DT refers to the use of digital technology for the sake of advancing business outcomes."

Figure 1. Conceptual Research Framework

As companies integrate more digital technology into their business processes (Tilson et al., 2010; Yoo et al., 2010), they move beyond their existing safe and proven innovation paths (Henfridsson et al., 2014). Moreover, as digital innovation increasingly blurs the distinction between process and outcome (Nambisan et al., 2017), significant organizational change and shifts in conventional patterns of behavior codified in fundamental beliefs, routines, and procedures are required (Tripsas, 2009). Due to the rapid changes that digital technologies enable, they also reframe established notions of ambidexterity, as they increasingly play "a central role in exploration and exploitation activities" (Hund et al., 2021, p. 10). Accordingly, Piccinini et al. (2015, p. 14) identified ambidexterity "to be of major importance for managing the challenges of digital transformation."

2.3 Ambidexterity

In the context of digital transformation, ambidexterity is the capability of balancing the exploration of new digital innovation opportunities with the exploitation of those opportunities to improve existing products and services (Gregory et al., 2015; Svahn et al., 2017; Vial, 2019). The concept of ambidexterity has evolved over a long time. Duncan (1976) recommended achieving innovation by organizing the company around innovation cycles, oscillating between creating new resources and capabilities and using existing ones. In the first stage of the innovation cycle, Duncan recommended an organizational design with loose controls enabling complexity. In the second stage of the cycle, organizational design should include tighter controls and standardization. Building on this dual organizational design structure, March (1991) conceptualized exploration and exploitation as a frame for ambidexterity. Whereas Duncan focused more narrowly on the actual innovation, March emphasized the broader organizational scope of innovation and theorized ambidexterity as allocating scarce resources between exploratory and exploitative activities.

Consequently, being ambidextrous means "simultaneously pursu[ing] both incremental and discontinuous innovation" by "hosting multiple contradictory structures, processes, and cultures within the same firm" (Tushman & O'Reilly III, 1996, p. 24). Based on the discussed levers for innovation in organizations, scholars have identified activities at the individual and organizational levels for ambidexterity. Accordingly, two forms of ambidexterity are most commonly discussed: *contextual* and *structural* (Lavie et al., 2010; Stadler et al., 2014). Both forms must balance exploratory and exploitative activities to achieve ambidexterity.

Exploratory activities manifest in "search, variation, risk-taking, experimentation, play, flexibility, discovery, [and] innovation" (March, 1991, p. 71). For example, a company may search for innovative technological ideas and creative ways to satisfy customer needs or develop new offerings for new market segments. In contrast, exploitative activities manifest in "refinement, choice, production, efficiency, selection, implementation, execution" (March, 1991, p. 71). The allocation of resources to one side of the ambidextrous continuum may weaken the performance on the other side. Hence, the only way to stay competitive in the long run is to excel at both exploration and exploitation (Montealegre et al., 2019).

The core concept behind *structural ambidexterity* is having two structural entities in the organization to achieve balance. It is the "ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm" (Tushman & O'Reilly III, 1996, p. 24). The separation reduces institutionalized antagonism between incremental innovation (exploitative activities for new processes and products) and discontinuous innovation (exploration activities for creating disruptive and novel innovations) (Tushman & O'Reilly III, 1996).

Gibson and Birkinshaw (2004) initially conceptualized *contextual ambidexterity* as "the capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (p. 209). In this context, alignment refers to "coherence among all the patterns of activities in the business unit" (i.e., exploitation), while adaptability refers to "the capacity to reconfigure activities in the business unit quickly to meet changing demands in the task environment" (i.e., exploration) (Gibson & Birkinshaw, 2004, p. 209). In contextual ambidexterity, employees switch rapidly between exploration and exploitation based on their assessment of situational needs.

Scholars and practitioners recognize ambidexterity as a path to innovation, but it remains unclear how companies leverage structural and contextual ambidexterity in the context of digital transformation. "Environmental and strategic dynamics produce both paradoxical demands and organizational drifting" (Gregory et al., 2015, p. 76) and thus cause companies to struggle to find the right organizational design and achieve strong organizational performance (Tang et al., 2006). For companies to achieve ambidexterity and reap the intended benefits, they must undertake "significant changes" (Fichman et al., 2014, p. 333), including changes to their organizational design. One such approach is to establish "digital innovation labs."

2.4 Digital Innovation Labs

Efforts to establish distinct and separated organizational units for digital innovation, often called digital innovation labs (DILs), have sparked debate around their design, integration, and oversight (Ahuja, 2019). They build on the notion of Christensen and Bower (1996, p. 215) to manage "disruptive technology in a manner that is out of the organizational and strategic context of mainstream organizations." However, completely separating DILs from the main organization with regard to location, mindset, collaboration mechanisms, and communication channels makes it difficult to ensure sufficient knowledge and innovation transfer between the DIL and the main organization. To mitigate this separation, some DILs let employees rotate between exploration (i.e., in the DIL) and exploitation (i.e., in the main organization). Rotation allows the dissemination of knowledge about digital technologies, prevents knowledge from being lost during handovers of innovation results, and ensures that innovations are exploited to generate business value instead of getting stuck at the invention stage (Gupta et al., 2006).

Our analysis of the extant literature reveals a research gap regarding the implementation of DILs, how they facilitate digital innovation, and how they enable successful handovers of innovation from the DIL back into the main organization. Likewise, there is scarce research on DILs as a new organizational design approach to balancing exploration and exploitation in the context of digital transformation. The potential of DILs to apply different mechanisms of ambidexterity to innovate has yet to be explored. While practical experience indicates that DILs reduce reaction time, increase the frequency of testing new products, and generally deliver promising results, there is a gap in systematic research into their processes, structures, staffing, and their role in digital transformation in terms of efficacy and efficiency.

3 Research Methodology

We see that DILs have the potential to initiate rethinking about achieving ambidexterity and deliver a fresh approach for companies by leveraging digital technologies in all innovation activities. DILs are a nascent phenomenon, and since we want to understand the deeper relationships between ambidexterity and digital transformation, we used an exploratory case study approach to collect empirical evidence (Cecez-Kecmanovic et al., 2020; Yin, 2009). In line with established best practices, we adopted a post-positivist worldview (Langley & Abdallah, 2011) and used a multiple-case study design, which allowed us to treat every case as "a distinct experiment that stands on its own as an analytic unit" (Eisenhardt & Graebner, 2007, p. 25). By collecting data from multiple cases, we can view ambidexterity "in novel ways and [develop] innovative theoretical accounts" (Cecez-Kecmanovic et al., 2020, p. 225). Furthermore, the cases enable us to reflect critically on DILs and test falsifying and confirming assumptions, thus developing new insights into ambidexterity (Silva, 2007).

3.1.1 Case Sampling

We started with an opportunistic sampling approach to gather a comprehensive data set. We contacted 48 companies across various industries that we knew had a DIL based on press releases or our professional and private networks. Of these 48 DILs, the heads from 22 DILs across eight industries expressed a willingness to participate and their DILs were subsequently studied (details of data collection follow below).

After collecting the 22 cases, in a second step, we narrowed the sample based on the cases' suitability for our theoretical exploration (Eisenhardt, 1989; Yin, 2009). We identified the transfer of employees as the focal phenomenon of the DILs' efforts to develop digital innovation. They are mostly enabled with a direct link to senior management and are equipped with programs to enable the transfer of employees. The transfer is the primary enabler for collaborating with the main organization to develop innovation. Based on these observations, we concluded that the transfer is the common theme to achieving ambidexterity. Based on the literature, those transfers can be differentiated regarding their direction and intensity. The *direction of transfer* refers to moving between the DIL and the main organization and when employees move back from the DIL to the main organization "reintegration occurs [and] exploratory innovation is transferred back into the exploitative space to benefit from core business strengths in commercialization" (Hansen et al., 2019, p. 487). Durisin and Todorova (2007) found this transfer to be key to successful strategy execution because otherwise innovation projects risk never finding their way out of the exploration-focused unit. The transfer is influenced by the "degree of separation between the unit and the parent" (Markides, 2013, p. 314)—often allowing for bidirectional transfers if the separation is low and the locations are close. Separation also influences intensity. The *intensity of transfer* has been shown to be important for sufficient information exchange and enabling fast decision-making (Fourné et al., 2019); the right level of "collaboration intensity can improve the quality of the internal relationships and can favour employees' professional development" (Lazzarotti et al., 2017, p. 6). In our cases, we identified considerable differences regarding the intensity and direction of the transfer; therefore, we theoretically sampled nine (polar) cases out of the 22 that "sharply illuminat[e] stark differences across cases" (Eisenhardt, 2021, p. 150).

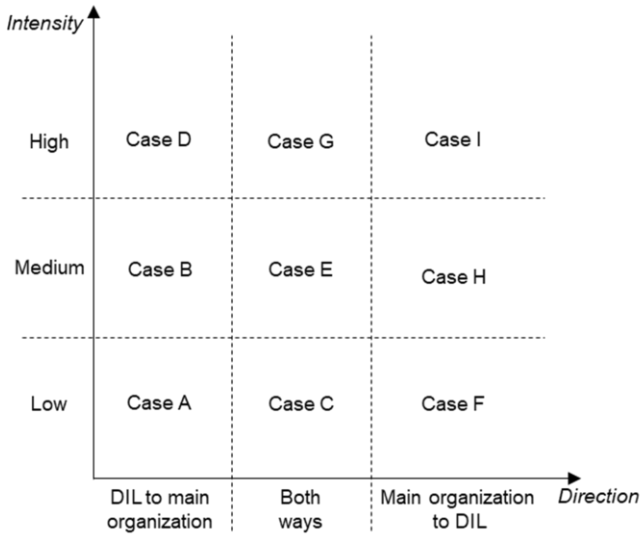

Figure 2. Case Sampling by Direction and Intensity of Employee Transfer

Appendix A provides brief case descriptions to illustrate the differences regarding the DILs' governance, innovation activities, and collaboration with the main organization. This analysis allowed us to uncover insights based on strong differences in a few focal aspects while also considering similarities in many other aspects (Langley & Abdallah, 2011). As Figure 2 illustrates, the cases exhibit various degrees of direction and intensity regarding transfers of employees into and out of the DIL.

In some cases, the dominant transfer direction is *from the DIL to the main organization*, such as when DIL team members temporarily join projects outside the DIL in other units. In other cases, the dominant transfer direction is *from the main organization to the DIL*, such as when employees leave their exploitative home base and temporarily join a DIL project or team. Most cases lean toward one of the dominant directions, but in some cases, transfer is equally common in both directions.

Transfers also take place with varying degrees of *intensity* in terms of length of membership in the DIL, percentage of working time dedicated to the DIL, and how connected employees stay after the transfer. An example of low intensity would be the transfer of employees for only a few days for a workshop, medium intensity might involve employee transfer for one or two weeks to collaborate on projects or tasks, and an example of high intensity would be the transfer of employees for two months or longer on a full-time basis, exempting them from their usual tasks.

3.1.2 Data Collection

To fully understand the different facets of the organizational design of a DIL and its role in achieving ambidexterity, we conducted at least three interviews per case to capture different nuances and to triangulate different perspectives. First, we interviewed the head of the DIL, who is sometimes the chief digital officer (CDO), a manager reporting directly to the CDO, or, in cases where there is no CDO, the manager responsible for digitalization. Then, we interviewed a DIL project manager, who generally heads an initiative or project running in the lab and has budget and personnel resources. Finally, we interviewed a manager who is *not* a member of the DIL but has been working with the DIL to accelerate a topic or project in their purview (e.g., a "project sponsor"). This manager usually belongs to a business unit in the main organization and is often in charge of some customer-relevant products/services. In some cases, we were able to interview a fourth person, who might have different roles, such as an additional project manager from the DIL or an IT specialist providing specialized technical knowledge about certain digital technologies required to develop the innovations.

We conducted our interviews in a semi-structured manner to focus on our research question while retaining sufficient flexibility to follow up on promising issues. We first collected basic information about the DIL, such as its members, tenure, location, mission, features of its projects, project examples, coordination and communication with the main organization, and its output, plans, or ideas. Two of the authors conducted each interview together on-site in 2018 and 2019. We also collected publicly available information and internal documents provided by the DILs to flesh out our portrait of the DILs. Table 1 provides an overview of the cases and their digital innovation activity outcomes.[1]

[1] Please refer to Appendix B for a list of all interviewees with their roles and background.

Table 1. Case Descriptions and Innovation Outcomes

Case	Industry	Case description	Innovation outcomes	Interviews	Total minutes
A	Apparel	DIL has a core team and its members are known in the main organization. Project activity happens jointly with other units. Project outcomes are frequently presented to all units of the main organization.	Virtual reality solution implemented in close collaboration with the business. DIL provides technical expertise and the business unit ensures fit between VR application and internal user needs.	4	228
B	Banking	DIL staffed cross-functionally with DIL core members and temporary members from business units in the main organization. Exchange between DIL and main organization focuses on diffusing innovation and insights.	Digital innovation projects are directly linked to business units and outcomes are tightly aligned with business needs. Digital innovations utilize digital technologies to improve processes and/or customer experience (i.e., new mobile banking apps).	4	232
C	Logistics	DIL is located on same floor as most people interacting with the lab. Primarily permanent members have been assigned to the DIL. Employees are aware of the lab but there is little exchange and activities are separated.	DIL gathers ideas from and supports efforts by the business units to explore digital innovation ideas mainly through studies and digital technology expertise. DIL is open for new ideas as input and shares insights with the main organization.	4	237
D	Banking	DIL is new and not yet well-established in the organizational structure. DIL reports to the CEO and has strong backing. All projects and workshops are initiated by the DIL and address the main organization.	Innovations are triggered by scouting the startup scene and spreading insights via workshops and joint projects. Digital business opportunities are identified by the DIL and then pitched to the business units.	3	179
E	Logistics	DIL is close to headquarters but organizationally separated from the main organization. Most members are permanent, but employees join the DIL from the main organization. DIL members present insights in meetings and workshops.	DIL has a deep understanding of the business and can identify problems that can be solved with digital technologies. Joint prototypes are developed to improve customer services and delivery.	3	186
F	Insurance	DIL is isolated and has little connection to the main organization. Employees are transferred to the DIL temporarily—but long-term (usually 12 months). Outcomes are rarely presented to the main organization and there is little knowledge about the DIL's activities within the company.	DIL has developed and currently manages two innovative products outside the current business scope of the company. These products are poorly integrated into the company's product portfolio.	4	243
G	Transportation	DIL is located at headquarters. Some members are permanent and others join the DIL temporarily from the main organization. Employees collaborate through workshops and demos and projects are staffed mutually.	DIL scans the environment, identifies and analyzes digital trends, pilots, new products, and customizes prototypes to fit current business.	3	176
H	Banking	DIL is a separate entity and its core team is staffed mainly with fresh hires, which leads to weak connection with main organization. Employees from the main organization join the lab temporarily for projects and see the DIL as breeding ground for innovation.	Digital innovations are developed and tested based on input from the main organization. New apps and digital services are developed as prototypes but remain in the DIL. No market launches yet.	3	183
I	Insurance	DIL is highly integrated. Projects are sponsored and staffed by the main organization. Employees join temporarily to support the DIL's core team. Project work is collaborative and results are constantly discussed with business units.	DIL provides new business opportunities close to the current business based on app-based customer interaction. The business supports the app and promotes it through the existing customer channels.	3	182

3.1.3 Analysis

We recorded all interviews, transcribed them, and coded them using MaxQDA 2018. Two researchers conducted the coding process by following the guidelines for deductive qualitative content analysis by Miles and Huberman (1994). We chose a deductive coding approach based on the theoretical background of our research framework (ambidexterity, digital innovation, and digital transformation) to better understand the exploration and exploitation activities of the DILs.

In our analysis, we not only looked at the context around each DIL regarding setup, motivation and vision, governance and structure, skills and staffing, operations and processes, and culture, but we also specifically focused on ambidexterity. In our coding, we probed the DILs' exploitation and exploration activities to understand how DILs achieve ambidexterity. In particular, we explored how a DIL supports the main organization or how the main organization supports the DIL in the respective exploration and exploitation activities.

Ambidexterity served as the basis for our deductive coding procedure, and we derived four theoretical dimensions (exploration, exploitation, transfer, and intensity). We coded the output of the DILs to relate the dimensions to how effectively the DILs developed innovation. Based on the empirical insights, we then undertook (open) recoding of the previously coded segments to gain more granular insights into *how* DILs achieve exploration and exploitation. The existing research on organizational change for digital transformation and ambidexterity guided our analysis. We focused on mechanisms that utilize the DIL's activities to balance exploration and exploitation and suggested contextualized forms of ambidexterity. Figure 3 provides an overview of our analysis, summarizing the deductive coding and the granular analysis of all coded segments using open coding to identify ambidexterity mechanisms.

Of the 900 coded segments, 350 provided more profound insights into *how* mechanisms were applied to achieve ambidexterity aligned to the context of digital transformation. Appendix C shows the coding table used for deductive coding. Along with the table, sample quotes provide more details in our analysis of the interview data. Table 2 provides examples of how we derived the mechanisms of ambidexterity from the identified quotes. We summarize the mechanisms and identify the approaches of differentiation and integration at either an organizational level or an individual level.[2] For a differentiation between the two levels, see Section 4.1 below. We provide quotes in the empirical findings section below to better illustrate our findings.

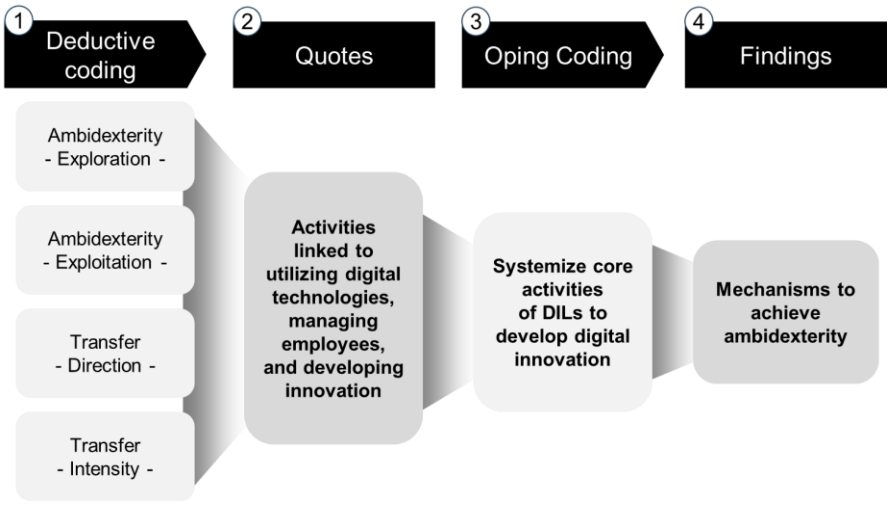

Figure 3. Data Analysis Approach Using Deductive Coding

[2] Appendix D explains the two different levels in our research. They are commonly used in the ambidexterity literature, and help structure our findings and discussion.

Table 2. Sample Coded Segments with Analysis and Findings

Sample coded segment	Analysis	Findings	
Topic and quote	**Open codes**	**Mechanism**	**Approach**
DIL takes ownership of ideas assigned to them "We have started to work on specific topics, and we [the DIL] have taken responsibility for them. We are the ones who are building teams for these topics. We combine employees working permanently in the DIL with employees sent to the DIL by the main organization." (Case E, E1)	Combination of employees from the main organization and the DIL to explore	Transferring employees full-time to support exploration.	Differentiation (individual level)
Different tasks for the DIL and the main organization "Our [the DIL's] strategy is that we have an idea coming from somewhere—such as from the main organization, from the market, or from us [the DIL]. We are evaluating the overall context, trying to illustrate the idea, collecting advantages and disadvantages, and assessing the idea itself. ... The goal is to involve the different departments relatively early and to sound the idea with them. What are possible showstoppers or follow-up ideas, and how can we best further explore the idea? Maybe we already have something like this that we could adopt?" (Case A, A2)	DIL evaluates ideas and manages the exploration	Separating exploration and exploitation to increase focus.	Differentiation (organizational level)
	Main organization is involved in the exploitation	Gathering employees to pool skills and knowledge for exploration (and exploitation separately).	Differentiation (individual level)
Employees returning to the main organization "We motivate employees who have transferred to the DIL to keep a close link to their department [in the main organization]. Using the project they are working on here in the DIL and the ideas they have generated, we encourage the employees [while being in the DIL] to further test the ideas and discuss them with their colleagues and managers. Sharing about the innovations is crucial, and the managers need to get to a point where they understand. Because then employees return with their projects and can implement and test it further." (Case I, I2)	Returning back to the main organization allows information and knowledge sharing about innovations	Transferring employees together with their innovation outcomes to ensure successful integration	Integration (individual level)
Transfers happen (mainly) full-time, and employees can entirely focus on their tasks in the DIL "My colleague over there is from the main organization and now working with us for two months. His unit told him they want to explore deeper digitalization and connected changes. So we invited him [to join the DIL]. The main organization still pays his salary, but he works for two months here on the project and takes learnings with him for the main organization." (Case H, H3)	Employees use full-time transfers from the main organization to the DIL.	Transferring employees full-time to support exploration.	Differentiation (individual level)
	Employees contribute expertise and discuss ideas when they join the DIL; later, they return to the main organization and take the learning with them	Providing flexibility for employees to switch back and forth between exploration and exploitation.	Integration (organizational level)

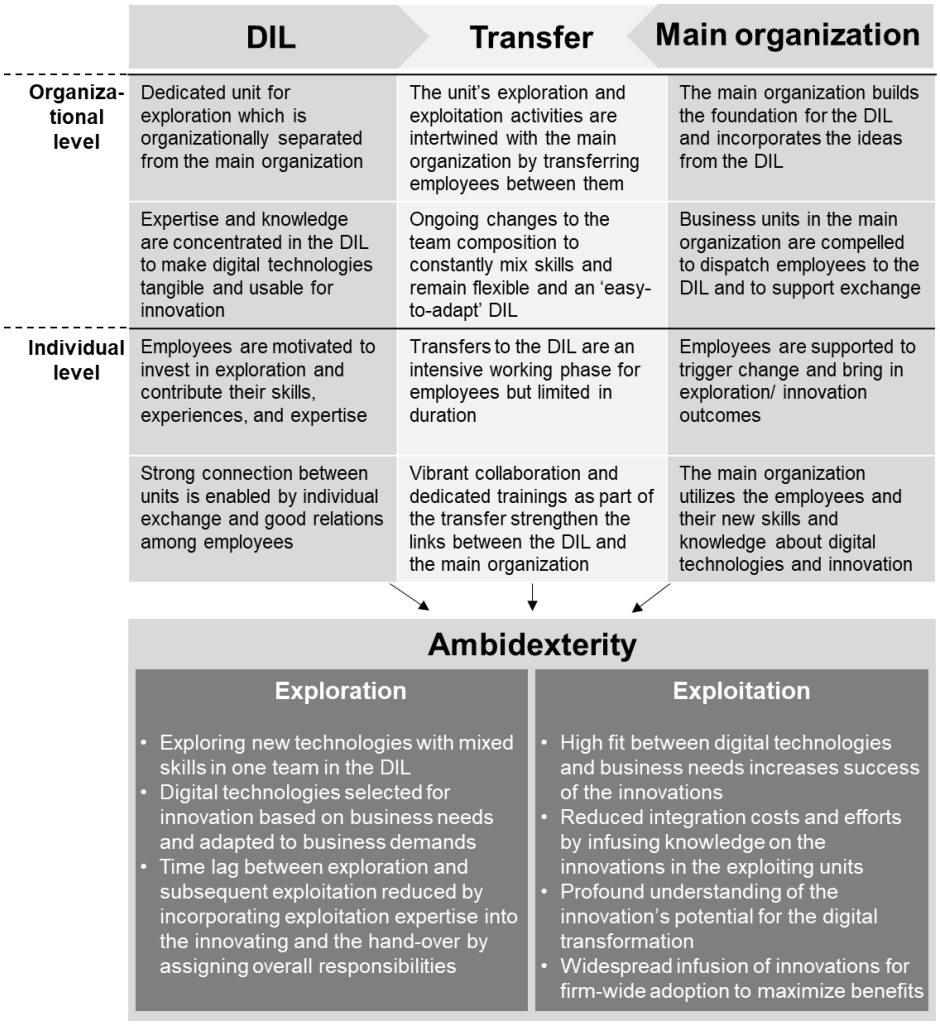

Figure 4. Guiding Themes to Achieve Ambidexterity in a Digital Transformation Context

4 Empirical Findings

In the following, we first explain the implementation of DILs, how the transfer of employees works, and the essential characteristics of the main organization collaborating with the DILs. We conceptualize how both the DIL implementation and the transfer of employees deliver outcomes suited to digital transformation through ambidexterity (see Figure 4). Then, we identify 14 mechanisms of ambidexterity, describing how companies achieve a balance of exploration and exploitation.

4.1 DIL Implementation

Overall, we observed that certain features of a DIL implementation increase its potential to promote ambidexterity (Table 3). These features are categorized along two levels: (1) The *organizational level* corresponds with structural ambidexterity and includes separate organizational structures/setups that anchor activities in different organizational units to support the balance between exploration and exploitation; (2) the *individual level* corresponds with contextual ambidexterity and includes changes in DIL team members' work assignments that support ambidexterity and features that ensure collaboration between the DIL and the main organization to improve the flow of ideas for digital innovation and transformation. Employees move between the two locations and interact in a certain way depending on their location and work assignment to support the goals of the exploration or exploitation activities.

> *We have gone so far as to put one employee [from the main organization] here in the [DIL] team who has also taken on a fixed role here and thus we are just expecting a closer exchange so that topics concerning [the main organization] will find their way in here more quickly. And vice versa, of course, things developed here may be implemented in more detail, and colleagues simply know how it works and know tricks that cannot be transferred with a meeting.* (Case E, E2)

Table 3. DIL implementation features and ambidexterity outcomes

Level	Features of DIL implementation	Ambidexterity outcomes
Organizational level	• DILs focus on making innovative digital technologies usable • DILs are organizationally separate with dedicated teams and resources • DIL exploration activities are aligned and intertwined with the exploitation activities of the main organization	• New digital technologies are used to create new business and improve existing business • Insights from exploration are infused into the main organization • Exploration is separated but not detached from the main organization • A specific unit within the organization is the breeding ground for ideas to explore
Individual level	• DILs integrate employees from the main organization with different backgrounds and skills • Employees active in the DIL are supported by employees transferred temporarily to the DIL from the main organization • Separated but not detached—close collaboration and exchange between employees in DIL and main organization	• Effective allocation of resources for exploration with staffing of innovation project based on technology and knowledge requirements • DIL and other units collaborate to link exploration and exploitation • New and existing knowledge is leveraged for new business opportunities • Exploration and exploitation are connected through mutual education and learning (employees learn about and experience the work in the other units) • Over time, employees work in the DIL and the main organization and, thus, have a shared responsibility for exploration and exploitation

At the *organizational* level, we observed that DILs are tasked with exploring "new things" in the digital business environment. DIL activities often drive digital transformation through the exploration of opportunities to leverage digital technologies (such as virtual reality or autonomous driving), in some cases spanning "everything from business model to process optimization and digitalization" (Case A, A3).

Insights generated by the DIL's exploration flow back into the main organization through various formal and informal exchange mechanisms, presentations, or online communication channels to ensure that exploration and exploitation do not drift apart. The DIL's goal is to focus on exploration activities and innovation outcomes customized to the company's needs so that the main organization can use them quickly.

> *We are a bit picky, and only take ideas that are promising for [the company]. We don't start with a new technology, just because it is hype right now. We only work on topics that look promising for [the company] in any way. This is essentially evaluated by our CIO and the Digital Transformation board.* (Case C, C1)

DILs are usually implemented as an exploration unit, being part of the company but separated from the main organization, and staffed by dedicated permanent plus temporary team members. DILs commonly work in "sprints, workflows, that is where we are very autarkic … [exploring] user-centric ideas and prototypes" (Case H, H3).

> *It is our goal to decide which idea helps the company; then we decide that we make a prototype in one or two sprints. If we say afterwards it's still good and we decide to continue, then we drive that to the MVP [(i.e., minimum viable product) stage]. After that, it is passed over to the main organization or thrown away if it has not borne fruit.* (Case C, C1)

Structuring the DIL as a separate central unit concentrates the resources needed for the exploration of new ideas or digital technologies efficiently in one location while keeping the remaining organizational structure of the company mostly untouched.

> *We have eight to max ten employees. Half of them are permanent DIL team members. The rest consists of employees from units of the main organization—always depending on the main focus at the moment. If, for example, we work on the technical interface to the core banking system, employees from the IT unit are temporarily transferred.* (Case H, H2)

DILs with members from diverse backgrounds and with different perspectives are well suited to drive exploration and consider relevant business aspects such as technology, marketing, and sales.

> *We have projects that span between a couple of weeks to a few months. Then, … we have small expeditions that do not last*

> *as long as the projects but have the same focus: quickly come to a solution that cannot be done in the main organization and show how we can work together in cross-functional teams and networks to apply new methods and come to a result faster.* (Case B, B3)

DILs thus draw on cross-functional knowledge and experience to innovate successfully, remaining mindful of and in part responsible for the subsequent exploitation of innovation in the main organization.

> *[At the beginning of the DIL phase] the employees did not know most of our apps, so we installed a digital ambassador [from the DIL in the main organization] who knows the products and is responsible for showing them to the employees. The ambassador has to make himself/herself familiar with the digital products and know them by heart, test them, and then, of course, recommend them to the customer.* (Case I, I1)

DIL teams typically have a direct link to the management board and to more than one executive director "to ensure [that the lab's] efforts are not too focused on one aspect, but rather reflect the variety of the company" (Case D, D1). Depending on the strength of this link, the DIL might experience more alignment with the main organization (strong/formal link) or more autonomy (weak/informal link).

> *Our DIL is "practically a mixed setup, not quite outside the main organization, and not within the main organization … with a special position and somehow also embedded. You can't let them run completely free, because that doesn't work at all, so we said we let [the DIL] be embedded but with much more freedom than other units."* (Case C, C1)

"We directly report to the chairman of the board" (Case G, G1) to strengthen the link to the CEO. This link prevents exploration and exploitation from drifting apart by ensuring a high fit between the innovations, the business side, and management support. Close collaboration with the CEO enables "quick decision-making and ensures that the DIL remains neutral" (Case D, D1).

Dedicating resources to exploration activities by implementing a partly autonomously acting DIL ensures that freedom for exploration is provided organizationally and helps companies achieve ambidexterity. It creates the capacity to trigger innovation where the main organization is otherwise completely blocked.

> *That exactly describes what [the DIL is doing]: identifying [opportunities], doing workshops, going to customers who may have a need for digitalization. We get into conversation with the employees … who work there and work with them for a few hours, and we sit down for four hours just to see where the core problems are that we can really improve with digital solutions.* (Case G, G2)

Although, we found that some DILs were separate entities (sometimes even legally), integration or connection to the main organization is important. If this is lacking, innovation outcomes may not be recognized or, even worse, get lost.

> *[A former version of our DIL] did a great job, but communicated [their success] poorly. Because they isolated themselves, they felt that they were not recognized in the main organization.* (Case F, F2)

At the *individual* level, the processes of DILs facilitate efficient and effective innovating in the context of digital transformation by bringing together skilled employees with diverse backgrounds. Employees are highly engaged in digitalization, and DIL team members originate from different units of the company or sometimes even from startups and competitors. DIL team members often have profound knowledge of their company's products and services and often exhibit an entrepreneurial, technology-affine, and innovative mindset. Close collaboration among DIL team members allows knowledge to be quickly recombined and diffused. Hence, the exploration activities of DILs are based on new and existing knowledge about what is needed from the company's and the team members' perspectives and what fits the company's business context.

> *Interdisciplinarity is extremely important to us. For each project, we look for employees in the different organizational units with the appropriate skills we need. … we have one from the IT department, one from sales, one from marketing.* (Case D, D3)

> *The DIL has now started to collect ideas which come, e.g., from the innovation department, from employees, from projects, or through the DIL's own research (e.g., on potentials of new technologies), so that the DIL itself also places ideas. A mixture of own ideas that should be driven forward.* (Case C, C1)

Even though they are often set up as separate units, many DILs are not detached but provide employees opportunities for active collaboration between the DIL and other units from the main organization. These collaborations trigger further exploratory activities

within the main organization, potentially supported by individuals of the DIL through coaching, innovation workshops, or as expert resources. Hence, employees from other units also influence and contribute to the DILs' exploration activities—for example, in workshops, project work, or job rotations. Such mutually close collaborations and intense exchange link exploration and exploitation across the company.

4.2 Transfer of Employees

A common theme among the different features of DIL implementation is the temporary transfer of employees between the DIL and the main organization. Employees who rotate in and out of the DIL work iteratively in exploration and exploitation and thus become highly knowledgeable in both areas. This transfer is a balancing mechanism that ensures alignment and knowledge flow between exploration and exploitation. The exchange of knowledge and the transfer of employees creates a permeable boundary and shortens the time between the development of innovations and their exploitation.

In most cases, employees are transferred both to and from the DIL: Employees from other business units join the DIL temporarily to participate in exploration projects, and DIL team members temporarily join other units to support remote and distributed exploration and exploitation activities—transfers are always initiated by new ideas or project proposals.

> *So when employees come and say, I have an idea, the DIL can somehow make a business model check, we can talk about it, what is there already? Who is the customer? For all employees, the DIL is the point of contact and they tell us what they are up to so that we take a white sheet and record what they want to do. … In the second step, we have methods to condense the ideas bit by bit and ask, okay is that scalable and does it relate to our core business?* (Case G, G2)

After the initial analysis of the idea, the DIL initiates the transfer. We observed that DILs are required to include one or more employees from the main organization for every new exploration project and that the teams are composed of individuals with various skills and backgrounds— specifically selected and transferred for the project.

> *Our DIL has built an innovation ecosystem or intrapreneurship system. … This space helps us to make innovation tangible and gives the employees of the main organization the chance to get in touch with the DIL team members who work on innovation [and can explain the benefits]. … The space initiates collaboration through joint workshops using the creative spaces [of the DIL]. And so our DIL has at least one physical point of contact at each location for employees who want to innovate.* (Case G, G1)

Transferring or moving employees back and forth between the DIL and the main organization to link exploration and exploitation efforts is at the core of DILs' contribution to ambidexterity as it addresses the inherent tensions of pursuing exploration and exploitation simultaneously. Typically, employees oscillate between exploratory phases or projects within the DIL and exploitative phases in their "home" unit in the main organization.

> *Later, they [employees] act as multipliers in order to make our [the DIL's] methods and mindsets available to many employees. Many employees try to implement what they have learned with us in their department in the main organization.* (Case D, D1)

As outlined in the methods section above, such employee transfers vary in terms of *direction* and *intensity*. Table 4 illustrates the features of DIL implementation and the ambidexterity outcomes of each direction of transfer.[3]

Employees transferred *from the DIL to the main organization* do temporarily support project teams in the main organization to use digital innovation and contribute a more profound understanding of how to best use digital technologies. They might recommend investing in new digital technologies to achieve specific exploitative benefits (Cases A and C). This familiarizes the main organization with these new digital technologies and facilitates the subsequent integration of digital innovation into daily operations to create new value propositions (Case D).

> *At the beginning of the project setting, we think about [which DIL team member] should join the team in the main organization. Next, we try to get a solution hypothesis for each challenge and generate new ideas. … Once we have set the basis, we ask for a confirmation from the team. After all open questions are answered the DIL team leaves the project which then, depending on the answers, is continued by the main organization.* (Case D, D3)

[3] "Both ways" mentioned in Figure 2 above combines features and outcomes of both directions. In our empirical analysis, we focus on each direction separately. Please refer to Appendix E for our findings on the *intensity* of the transfer, which are less focused on in our empirical analysis and theoretical derivations.

Table 4. Ambidexterity Outcomes Associated with the Direction of Transfer

Direction of transfer	Feature of DIL implementation	Ambidexterity outcomes
DIL to main organization	• DIL team members share knowledge about integrating digital technologies into existing projects • DIL team members teach other employees innovation methods like achieving higher customer centricity or using frameworks such as design thinking or scrum	• Exploitation builds on digital technologies discovered and assessed during exploration in DIL • Joint workshops with the DIL and shared knowledge enable the main organization to become more familiar with digital technologies and, thus, facilitate the integration of an innovation after its exploration in the DIL • Exploitation is better managed to reflect the digital context, for example, innovation with increased customer centricity, and faster changes through wide use of agile approaches
Main organization to DIL	• Employees from the main organization contribute practical insights to exploration projects • Innovation projects benefit from diverse backgrounds and experiences • New exploratory innovation projects in the DIL have product owners from and ambassadors in the main organization	• Exploration builds on experience from exploitation • Integrating diverse insights and perspectives into exploratory projects reduces future barriers to integrating innovation into exploitative activities • Experience level, reputation, and standing of employees transferred to DIL help exploration projects succeed

DIL team members temporarily join projects in the main organization to share insights about digital technologies and help leverage innovation for new value propositions. This allows projects to move more quickly from prototype to value generation. For example, if DIL members go over to the main organization and show everything that can be done with 3D printing, it helps increase the acceptance of new products built on this technology.

> *The DIL team members stood in the canteen and demonstrated the new technologies such as virtual reality and mixed reality and we have let employees put on the glasses. We make this offer to anyone no matter from which department. They can also make their department jour-fixe with us in the DIL. And we will show them which topics we have already worked on and which ideas we are currently working on. We want to get more employees to share their ideas with us.* (Case A, A1)

Thus, the DIL is increasingly recognized and accepted in the main organization and can build a reputation for "one-stop-shop" innovation. Additionally, DIL team members joining projects in the main organization often train employees in the business units in using agile methods such as scrum and design thinking "to get the innovative [working styles] into the traditional [operations]" (Case D, D2) and thus achieve higher customer centricity in the main organization's exploitation projects (Cases C and D)

DILs are in an often challenging situation where they depend on experts from the main organization to thoroughly understand the current business and connected pain points. At the same time, this ensures that digital innovation in the exploration phase meets real business needs and creates new value propositions for the digital transformation of the business.

Employees transferred *from the main organization to the DIL* often temporarily join a DIL project or team in order to bring knowledge, expertise, and experience about the company's products, markets, and customers to the exploration activities. For example, the DIL of a large insurance company "always needs input [from the main organization] when it comes to insurance products" (Case F, F2). Sometimes, employees are transferred from the main organization to the DIL team for specific assignments. They "bring their own ideas with them [into the DIL] and are given the chance to implement their idea at their own initiative" (Case B, B3). In such situations, the person often acts as the product owner. It is advantageous if "the product owner comes from the business side and has the know-how [about the company's products and service]" (Case B, B2). A "product owner knows how the product works at its core … and can manage [the innovation] so it is not overruled by the company" (Case B, B1). Having a product owner with deep knowledge about the existing portfolio of products who takes an active role in the exploration project increases the likelihood that the innovation will later become a successful addition to the company's product or service portfolio. Having product managers transfer between the DIL and the main organization minimizes challenges from the handover and ensures that the main organization[4] integrates products appropriately.

[4] Please refer to Appendix F for more details on the role of the main organization in terms of integrating innovations developed in the DIL.

4.3 Mechanisms of Ambidexterity

After having described how the examined firms have established their DILs and employed approaches to transfer employees between those labs and the main organization, we take now a closer look at how they achieved ambidexterity in this digital context. In the following, we identify 14 *ambidexterity mechanisms* that build on the adapted organizational design.

As we will show, the combination of these mechanisms is particularly suitable for innovations built on digital technologies because the mechanisms can support specialization via *differentiation* and knowledge sharing via *integration*. Differentiation relies on spatial separation (Puranam et al., 2006) to channel exploitation or exploration work into distinct units. Differentiation strengthens exploration and exploitation at the expense of balancing the two. Differentiation provides specialization needed by companies that may have never been confronted with certain new digital technologies before and need to dedicate specialized resources to adapt those for their needs (Nambisan et al., 2017). By contrast, integration is a joint effort that allows teams in different units to synchronize their social and task-oriented processes (Hambrick, 1994). Integration is needed because digital technologies often do not naturally fit companies' work routines due to their different requirements and because digital innovation is often built through a recombination of multiple digital technologies (Yoo et al., 2010), requiring the integration of multiple fields of knowledge and expertise. Transfers and exchanges between exploration and exploitation align the activities related to both and thus help make the developed innovations successful. We continue by explaining how the implementation of DILs leverages these 14 mechanisms to achieve ambidexterity.

4.3.1 Differentiation Approach

The idea behind the "two hands" of ambidexterity is to have two specialized capabilities (Tushman & O'Reilly III, 1996), with the differentiation approach focusing on strengthening the two hands separately. The DIL and the main organization aim to develop experts for their respective activities. Six mechanisms strengthen the two hands:

We found that digital transformation requires differentiation at the *organizational level*, i.e., separate units that focus on different activities. The novelty of digital technologies requires substantial effort to innovate with these technologies and create new products and services. Hence, we derived the following mechanisms (M1-M3):

(M1) Separating exploration and exploitation to increase focus. Digital transformation needs a focused approach with dedicated teams, staff employees with the right skills, and a strategic orientation, allowing them to channel their efforts.

> *We [the company's management, including the head of the DIL] have decided to create a small unit—responsible for digitalization, directly linked to the senior management board, and closely related to the company's IT unit but not part of it. The DIL is independent of the main organization.* (Case C, C1)

(M2) Establishing boundaries between exploration and exploitation activities to enable differentiation. Separation guarantees focus and ensures that the organization's resources or investments are spent where they can create the most significant impact.

(M3) Focusing on either exploration or exploitation without shared responsibility. Shared responsibility would potentially cause a conflict of interest. Instead, developing digital innovation needs a fresh, unbiased view and high degrees of autonomy.

> *For example, we have one colleague who is now here [in the DIL], and many of her tasks have been delegated to someone else so that she can concentrate on her mission here. She only kept a few of her previous tasks, and we want to understand better the possibilities when it comes to digitalizing it.* (Case E, E2)

Beyond the organizational level, organizational design adaptations are evident at the *individual level.* Companies create an environment for employees that matches the individual's intended activities. If an employee is working on exploration, they are given the needed freedom, grouped with colleagues that complement their knowledge, and provided with work methods that foster innovation development. The employee is equipped with the right resources and techniques to develop innovation. Similarly, when the employee is transferred back to the main organization, the context of their work changes again to support exploration and day-to-day routine activities. The following mechanisms (M4-M6) build this employee environment:

(M4) Transferring employees full-time to support exploration. The exploration of new technologies requires substantial effort since these technologies have not been used by the company or employees before. Employees can only invest the high effort needed to fully understand the implications and prerequisites of these new technologies by focusing on them full-time.

(M5) Gathering employees to pool skills and knowledge for exploration (and exploitation separately). Depending on their current focus, employees must join different teams and contribute their expertise where needed. It is critical to leverage knowledge and skills cross-functionally to fully understand the implications of new technologies. Thus, the diverse set of skills allows companies to tackle the challenges of digital transformation more easily.

> *And on top, we have employees here [in the DIL] on a rotation program: they leave the main organization and join for three months. They apply voluntarily, receive a full week of training regarding methods, and then work on a project for 11 weeks.* (Case I, I1)

(M6) Establishing distinctive processes, work modes, and cultures for employees active in exploration or exploitation activities. There are different requirements for processes, work modes, and cultures regarding exploration and exploitation. Through separation, companies can enable an adapted work setting for employees and allow them to achieve the best results based on their intended activities.

> *We [the employees working in the DIL] have this vision and this mission. We aim to make the bank more digital, put the customer in the center, and don't only focus on processes and cost efficiency. And what we need for this are different work modes, methods, and collaboration models. We need an environment that fosters collaboration and, if possible, a new leadership style.* (Case B, B1)

4.3.2 Integration approach

While the first set of mechanisms focuses on separating the loci of exploration and exploitation, the following eight integration mechanisms aim at bridging the separation by focusing on collaboration and exchange. In particular, transferring people and their knowledge allows for different activities to be intertwined.

At the *organizational level*, companies benefit from a diverse and experienced workforce. Employees working in different departments provide different perspectives and enable the company to leverage cross-functional knowledge. Both exploration and exploitation benefit. Exploration is fostered by diverse sources of new ideas and various types of expertise to access the potential of innovation. Exploitation is promoted by experiences across the different stages of the innovation process that allow the team to do what is best to make new products and services successful. This integration is enabled by the following four mechanisms (M7-M10):

(M7) Integrating exploration and exploitation through employee transfer. Ambidexterity can only be successful and contribute to the needed digital transformation changes when both exploration and exploitation are leveraged. Integrating the two through transfer allows employees to switch from one to the other, and the organization's teams benefit from employees with experience in exploration and exploitation. Thus, empathy and understanding of other team activities are improved, enabling better collaboration among team members.

> *We run our acceleration program for our internal employees, so no outsiders come in, and no start-ups are directly involved. But the DIL is open to the entire group, … because the ideas are still very immature; it's simply costly from a business point of view to transfer employees completely for three months.* (Case G, G1)

(M8) Providing flexibility for employees to switch back and forth between exploration and exploitation. Digital transformation builds on employees being innovative with new technologies, which typically cannot be planned for. If innovations look promising, companies need to react quickly and provide flexibility to employees to adjust their focus, allowing them to transfer to the right team (and location within the organization).

(M9) Management supports investing time to share information about innovation across the organization. Innovation always involves something that a company has not used before. Hence, sharing information about it enables more employees to benefit and provides ideas for using it further within the company (e.g., ideas on employing new technologies or leveraging process improvements).

> *Every year, there are about 15 projects that come in [to the DIL]. We accept ideas from any hierarchical level, but we only accept ideas sponsored by at least one person from the (senior) management of the main organization—who needs to be fundamentally convinced [that the idea can be successful]. … They try to find the best possible solution from the customer's point of view, underpinned by a good business case.* (Case D, D3)

(M10) Organizational design supports handover from exploration to exploitation. More than sharing information about innovations is required; employees must explain how specific improvements or new things are used in day-to-day activities. A company can only make the best use of innovations if they do not remain in the exploration phase. The handover is crucial, and a well-integrated team can ensure that team members are able to share as much knowledge as possible.

We also observed mechanisms that provide integration at the *individual level*. Employees must be aware of exploration and exploitation and understand both to create innovation. Learning is improved if employees can experience both exploration and exploitation firsthand. An integration by employees transferring back and forth between the DIL and the main organization reduces potential borders between exploration and exploitation and fosters mutual understanding.

(M11) Transferring employees together with their innovation outcomes to ensure successful integration. Explaining and demonstrating new technologies can involve time and effort. Hence, allowing employees to be transferred with their innovation outcomes allows them to explain the innovation and apply it with their colleagues in their day-to-day routines. Employees remaining with the innovation outcomes during the transition from exploration to exploitation can personally ensure that key aspects are understood and the right (technical) environment is provided.

> *So, I hope my colleague will see what is already happening here [in the DIL], and she will find a way to integrate it into the day-to-day activities as quickly and easily as possible. The goal is to achieve the transition without us having to make a big project or anything else out of it but adopt from the DIL without asking too many questions. So, that's the first real benefit I want to have.* (Case E, E3)

(M12) Limiting the duration of employees' assignments to exploration/exploitation to foster exchange. Regardless of the importance of exploration and exploitation, success can only be achieved if the two are combined and, hence, if the stays of employees in the DIL are limited. After working on either exploration or exploitation, employees should switch tasks based on an upfront defined time limit to avoid becoming too focused and losing sight of the bigger picture. Additionally, employees who switch can often contribute new insights to their teams.

(M13) Providing employees with different formats to integrate exploration and exploitation in their work. Focusing on innovation tasks during routine activities takes work. Hence the DIL should employ different formats to engage employees in exploration tasks and attract employee transfers to the DIL. Employees can learn about exploration best if they join the DIL and support innovation with their ideas and experiences as part of a (temporary) team in the DIL.

(M14) Integrating employees with different backgrounds during exploration to increase variety in viewpoints and ideas. Digital transformation is a fundamental change process that strongly builds on integrating different viewpoints in the innovation process. The transfers integrate other employees with diverse backgrounds and allow them to exchange ideas. Diverse sets of knowledge are combined to offer a more rounded view of innovation and to better understand the various implications.

> *Interdisciplinarity is critical to us; for every project, we look for different organizational units and the appropriate skills that we [the DIL] need. We aim to get sufficient expert knowledge by building teams with someone from the IT unit, someone from distribution, and someone from marketing.* (Case D, D3)

In conclusion, our findings of the 14 mechanisms illustrate how companies use the DIL and the transfer of employees between the DIL and the main organization to differentiate and integrate. Together, both approaches help develop innovation, balance exploration and exploitation, and thus achieve ambidexterity.

5 Discussion

Digital transformation addresses "consequences that arise when value propositions are (re)defined by digital technology that alters the identity of an organization" (Wessel et al., 2021, p. 120). Implementing DILs changes the nature of organizations and allows companies to use digital technologies and create new value propositions. Our study contributes in three ways: First, we explain how the identified mechanisms of ambidexterity in the digital transformation context build on the theoretical concepts of structural and contextual ambidexterity. Second, our research reveals the contextualization of ambidexterity in the digital transformation context. We explain how the contextualization of ambidexterity meets the requirements of digital technologies. Lastly, we derive practical implications.

5.1 Discussion of the Ambidexterity Mechanisms

Pursuing ambidexterity means that companies must accommodate "multiple contradictory structures, processes and cultures" (Tushman & O'Reilly III, 1996, p. 24). To accomplish this in a digital transformation context, companies employ and combine different mechanisms at the organizational and individual levels. Whereas the concept of DILs is new, the single mechanisms deployed are mainly rooted in the most common types of ambidexterity discussed in the literature—structural and contextual ambidexterity (Lavie et al., 2010; Stadler et al., 2014; Werder & Heckmann, 2019). As outlined in the theory section above, both forms provide several mechanisms suited for various situations. Table 5 below illustrates how DILs recombine these mechanisms—with different emphasis on one of the two forms, depending on the specific mechanism (see Appendix G for an extended overview of these mechanisms with a mapping to the ambidexterity literature and to our cases).

Table 5. Mechanisms of Ambidexterity in Relation to Structural and Contextual Ambidexterity

	Mechanisms of ambidexterity	Structural ambidexterity	Ambidexterity in the context of digital transformation	Contextual ambidexterity
Differentiation approach				
Organizational level	(M1) Separating exploration and exploitation to increase focus.	Yes		No
	(M2) Establishing boundaries between exploration and exploitation activities to enable differentiation.	Fixed		Semi-fixed
	(M3) Focusing on either exploration or exploitation without shared responsibility.	Yes		No
Individual level	(M4) Transferring employees full-time to support exploration.	(No)[a]	*Yes*	(No)[b]
	(M5) Gathering employees to pool skills and knowledge for exploration (and exploitation separately).	Yes		No
	(M6) Establishing distinctive processes, work modes, and cultures for employees active in exploration or exploitation activities.	No		Yes
Integration approach				
Organizational level	(M7) Integrating exploration and exploitation through employee transfer.	No		Partly
	(M8) Providing flexibility for employees to switch back and forth between exploration and exploitation.	No		Yes
	(M9) Management supports investing time to share information about innovation across the organization.	Yes		No
	(M10) Organizational design supports handover from exploration to exploitation.	No		Yes
Individual level	(M11) Transferring employees together with the innovation outcome to ensure successful integration.	(No)[c]	*Yes*	(No)[d]
	(M12) Limiting the duration of employees' assignments to exploration/exploitation to foster exchange.	No		Yes
	(M13) Providing employees with different formats to integrate exploration and exploitation in their work.	No		Yes
	(M14) Integrating employees with different backgrounds during exploration to increase variety in viewpoints and ideas.	Exploration experts		Mixed backgrounds

Note:
[a] No transfer of employees on a full-time basis is discussed.
[b] Transfer of employees is specifically not full-time: employees are expected to work in both part-time.
[c] Employee transfers happen rarely and are not used to integrate innovations.
[d] Employees transfer repeatedly back and forth between exploration and exploitation without long-term transfers.

As illustrated, both *structural* and *contextual* ambidexterity mechanisms are relevant to digital transformation. Combining them offers companies a way to contextualize ambidexterity by leveraging the advantages of various mechanisms and their recombination.

5.1.1 Differentiation Approach: Organizational Level

(M1) Separating exploration and exploitation to increase focus. Our results show that companies address ambidexterity in the context of digital transformation, providing two separate locations for exploration and exploitation at the organizational level. In particular, this increases the innovation team's focus on its exploratory tasks. This aligns with the logic of structural ambidexterity (Jansen et al., 2009). Still, the degree of separation has to be carefully managed as it "guarantees short-term success" but might lead to "long-term failure" (Tushman & O'Reilly III, 1996, p. 11) if they are not linked to the main organization.

(T2) Establishing boundaries between exploration and exploitation activities to enable differentiation. In structural ambidexterity, the boundary between the logic of the two activities is rather fixed, i.e., there is a static differentiation between the two (Duncan, 1976). Contextual ambidexterity assumes a semi-fixed boundary since it allows an individual to transfer back and forth between exploration and exploitation for short-term tasks, even if only for a few hours per week (Gupta et al., 2006). In structural ambidexterity, in contrast, employees usually transfer for longer periods of time and less frequently. Our results show that this boundary is most permeable, allowing employees and knowledge to diffuse using a structured, well-planned transfer of employees between the DIL and the main organization.

(M3) Focusing on either exploration or exploitation without shared responsibility. Since units in the main organization transfer employees to the DIL and benefit from the insights the transferred employees bring back later, all units share knowledge from exploration and exploitation. Although the cross-functional makeup of the DIL team members combines expertise from different operational units in the main organization, there is no shared responsibility. Here, differentiation builds on separate responsibilities and follows the logic of structural ambidexterity, where employees in one location are only responsible for the particular outcomes of the location.

5.1.2 Differentiation Approach: Individual Level

(M4) Transferring employees full-time to support exploration. The transformational potential of digital technologies should be assessed by considering the combination of new technological features and the company's existing capabilities (Fichman et al., 2014). The main organization transfers employees with specialized technological skills, experience, and knowledge to the DIL to explore innovative technology or to develop an innovation. Later, the DIL transfers these individuals back to the main organization to support projects exploiting the technology or implementing the developed innovation. This transfer does not match the logic of both forms of ambidexterity since structural ambidexterity does not generally involve employee transfer (traditional R&D units instead work in a fixed team), and contextual ambidexterity does not propose that individuals allocate their time and cognitive effort full-time (over more extended time periods) to either exploration or exploitation.

(M5) Gathering employees to pool skills and knowledge for exploration (and exploitation separately). In structural ambidexterity, the company's exploration and exploitation activities are organizationally and spatially separated, and their respective work activities differ accordingly. In digital transformation, this dual structure maximizes the intensity of DIL team members' focus on and their skills in exploring digital technologies (Ciriello & Richter, 2015). DILs thus utilize "differential effects of structural attributes for … temporal separation of exploratory and exploitative innovation" (Jansen et al., 2009, p. 808). Using this sharp focus on building DIL team members' skills and knowledge allows for ambidexterity in the context of digital transformation to leverage the differentiation mechanisms of structural ambidexterity.

(M6) Establishing distinctive processes, work modes, and cultures for employees active in exploration or exploitation activities. Following the logic of structural ambidexterity, DILs are created as distinctive units for exploration and have their processes, work modes, and culture (Tushman & O'Reilly III, 1996). However, companies with DILs tend not to adopt the traditional logic of structural ambidexterity involving (only) permanent DIL team members but rather rotate employees in and out—with different processes, working modes, and cultures in the main organization. Individual employees transferred from their home unit leave their exploitation tasks, focus on innovation in the DIL team, and then rotate back to their home unit to support the exploitative implementation of the innovation, taking, for example, agile methods and values with them. A similar blending of methods and cultural values occurs when DIL experts visit business units in the main organization to train them in new approaches to digital innovation. This blending points toward the logic of contextual ambidexterity—altogether positioning the DIL approach between structural and contextual ambidexterity.

5.1.3 Integration Approach: Organizational Level

(T7) Integrating exploration and exploitation through employee transfer. Employee transfer is the mechanism that links exploration and exploitation in contextual ambidexterity. Employee transfer enables the dispatching of employees to a "supportive environment that inspires an individual to do 'whatever it takes' to deliver results" (Gibson & Birkinshaw, 2004, p. 213). Thus, employees can choose how to divide their time. In the context of digital transformation, employees are transferred to the DIL to pursue exploration before they return to their home unit to focus on exploiting their ideas. Implementing a DIL is usually supported by a program for rotating employees into and out of a DIL. The rotation program ensures budget, time, and management support for continuous and full-time employee rotations. This rotation approach overcomes structural separation (i.e., structural ambidexterity) and helps avoid misalignment between exploration and exploitation.

(M8) Providing flexibility for employees to switch back and forth between exploration and exploitation. The organizational design of DILs allows innovators to contribute to exploration projects temporarily if their home unit has sufficient resources and can accept their transfer to the DIL. Following the logic of contextual ambidexterity, when employees transfer to a DIL and dedicate their working time to exploration, they work less on exploitation (and other tasks) in their home unit in the main organization, thus creating opportunity costs that companies and the sending business units have to consider.

(M9) Management supports investing time to share information about innovation across the organization. Similar to structural ambidexterity, the responsibility for exploration and exploitation is split between the DIL and the main organization—both locations must be mindful of each other's activities but use different techniques to share information. There is a shared interest in providing each other with information and reporting on innovation outcomes. Following Lubatkin et al. (2006, p. 647), managers of well-integrated teams "synchronize the team's social and task processes" by aligning the team's knowledge, improving collaboration, and encouraging joint decision-making. Thus, rotating employees are well-connected and well-informed about all activities and advocate for the DIL and the main organization, allowing them to align goals between the two locations.

(M10) Organizational design supports handover from exploration to exploitation. Employee transfer supports the handover between units for exploration and exploitation to integrate innovation outcomes of the DIL in the main organization. Handing over explored innovation outcomes to be implemented and exploited is key and determines in large part whether ambidexterity is truly successful (Gupta et al., 2006). The handover requires careful management of the employees responsible for innovation during exploration and exploitation. Temporary DIL team members are strongly involved both in exploration in the DIL and, after returning to their home unit, in the exploitation of their exploratory work results. Such ambidexterity enabled by DILs is agile and well-suited to fast-paced digital innovation changes.

5.1.4 Integration Approach: Individual Level

(M11) Transferring employees together with their innovation outcomes to ensure successful integration. When employees are transferred back from the DIL along with their innovation outcomes—with the related experiences and understanding of their exploitation potential—the innovation can be integrated more effectively into the home unit, eliminating the need for handovers from one individual or team to another. Since the same employees are strongly involved in exploring the innovation in the DIL *and* realizing its exploitation potential in the home unit, the risks of unfamiliarity, loss of tacit knowledge, and incorrect use are mitigated, and increased levels of commitment to the innovation beyond exploration are achieved. The idea of transferring employees for integration is found in neither the logic of structural nor contextual ambidexterity.

(M12) Limiting the duration of employees' assignments to exploration/exploitation to foster exchange. To reach the goal of ambidexterity in a digital context, the company's employees should engage both in exploration and exploitation (Vial, 2019). Similar to contextual ambidexterity, where the balance between exploration and exploitation is achieved at the individual level, DIL team membership periods are intentionally limited. After working on exploration in the DIL for a limited time, employees return to working on exploitation in their home unit. Hence, employees are always dedicated to either exploration or exploitation but temporarily integrated into DIL teams with individuals from different units. This rotating approach prevents employees from becoming one-sided and losing sight of the need for either exploration or exploitation.

(M13) Providing employees with different formats to integrate exploration and exploitation in their work. Employees who are only temporarily transferred maintain their ties to their home unit in the main organization and are thus less prone to separate exploration from exploitation and better able to integrate innovation outcomes efficiently than with strict separation in structural ambidexterity (Raisch et al., 2009). Ambidexterity in the context of digital transformation provides an ongoing oscillation for

employees to go from working full-time on exploitation to working full-time on the exploration of innovation in the DIL to then going back to full-time exploitation to integrate the innovation in the main organization. This rotation of employees between full-time assignments in two distinct units is a balancing mechanism for achieving ambidexterity (Gregory et al., 2015). The temporary full-time transfer between exploration and exploitation makes ambidexterity in the context of digital transformation unique and enables employees to develop innovation and drive the later exploitation to create new value propositions.

(M14) Integrating employees with different backgrounds during exploration to increase variety in viewpoints and ideas. The flexible team composition in DILs leverages the benefits of cross-functional teams consisting of employees with diverse backgrounds. This is beneficial because DIL team members use their cross-functional backgrounds to provide different technological and methodical skills, trigger creative problem-solving, and contribute knowledge, experiences, and perspectives to digital transformation. Additionally, the composition of teams in DILs is dynamically adapted to fit the specific needs of the various digital innovation projects. This creates greater alignment with the requirements of the innovation projects and increases diversity among the DIL team members.

5.2 Theoretical Implications

The key theoretical contribution of this paper is the contextualization of ambidexterity in the context of digital transformation. Neither structural nor contextual ambidexterity alone sufficiently explains how DILs can contribute to ambidexterity and how they develop innovation using digital technologies. Identifying and analyzing 14 different mechanisms of ambidexterity reveals how to achieve ambidexterity to manage the challenges of digital innovation.

5.2.1 The Contextualization of Ambidexterity

Werder and Heckmann (2019) illustrate in their review the different perspectives of ambidexterity. Whereas Gregory et al. (2015) address ambidexterity as efficiency versus innovation and Piccinini (2015) as stability versus agility, we follow He and Wong (2004) and focus on exploitative versus explorative innovation. From this perspective, the extant research defines structural ambidexterity as the separation of exploration and exploitation spatially at the organizational level and contextual ambidexterity as the separation of exploration and exploitation behaviorally at the individual level (Stadler et al., 2014). Figure 5 depicts the relationship between the two along the two dimensions of mechanisms of ambidexterity at the organizational and individual levels. By recombining structural and contextual ambidexterity mechanisms, companies can leverage mechanisms at the individual and organizational levels and thus expand the measures available to them to adapt their organizational design and operational structure. The context of digital transformation extends the playing field and adds new mechanisms to achieve ambidexterity. Implementing DILs and transferring employees provide new opportunities for companies to manage the tensions between exploitative versus explorative innovation.

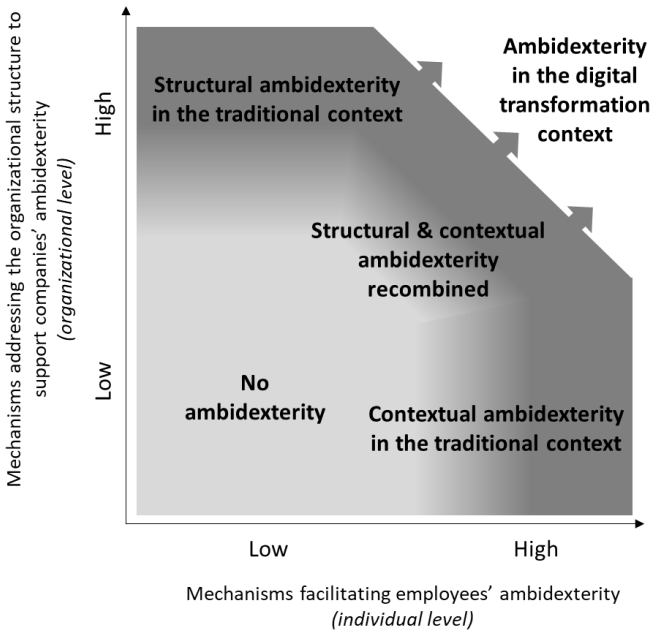

Figure 5. Ambidexterity in the Context of Digital Transformation

5.2.2 DIL Implementation

The literature on digital transformation remains vague about how organizational design can support developing innovation from digital technologies (Hanelt et al., 2021). Our findings suggest that implementing DILs allows companies to establish different locations in the organization for different activities needed to create innovation from digital technologies. When implementing a DIL, the overall strategy is to explore ideas and innovation utilizing digital technologies in a dedicated unit and provide the outcomes to the main organization. The dedicated unit extends Brown and Eisenhardt's (1997, p. 3) notion, which states that "semistructures" help to provide an oscillating rhythm to switch between exploration and exploitation by providing the needed flexibility through partial order. In DILs, the switching extends the notion in the way that exploration and exploitation do "not always [have to be] be competing activities, but can and should be complementary" (Chen & Katlia, 2008, p. 208).

5.2.3 Transfer

Rotating employees between the DIL and the main organization integrates exploration and exploitation activities. Building on the exploration outcomes in the DIL, the main organization's employees work with the DIL to create value propositions that allow the company to improve its strategic market positioning by leveraging new digital offerings. Although Gregory et al. (2015, p. 72) find "the vicious cycle of organizational drift toward exploiting IT … difficult" to overcome, we observed that the transfer of employees between exploration and exploitation embodied in the identified mechanisms of ambidexterity helps to balance this. Employee transfer ensures end-to-end ownership for innovation created in the DIL, thus preventing such drift. While structural ambidexterity does not capture the dynamics of the handover of innovation between separate units, employees cannot fully utilize contextual ambidexterity in the digital transformation context due to organizationally separate locations that create the sharp focus needed for distinct exploration and exploitation. Thus, employees profit from structural ambidexterity to strengthen their focus but still engage in transfer between locations. Returning to the main organization, employees utilize contextual ambidexterity mechanisms to integrate innovation while staying connected with the DIL.

5.2.4 Digital Technologies

We found that digital technologies require the recombination of ambidexterity mechanisms, which take their characteristics and fast technological advancements into account. Previous studies have addressed changes at the organizational level to enable "IT-leveraging in new product development" (Pavlou & El Sawy, 2010, p. 443). As market offerings are "ever-in-the-making" (Lehmann & Recker, 2022) and face the overall increased clock speed of digital business (Henfridsson, 2020), organizations are intertwining different approaches to ambidexterity to rapidly iterate between exploration and exploitation and thereby keep up with the required pace of change.

Ultimately, our findings show that the recombination of ambidexterity forms leverages DILs and employee transfers and makes the contextualization of ambidexterity superior. First, recombining distinct characteristics of different forms of ambidexterity and switching flexibly between forms that have proven successful in the past (O'Reilly III & Tushman, 2013) provides a large toolset of established mechanisms. Second, just as recombination is a cornerstone of digital innovation (Yoo et al., 2012), companies can apply recombination of the two forms of ambidexterity in the context of digital transformation. Third, we observed that implementing DILs and transferring employees form the basis for the unique mechanisms of ambidexterity in the digital transformation context.

5.2.5 Developing Digital Innovation

Our findings support the notion that "digital technology while being rapidly adopted by organizations, is fundamentally reshaping them" (Yoo et al., 2012, p. 1405). Digital technology creates challenges that Svahn et al. (2017) identify as the four competing concerns of digital innovation for organizations: namely, *innovation capability, focus, collaboration,* and *governance*. As "digital innovation has grown steadily to become the primary driver of business innovation" (Fichman et al., 2014, p. 331), concerns have to be overcome to make use of the full potential of the innovation. DILs provide speed, focus, scalability, and the smooth integration of digital innovations. Indeed, they enable companies to manage the competing concerns of digital innovation by, for example, balancing the acquisition of new skills with the need to maintain existing skills or foster internal collaboration while simultaneously engaging with external partners (Svahn et al., 2017). Figure 6 summarizes how DILs leverage the recombination of ambidexterity mechanisms to address each concern in the context of digital transformation. Please refer to Appendix H for a detailed discussion of each of the concerns and some further research avenues.

5.3 Practical Implications

Our research also has several implications for practitioners. In the digital transformation context, DILs provide an organizational structure for managers to implement ambidexterity in their companies. In the following, we outline the key organizational challenges in implementing a DIL and offer guidelines for transferring employees.

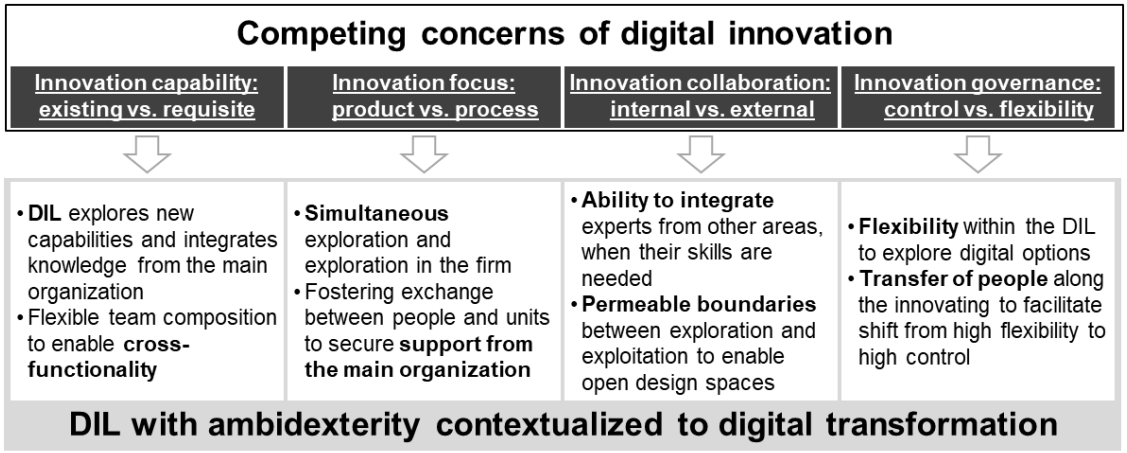

Figure 6. How DILs Address the Competing Concerns of Digital Innovation as Defined by Svahn et al. (2017)

Design recommendations for DIL implementation: Redesigning an organizational structure entails implementing a DIL while keeping the established main organization stable. While a small permanent DIL team can provide a core set of skills and knowledge about digital technologies and new methods, such as design thinking or rapid prototyping, our research indicates that a permanent DIL team must be supplemented by "speed-boat teams," e.g., Case D, enables the DIL to develop new ideas quickly and react quickly and flexibly to changing business needs and technological advances. DIL team composition must be flexible and adaptable to meet the demands of the innovation, drawing on available employees from different backgrounds with different perspectives and skill sets. The cross-functional backgrounds of DIL team members transferred temporarily from the main organization combine expertise from different operational units in the main organization.

Recommendations for employee transfer: To integrate exploration and exploitation, managers should facilitate the temporary, rotational transfer of employees between the DIL and the main organization. Such employee transfers can vary in scope and duration depending on the size of the company and the intensity of the transfer. Our case sample covers different manifestations. For managers, the focus should not be on the length of the employees' stay in the DIL but rather on continuous rotation to maximize the business impact of bidirectional knowledge exchange. Three different models of transfer to rotate employees are evident in our case sample (see Table 6). These models differ in terms of the reasons for transferring employees (i.e., use case, project, or program) as well as the focus, duration, and frequency of the transfer. Either approach can be useful, but managers must keep in mind the different investments it takes to enable a transfer. Similarly, they must prepare their employees to embrace change while following the initiation and processes of the transfer program.

5.4 Limitations and Future Research

Certain limitations of our study must be considered. While we initially contacted companies from 12 industries, our final sample contained companies from only five industries: apparel, banking, logistics, insurance, and transportation. Future research should validate our findings using additional industries. Furthermore, since DILs are a rather recent phenomenon, we could not follow up on the DILs' long-term success rate or their ultimate contribution to the companies' successful or failed digital transformation and competitiveness. Future research could use longitudinal firsthand and archival data to track the evolution of DILs and their impact on companies' innovativeness and competitiveness. Additionally, researchers could use the 14 ambidexterity mechanisms to further investigate the outcomes of ambidexterity or analyze different organizational designs and their ability to support the mechanisms. Lastly, in our interviews, we focused on interactions between the DIL and the main organization without considering potentially more complex situations. While our two dimensions of intensity and direction partially address this concern, future research should consider more nuanced configurations of stakeholders, such as the additional involvement of the IT unit, the legal department, or external partners (start-ups, technology providers, research institutions, etc.). This would allow researchers to analyze how companies address the paradoxical tensions in digital transformation projects with DILs, as identified by Gregory et al. (2015).

Table 6. Operationalization of Different Transfer Models to Enable Employee Rotation between the DIL and the Main Organization

	Use case-related transfer	Project-related transfer	Program-related transfer
Reason	The main organization mainly initiates the transfer for employees to experience innovation, or the DIL initiates the transfer to share innovation knowledge with the main organization.	The main organization mainly initiates the transfer through unstructured or spontaneous project assignments. Projects are submitted to the DIL and prioritized/staffed accordingly.	The DIL mainly initiates the transfer by running a regular program to join the DIL where employees can apply and are selected based on predefined criteria (e.g., prior experience).
Focus	The DIL and the main organization work together to identify relevant use cases on an ad hoc basis. Use cases are matched to the company's requirements.	Projects are identified and selected by the main organization, and ideas focus on problems/opportunities in the current business.	The DIL has a backlog of ideas for innovation and selects ideas for the next cycle based on fit with applicants and the overall innovation strategy.
Duration	The transfer is rather short (one or a few days) and addresses the potential users of the use case in the company and the innovation experts of the DIL.	The duration depends on the project duration, and employees join or leave the DIL depending on the requirements/progress of the innovation project.	Usually, the stay in the DIL spans multiple months but depends on the program's specifications. Innovations are delivered in sprints, and an MVP is delivered at the end of the program.
Frequency	Employees rotate frequently but with rather short assignments into the DIL. DIL members join the main organization for short workshops or presentations.	Transfer focuses on integrating skills for the project in the DIL and can happen often or rarely, for a few days or many weeks, depending on the needed skills.	Frequency depends on the available budget and how often employees with new skills are needed in the DIL—employees stay until the next program cycle starts.
Handover	Only a few insights are transferred, with no particular focus on integrating a new product.	Projects are continued in the main organization after the exploration was done in the DIL.	The final product is integrated into the main org together with the return transfer of employees who joined the program.
Investment	low investment		high investment
Adaptability	high adaptability		low adaptability
Formalization	low formalization		high formalization

6 Conclusion

This study contributes to the IS literature on ambidexterity by identifying DILs as locations for developing innovation from digital technologies and conceptualizing the transfer of employees to achieve ambidexterity. Furthermore, it contributes to the digital transformation literature by conceptualizing and theorizing ambidexterity in this context.

DIL: Our study reveals that DILs allow companies to develop the needed capabilities attuned to dynamic environments, such as in a digital transformation context (Gregory et al., 2015). The design of DILs is essential to companies' organizational structure. Scholars have already pointed toward the need to create a separate unit as a success factor for digital transformation (Maedche, 2016). Our analysis supports and goes beyond previous findings by showing how separate innovation units work and explaining why the temporary full-time focus on innovation while keeping a close link to the main organization is a success factor. DILs' goal to make digital technologies accessible for new products and services allows companies to break "one of the most significant barriers to digital transformation" (Vial, 2019, p. 130). Inertia erroneously leads companies to rely on existing resources and capabilities, but DILs draw attention to promising digital augmentation of existing products and services and agile work methods. We confirm that the success of digital transformation does not depend solely on a strategic perspective but on leveraging the organizational design and operational processes of innovating (Wessel et al., 2021).

Transfer: Whereas DILs provide a dedicated location for innovating, the transfer between the DIL and the main organization is an important technique to link exploration and exploitation. Our results indicate that temporarily

transferring employees to DILs has great potential for companies striving to create innovation by addressing the dedicated focus and cross-functional collaboration needed for digital transformation (Vial, 2019).

Ambidexterity: Our research deepens and structures the understanding of how companies can balance exploration and exploitation, addressing quickly changing digital technologies and the crucial need for digital innovation to provide new value propositions. We build on the findings of Gregory et al. (2015, p. 75) and treat ambidexterity as "a multi-faceted concept with multiple areas in which paradoxical demands need to be managed simultaneously" in the context of digital transformation. Here, the 14 ambidexterity mechanisms explored embody changes at the organizational and individual levels as well as the approaches of differentiation and integration. As a result, companies can master the tension between developing innovation from top-notch technologies and keeping the main organization in sync.

By including the analysis of different levels and approaches in our research, we explain how to change the organizational design and how to transfer employees, disentangling the relevant mechanisms needed to better understand the microfoundations of ambidexterity (Eisenhardt et al., 2010; Gregory et al., 2015). This deepens the understanding of ambidexterity in transformations and improves its theoretical foundation (Turner et al., 2013). We add to the knowledge of the *micro* (i.e., individual) level of ambidexterity and integrate both levels in our research to overcome the sole focus on the *macro* level of most ambidexterity studies (Gupta et al., 2006).

Despite the many advantages of achieving ambidexterity through DILs, there may be drawbacks and trade-offs. First, DILs can be expensive, resource-intensive, and complex due to the transfer of employees between two locations. Second, temporarily removing employees from their home units in the main organization has opportunity costs. Third, transferring employees between two units is cited as one of the biggest challenges in implementing units for exploration because it is "difficult for an individual to even switch between routines of exploration and exploitation" (Gupta et al., 2006, p. 696).

While DILs do not constitute the only way to establish ambidexterity in a digital transformation context, our insights can guide companies in using DILs to achieve greater ambidexterity, adapting their organizational structure toward transformation, and acting with greater agility and flexibility in the face of technological opportunities and disruptions.

References

Ahuja, S. B. (2019). Why innovation labs fail, and how to ensure yours doesn't. *Harvard Business Review.* https://hbr.org/2019/07/why-innovation-labs-fail-and-how-to-ensure-yours-doesnt

Benner, M. J., & Tushman, M. L. (2015). Reflections on the 2013 Decade Award: "Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited" Ten years later. *Academy of Management Review*, *40*(4), 497-514.

Brown, S. L., & Eisenhardt, K. M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, *42*(1), 1-34.

Cecez-Kecmanovic, D., Davison, R. M., Fernandez, W., Finnegan, P., Pan, S. L., & Sarker, S. (2020). Advancing qualitative IS research methodologies: Expanding horizons and seeking new paths. *Journal of the Association for Information Systems*, *21*(1), 246-263.

Chen, E. L., & Katlia, R. (2008). Rival interpretations of balancing exploration and exploitation:simultaneous or sequential? In S. Scott (Ed.), *Handbook of technologyand innovation management* (pp. 197-214). Wiley.

Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail*. Harvard Business School Press.

Christensen, C. M., & Bower, J. L. (1996). Customer power, strategic investment, and the failure of leading firms. *Strategic Management Journal*, *17*(3), 197-218.

Ciriello, R. F., & Richter, A. (2015). Idea hubs as nexus of collective creativity in digital innovation. *Proceedings of the International Conference on Information Systems*.

Duncan, R. B. (1976). The Ambidextrous organization: Designing dual structures for innovation. In R. P. Louis & D. Slevin (Eds.), *The Management of Organization Design* (pp. 167-188).

Eisenhardt, K. M., Furr, N. R., & Bingham, C. B. (2010). Microfoundations of performance: balancing efficiency and flexibility in dynamic environments. *Organization Science*, *21*(6), 1263-1273.

Eisenhardt, K. M., & Graebner, M. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, *50*(1), 25-32.

Fichman, R. G., Dos Santos, B. L., & Zheng, Z. (Eric). (2014). Digital innovation as a fundamental and powerful concept in the information systems curriculum. *MIS Quarterly*, *38*(2), 329-A15.

Fourné, S. P. L., Rosenbusch, N., Heyden, M. L. M., & Jansen, J. J. P. (2019). Structural and contextual approaches to ambidexterity: A meta-analysis of organizational and environmental contingencies. *European Management Journal*, *37*(5), 564-576.

Germonprez, M., Levy, M., Kendall, J. E., & Kendall, K. E. (2020). Tapestries of innovation: Structures of contemporary open source project engagements. *Journal of the Association for Information Systems*, *21*(3), 615-663.

Gibson, C., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, *47*(2), 209-226.

Gregory, R. W., Keil, M., Muntermann, J., Mähring, M., Keil, M., & Mähring, M. (2015). Paradoxes and the nature of ambidexterity in IT transformation programs. *Information Systems Research*, *26*(1), 57-80.

Gupta, A. K., Smith, K. G., & Shalley, C. E. (2006). The interplay between exploration and exploitation in SMEs. *Academy of Management Journal*, *49*(4), 693-706.

Hambrick, D. C. (1994). Top management groups: A conceptual integration and reconsideration of the "team" label. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 16, pp. 171-214). JAI Press.

Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of Management Studies*, *58*(5), 1159-1197.

Hansen, E. G., Wicki, S., & Schaltegger, S. (2019). Structural ambidexterity, transition processes, and integration trade-offs: A longitudinal study of failed exploration. *R&D Management*, *49*(4), 484-508.

He, Z.-L., & Wong, P.-K. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, *15*(4), 481-494.

Henfridsson, O. (2020). Scaling digital enterprises. In S. Nambisan, K. Lyytinen, & Y. Yoo (Eds.), *Handbook of digital innovation*. Edward Elgar Publishing.

Henfridsson, O., Mathiassen, L., & Svahn, F. (2014).

Managing technological change in the digital age: The role of architectural frames. *Journal of Information Technology*, *29*(1), 27-43.

Henfridsson, O., & Yoo, Y. (2014). The liminality of trajectory shifts in institutional entrepreneurship. *Organization Science*, *25*(3), 932-950.

Hund, A., Wagner, H. T., Beimborn, D., & Weitzel, T. (2021). Digital innovation: Review and novel perspective. *Journal of Strategic Information Systems*, *30*(4), 1-39.

Jansen, J. J. P., Tempelaar, M. P., van den Bosch, F. A. J., & Volberda, H. W. (2009). Structural differentiation and ambidexterity: the mediating role of integration mechanisms. *Organization Science*, *20*(4), 797-811.

Langley, A., & Abdallah, C. (2011). Templates and turns in qualitative studies of strategy and management. In D. D. Bergh & D. J. Ketchen (Eds.), *Building methodological bridges* (Vol. 6, pp. 201-235). Emerald Group.

Lavie, D., Stettner, U., & Tushman, M. L. (2010). Exploration and exploitation within and across organizations. *Academy of Management Annals*, *4*(1), 109-155.

Lazzarotti, V., Manzini, R., Nosella, A., & Pellegrini, L. (2017). Innovation ambidexterity of open firms. The role of internal relational social capital. *Technology Analysis & Strategic Management*, *29*(1), 105-118.

Lehmann, J., & Recker, J. (2022). Offerings that are "ever-in-the-making": How digital ventures continuously develop their products after launch. *Business and Information Systems Engineering*, *64*(1), 69-89.

Leifer, R., O'Connor, G. C., & Rice, M. (2001). Implementing radical innovation in mature firms: The role of hubs. *Academy of Management Perspectives*, *15*(3), 102-113.

Lubatkin, M. H., Simsek, Z., Ling, Y., & Veiga, J. F. (2006). Ambidexterity and performance in small-to mmedium-sized firms: The pivotal role of top management team behavioral integration. *Journal of Management*, *32*(5), 646-672.

Maedche, A. (2016). Interview with Michael Nilles on "What Makes Leaders Successful in the Age of the Digital Transformation?" *Business and Information Systems Engineering*, *58*(4), 287-289.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, *2*(1), 71-87.

Markides, C. C. (2013). Business model innovation: What can the ambidexterity literature teach us? *Academy of Management Perspectives*, *27*(4), 313-323.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: Expanded sourcebook*. SAGE.

Montealegre, R., Iyengar, K., & Sweeney, J. (2019). Understanding ambidexterity: Managing contradictory tensions between exploration and exploitation in the evolution of digital infrastructure. *Journal of the Association for Information Systems*, *20*(5), 647-680.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *Management Information Systems Quarterly*, *41*(1), 223-238.

Nwankpa, J. K., & Datta, P. (2017). Balancing exploration and exploitation of IT resources: The influence of digital business intensity on perceived organizational performance. *European Journal of Information Systems*, *26*(5), 469-488.

O'Reilly III, C. A., & Tushman, M. L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behavior*, *28*, 185-206.

O'Reilly III, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, *27*(4), 324-338.

Pavlou, P. A., & El Sawy, O. A. (2010). The "third hand": IT-enabled competitive advantage in turbulence through improvisational capabilities. *Information Systems Research*, *21*(3), 443-471.

Piccinini, E., Gregory, R. W., Hanelt, A., & Kolbe, L. M. (2015). Transforming industrial business: The impact of digital transformation on automotive organizations. *Proceedings of the International Conference on Information Systems*.

Puranam, P., Singh, H., & Zollo, M. (2006). Organizing for innovation: Managing the coordination-autonomy dilemma in technology acquisitions. *Academy of Management Journal*, *49*(2), 263-280.

Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. L. (2009). Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. *Organization Science*, *20*(4), 685-695.

Ross, J. W., Beath, C. M., & Mocker, M. (2019). *Designed for digital: How to architect your business for sustained success*. MIT Press.

Silva, L. (2007). Post-positivist review of technology acceptance model. *Journal of the Association for Information Systems*, *8*(4), 255-266.

Stadler, C., Rajwani, T., & Karaba, F. (2014). Solutions to the exploration/exploitation dilemma: Networks as a new level of analysis. *International Journal of Management Reviews*, *16*(2), 172-193.

Svahn, F., Mathiassen, L., & Lindgren, R. (2017). Embracing digital innovation in incumbent firms: How Volvo managed competing concerns. *MIS Quarterly*, *41*(1), 239-253.

Tan, B., Pan, S. L., Lu, X., & Huang, L. (2015). The Role of IS capabilities in the development of multi-sided platforms: The digital ecosystem strategy of Alibaba.com. *Journal of the Association for Information Systems*, *16*(4), 248-280.

Tang, F., Xi, Y., & Ma, J. (2006). Estimating the effect of organizational structure on knowledge transfer: A neural network approach. *Expert Systems with Applications*, *30*(4), 796-800.

Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research commentary—Digital infrastructures: The Missing IS ResearchAgenda. *Information Systems Research*, *21*(4), 748-759.

Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualization. *The Academy of Management Review*, *32*(3), 774-786.

Tripsas, M. (2009). Technology, identity, and inertia through the lens of "The Digital Photography Company." *Organization Science*, *20*(2), 441-460.

Turner, N., Swart, J., & Maylor, H. (2013). Mechanisms for managing ambidexterity: A review and research agenda. *International Journal of Management Reviews*, *15*(3), 317-332.

Tushman, M. L., & O'Reilly III, C. A. (1996). The ambidextrous organization: Managing evolutionary and revolutionary change. *California Management Review*, *38*(4), 8-30.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, *28*(2), 118-144.

Werder, K., & Heckmann, C. S. (2019). Ambidexterity in information systems research: Overview of conceptualizations, antecedents, and outcomes. *Journal of Information Technology Theory and Application*, *20*(1), 23-52.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Jensen, T. B. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, *22*(1), 102-129.

Yin, R. K. (2009). *Case study research: Design and methods*. SAGE.

Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, *23*(5), 1398-1408.

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, *21*(4), 724-735.

Appendix A: Brief Case Descriptions

To provide more details regarding the DIL's individual operational models, we briefly describe each case (A-I). The descriptions address the relevant characteristics of each DIL. Each DIL is different, and the DIL's and the main organization's management emphasize different aspects. We focus on three essential aspects that best illustrate the differences between the cases:

a) How is the DIL organized and governed?

The DIL's role in an organization depends on how the DIL is governed and how the reporting and funding mechanisms around the DIL are designed. Case F provides its budget and reports outside the existing reporting structure to the head of a corporate division (similar to a staff function). Cases A and C are integrated into the IT function of the company and report to the chief digital officer within the IT function. Cases D and H focus on a wider audience in the organization and present results to the management board or a specific selection of members of the management board aligned with the developed outcomes of the past innovation cycle.

b) What are the main activities of the DIL, and how are innovations developed?

We observed that DILs focus on different activities to develop innovation. Whereas Cases G and C focus on developing prototypes and testing earlier stages of potential products, Cases F and I are developing customer-ready products and are thinking about how these new products can be marketed.

c) How and to what extent is the collaboration with the main organization utilized?

Cases A and D focus on creating innovation in collaboration with the main organization and depend on this collaboration. Cases C and I receive input from the main organization but are developing innovation with little collaboration. The collaboration between DIL and the main organization is always characterized by the transfer of employees between the two, but differences in how intensively the transfer is utilized exist. Whereas Cases E and I have a structured transfer program, Cases D and H focus on transfers aligned to the specific project needs.

The following case descriptions provide more detail about the differences in DIL characteristics and are structured based on the outlined questions:

Table A1. Brief Case Descriptions

Case	Brief description
A	a) The head of the DIL reports to the chief digital officer (CDO), and the DIL focuses on innovation that addresses the entire value chain of the apparel industry. The DIL is staffed with employees who have been with the company for a long time—thus, besides being experts with digital technologies, they are also well-experienced in the apparel industry. This allows them to make sound judgments regarding new ideas or analyze digital technologies' disruptive potential. The DIL is situated at the same location as the headquarters. There is close interaction between the DIL employees and the employees of the main organization. The head of the DIL is well-known within the entire organization, and the DIL has a good reputation. b) The DIL decides together with involved business units which ideas should be explored and initiates new innovation projects accordingly. Usually, the DIL prepares a few prototypes that might not yet be tailored to the company's specific needs but help understand what a future product or service could look like. c) The DIL constantly presents and "markets" new technologies to the main organization. For example, virtual reality goggles have been presented at a stand in the canteen to provide easy access to new technologies. The DIL has also supported different business units to pilot digital technologies in their business processes. The business unit provides the specific use case or the challenges, and the DIL provides the technology. The potentials of new technologies are explored jointly.
B	a) The DIL is part of the company's chief digital office (CDO unit), and the DIL also reports to the CDO. The CDO unit is building the "digital distribution" division—for example, developing an app for digital sales. Within this unit, the DIL focuses on the role of digital technologies in the company's digital transformation, i.e., to build a digital platform that serves as a foundation for transforming the company's core services and thus addresses the needs of younger customer groups. b) The DIL mainly works on digital technologies and provides new work methods, tools, expert support for innovation, and innovation facilities (e.g., a dedicated space in the office). To make digital technologies more usable, the DIL is developing prototypes and MVPs. Using various technologies, the DIL uncovers specific improvements and ways to digitalize the company's services. The innovations coming from the DIL are relatively diverse. Ideas for innovation either come directly from the DIL employees or are submitted via the CDO unit to support their digital distribution efforts. c) The innovations are developed mainly in the DIL, where the first phases of the innovation process are explored. Additionally, the DIL informs the main organization about new innovations and is working intensively to identify

	business units in the main organization to partner with. Thus, the DIL team is spreading into the main organization to identify and take over innovation projects and accelerate the exploration of new ideas. This enables the main organization to better focus on the subsequent exploitation. One recent example of a DIL project is a platform to gather all the relevant financial products neatly, present them to the customer, and also have the option to integrate partner services.
C	a) The DIL is part of a bigger group of innovation initiatives, and the DIL's team members are all part of a digital solutions program. The DIL works with the digital solutions team and a digital platforms team. The DIL team focuses on developing new digital products and testing them using MVPs while the other teams have a different focus. Notably, the DIL is very close to headquarters and is even in the same building. Thus, DIL employees and other employees interact frequently. b) New ideas are transferred to the DIL by (a few) employee transfers or some dedicated workshops to exchange ideas. The goal of the DIL is to support the company's top management by quickly testing and evaluating technological trends and their potential for creating new products. From screening market trends, innovation projects are initiated. The ideas are pitched to the management board, and the business units are expected to join the innovation process. Due to this setup, the resulting innovations are relatively close to the company's existing focus. c) DIL members understand the company's business very well and have been with the company for a long time—before joining the DIL, they have been working in other departments. A solutions center in the main organization helps develop the MVPs further to test prototypes and supports transitioning the prototypes to the main organizations.
D	a) The DIL was set up from scratch by the head (and first member) of the DIL (i.e., it did not emerge out of an existing team or organizational unit). The main focus of the DIL is to understand the role of digital technologies in the financial industry and provide employees of the main organization with a place where they can submit their ideas, discuss future potentials, and inform themselves about new trends. The DIL acts as a hub—receiving ideas and sharing them via presentations and workshops with the main organization. The DIL is independent from both business functions and the IT unit and is located in the same building as the main organization. b) The DIL focuses on four activities: develop new products and services, improve processes with digital technologies, change the company's culture (including preparing employees for transformation), and build external networks by connecting with schools, universities, and fintechs to collaborate. c) The projects of the DIL mainly focus on improving the customer experience by providing some additional services or enhancing the information shown to the customer. For example, an employee approached the DIL to develop new services around providing additional details about the bank advisor and asking customers to enter additional preferences. As a result, a bank advisor is now automatically assigned to a customer based on the customer's preferences. The DIL managed the project, and the main organization was tasked with the project execution.
E	a) The DIL is located in the same city as the main organization but at a separate location. The head of the DIL was tasked with exploring the potential of digitalization and help the company understand the implications of digital technologies and how they can be used. The DIL focuses on products and services close to the firm's core business. As a logistics company with a strong footprint in B2C, there is a strong focus on improving the "last mile" of delivery. Innovation addresses forecasting the delivery of packages or providing a great user experience to the delivery worker when using handheld devices. New services are added to an online platform that the firm's customers can use to book on-demand add-on services. There is also great potential for developing internal process innovation, e.g., improved warehouse routing systems to make package sorting faster. b) The head of the DIL is well-connected within the main organization and conducts a strict selection process to decide on the next project. The ideas for new projects are provided mainly by the main organization—depending on the needs of the business units; the ideas address hence different needs along the value chain. c) Innovative products are developed jointly in the DIL by DIL members and employees from the main organization that transfer to the DIL for a few months. The focus is on developing prototypes and MVPs. Due to the tight collaboration, it is easy to link the resulting innovations directly to a business unit's specific needs. Ultimately, the DIL hands over the new services or products when the business unit is "ready." Hence, there is always also a focus on providing workshops and presentations in which DIL employees share insights gained in the projects. Based on this exchange, new ideas are generated and also played back to the DIL.
F	a) The DIL is quite strongly separated from the main organization, having only a few loose ties. Although located in the same city, there is no real collaboration with employees from the main organization. The DIL is set up as a separate innovation vehicle, focusing solely on new product development, and the entire DIL team was transferred from the main organization to the DIL more or less permanently. b) The DIL defines its own agenda relatively autonomously and is hardly governed by the firm's senior management at all. The DIL focuses entirely on blue ocean innovation and extends the main organization's current product portfolio. There are no interdependencies, and the DIL works mainly with a green field approach where no legacy technologies exist or complex integrations are needed. The goal is not to create new insurance products or services related to insurance but instead focus on ideas that eventually will enhance or augment insurance services. Further, the DIL explores completely new technologies to understand them better and support the core business to develop future insurance products (e.g., insurance products for drones).

	c) Such projects are executed with many external technology partners; newly gained knowledge is combined with the employees' knowledge transferred from the main organization to the DIL. Due to the relatively strong separation between the DIL and the different business divisions, transferring innovation results to the main organization happens rarely. There are regular exchange formats where some additional employees are temporarily transferred to the DIL. Still, the DIL mainly works with a more or less constant core team (i.e., low intensity of transfer).
G	a) The DIL is part of a large logistics company and is located near its headquarters. The head of the DIL directly reports to the CEO and other executive board members. The DIL uses different forms of employee transfer to generate new ideas and inspiration for new projects. b) The main innovation mechanism taken by the DIL constitutes gathering information and knowledge from mainly external sources through external networks and business partners. The goal of the DIL is to substantiate identified potentials as quickly as possible in the form of semi-productive prototypes. Using most phases of the innovation process allows the DIL to contribute substantially to the company's future product and service portfolio. c) The DIL invites external partners and employees of the main organization to join and collaborate on projects. This enables new products to be introduced to the company, and employees can explore different opportunities easily. The newly acquired knowledge and ideas are then used for the two main activities of the lab. First, the DIL communicates and informs about state-of-the-art digitalization projects and ideas from companies in the same industry. The DIL is a knowledge exchange platform between external partners and the main organizations so that employees learn from other companies and build on their experience. Employees can develop new ideas based on these experiences and find more inspiration to overcome existing challenges in their business. Also, new opportunities outside the current business scope can be explored. Once new ideas are identified, they are brought back to the DIL, and by providing these different information formats and allowing employees to come to the DIL to explore options, the DIL is filling its innovation pipeline. Second, the DIL is developing prototypes based on the ideas received and showcasing them to the employees of the main organization. New ideas are quickly tested, and the DIL is closely connected with the company's R&D facilities to test bigger projects where digital technologies augment physical products. New products are developed in sync with the business requirements, giving the company a "fast follower" advantage.
H	a) The DIL is located near the headquarters and interacts intensively with the business units. All projects of the DIL are frequently presented to the main organization, and due to the proximity to the company's IT unit, employees of the IT unit are intensively involved in joint workshops and after-work events. The primary areas of the DIL are product management, UI/UX design, and technical implementation, each handled by different teams. b) Due to the increasing customer needs in the financial services industry, the DIL focuses on innovation that makes using financial services easier or provides access to financial products via mobile apps (e.g., loan applications). Employees from the main organization accompany all of the innovations initiated by the DIL to ensure a smooth transition from exploration to exploitation at a later stage. c) The DIL projects result from ideas of business units, and they are conducted collaboratively. The ideas for new projects are presented to an innovation board of the DIL, undergo some internal alignment, and are then selected for exploration. Regular meetings with employees from the main organization are organized to ensure alignment with business and customer needs. A product manager from the main organization is always involved in the projects. Sometimes, the main organization even coaches the DIL to help DIL employees understand how new products or services are expected to add value to the company. The innovation projects are therefore well aligned with the business needs.
I	a) The DIL is located far from the main organization, but interaction is ensured through employee transfers and exchange formats. Employees working in the DIL have a good understanding of how to improve customer centricity using innovations. Due to a structured transfer program between the DIL and the main organization, there is a frequent exchange of ideas and knowledge between the DIL and the main organization. Prototypes are developed based on customer demands by working closely with the business units. The ideas for new products and services are submitted to the DIL. b)The focus of the DIL is on developing new services. The goal is to enhance the insurance company's services portfolio and create a better customer experience. Thus, the innovative products and services that need to be developed focus on improving customer services (e.g., online claims process) or adding services that support customers' health (e.g., an app to support sleeping or eating habits). c) Ideas from the main organization are proposed to the DIL and go through a formal selection process involving managers of the business units. The DIL then initiates the innovation projects, develops prototypes, and runs the first tests with customers. In all stages of the projects, the DIL is in the driver's seat, but the projects are staffed with employees transferred from the main organization to the DIL. Employees apply voluntarily to be part of the project. The new services developed in the DIL are often out of the scope of the business units in the main organization, which do not have the skills, knowledge, or free capacity to develop innovation. But the business units support the DIL with industry-specific knowledge during the innovation process, and there are different exchange formats, such as workshops and internal communications.

Appendix B: List of Interviewees

Table B1. List of Interviewees with Their Roles and Backgrounds

Case	Interviewee ID	Role	Background	Years in the company
A	A1	Head of the DIL—manages two further DIL team members and focuses on communication & presentations	Has been with the company for several years; was asked to not limit the DIL to IT-initiated topics	10+
A	A2	Project manager—is responsible for the coordination of projects, controls the pipeline and funnel	Has been a manager in the IT department with several years of experience, sees the DIL also as an opportunity for personal growth	10+
A	A3	Developer—sets up the required hardware and software for all projects, manages the (IT) suppliers	The DIL is his first professional career stage; he is seen as the "techie" in the team	1-2
A	A4	Global product director—manages the product portfolio for one division and looks for new products and services	Previously a fashion designer, industry expert with no affinity to IT but open to digital topics (and their opportunities)	10+
B	B1	Head of the DIL—manages one of the DIL's projects and takes the role of the scrum master	Has a lot of experience in the banking industry, is focused on the digitalization of the bank	10+
B	B2	Director of processes—manages all process digitalization efforts, works with the DIL in some projects	Founded a small IT firm, has 11 years of (IT) consulting experience, has large-scale transformation experience	3-5
B	B3	Project manager—heads the digital culture team in the DIL that focuses on mindset shifts and change management	No background in the banking industry but expert in change management for digital transformation	3-5
B	B4	Project manager—leads a project for a new digital platform; project is a joint venture of different departments	Brings international and management experience, knows the company very well and has worked in different functions	10+
C	C1	Head of the DIL—is also a member of the main organization as director for IT architecture and cross-domain management	Is working on traditional information management issues and is now shifting focus toward digital solutions	10+
C	C2	Project manager—manages the different initiatives and focuses on selecting the right topics for the DIL	Has worked in digital agencies, is an expert in agile working methods and innovation	1-2
C	C3	Architect in the IT department—manages many client-driven projects, works with the DIL for innovative topics	Is part of the DIL head's team in the main organization (cf. C1), strong technical IT background, knows all the IT systems	10+
C	C4	Project manager—works on prototypes to test new ideas, prepares decisions for the CIO/CDO	Previously an application manager and project manager in the IT department, organized a hackathon	10+
D	D1	Head of the DIL—is well connected to management board, has one project manager, has attracted some attention to the DIL's projects	Has no banking or IT background, is inspired by Silicon Valley, started working on strategy project on digitalization	1-2
D	D2	Head of products—manages the strategic product portfolio for one division, explores new ideas with the DIL	Strong banking background, started his career in banking in the company, not an IT expert	10+

D	D3	Project manager—manages and aligns all the projects of the DIL, organizes work and helps as a mentor	Has strong IT background, is an expert in the management of new technologies, well connected in the company	10+
E	E1	Head of the DIL—manages project and product portfolio of the DIL, focuses on the IT/software component of innovation	Has an engineering background and is experienced in software development, has consulting experience	6-9
E	E2	Head of process management—is the business owner of various IT systems, works with the DIL to change the processes and systems	Has a background in logistics, is not an expert in IT or management, has international shipping experience	10+
E	E3	Project manager—sets up new projects, translates the goal of the DIL into tasks for team members of the project and DIL	Has technical background with expertise in software development, previously a trainee and has worked as a product owner	3-5
F	F1	Project manager—scans the project ideas and talks to the project owners in the main organization, networks for support for projects	No technical and no financial services background, previously worked in online marketing	6-9
F	F2	Head of the DIL—works on the target picture of digitalization, has been a project manager and now focuses on two main projects	Has a marketing background and worked on corporate designs, has experience in analyzing customer trends	10+
F	F3	Business analyst—focuses on requirements engineering, organizes workshops, manages communication	Has a solid insurance background but the DIL is the first step of his professional career	1-2
F	F4	Manager for business development—focuses on the IT-relevant topics of the business development, works with the DIL on IT-focused projects	Has background in controlling, insurance, and IT, but focuses also on business development and entrepreneurship	10+
G	G1	Head of the DIL—manages innovation as part of the overall strategy process, focuses on involving many employees of the company	Has an MBA in innovation management and entrepreneurship, previously worked as test and project manager, agile expert	10+
G	G2	Project manager—focuses on traditional innovation management, manages multiple (rather small) projects of the DIL	Has a background in IT, started his career in the company in innovation management, previously worked together with the head of the DIL	6-9
G	G3	Manager of the interface between DIL and main organization—manages the showcases of the DIL, sets up new projects with vendors	Trained as IT system integrator, has worked in IT support and IT consulting in the company	6-9
H	H1	Project manager—works as a product owner, responsible for several products, manages collaboration with fintechs	Was the first employee of the DIL, previously worked mainly with external colleagues, has background in IT	3-5
H	H2	Manager for start-up financing—works in the main organization to support start-up clients, looks for innovative (financial) products	Strong background in banking, experience in different departments of the main organization (including branches)	10+
H	H3	Head of the DIL—manages the DIL's product portfolio, sees the DIL as ecosystem "or marketplace" for innovation	Background in natural science, worked in software development, has start-up and product management experience	3-5
I	I1	Head of the DIL—mixes external and internal employees, tries to create start-up flair but also keeps strong links with the main org.	Background in political science, worked in consulting for several years, expert in health management	1-2
I	I2	Project manager—manages several projects, uses the service design approach, conducts field studies with (end) users/consumers	Background in nutritional sciences and health management, expert in digital health services, worked in service design	1-2
I	I3	Manager for change management—works with the DIL to develop products faster, tries to add digital to all departments and ideas	Background in health economics, previously a trainee in the company, is well-connected	6-9

Appendix C: Coding Table for Deductive Coding

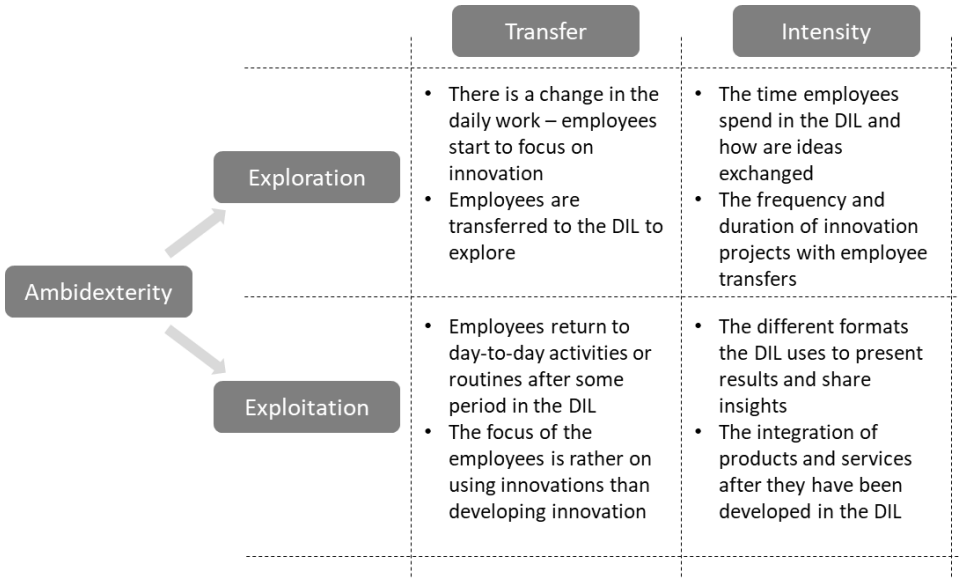

Figure C1. Coding Diagram with Short Definitions Derived from the Research Objectives

The following table provides an overview of sample quotes for the respective codes:

Table C1. Coding Table with Sample Quotes

Exploration: Transfer	"[The main organization] is working on the as-is state and is trying to optimize what we have today. … In the DIL, it is about the exploration of ideas and exploring problems that are currently not in yet in our scope and identifying them and working on them." (Case F, F2)
	"We have started to work on specific topics, and we [the DIL] have taken responsibility for them. We are the ones who are building teams for these topics. We combine employees working permanently in the DIL with employees sent to the DIL by the main organization." (Case E, E1)
	"I have to check where I can get the information- we are interested in transferring knowledge. We had one colleague in a workshop with us, and she collected different ideas. … She analyzed the innovations from the user perspective and asked questions about the product features. And, we have employees that work with us full-time for one week or three weeks." (Case H, H2)
Exploration: Intensity	"[In the DIL,] we have people on a rotation program who leave the main organization and join for three months. They apply voluntarily, receive a full week of training regarding methods, and then work on a project for 11 weeks. They learn with us [in the DIL] and get one day per week to focus on an innovation topic they have chosen—it will also be the topics they will take back to the main organization." (Case I, I1)
	"My colleague over there is from the main organization and now working with us for two months. His unit told him they want to explore deeper digitalization and connected changes. So we invited him [to join the DIL]. The main organization still pays his salary, but he works for two months here on the project and takes learnings with him for the main organization." (Case H, H3)
Exploitation: Transfer	"Sometimes we see that what we have explored in the DIL is not as successful as expected. Then that's the way it is. But we know this can be different for other innovations and we look at things like virtual reality. And we think about how we can provide training and teach about hazard prevention and build a small department [in the main organization]. So, this department aims to take full responsibility for virtual reality. The DIL helps to build the marketplace, the product, and the [internal] distribution—but the new department takes all of this over." (Case H, H1)

	"We motivate employees who have transferred to the DIL to keep a close link to their department [in the main organization]. Using the project they are working on here in the DIL and the ideas they have generated, we encourage the employees [in the DIL] to further test the ideas and discuss them with their colleagues and managers. Sharing about the innovations is crucial, and the managers need to get to a point where they understand. Because then employees return with their projects and can implement and test it further." (Case I, I2)
Exploitation—Intensity	"Our [the DIL's] strategy is that we have an idea coming from somewhere—such as from the main organization, from the market, or from us [the DIL]. We are evaluating the overall context, trying to illustrate the idea, collecting advantages and disadvantages, and assessing the idea itself. ... The goal is to involve the different departments relatively early and to sound the idea with them. What are possible showstoppers or follow-up ideas, and how can we best further explore the idea? Maybe we already have something like this that we could adopt?" (Case A, A2)
	"We [the company] aim to use the digital experts in the DIL and bring the remaining employees together in interdisciplinary teams so that they can learn what the digital mindset is and what it is like to work agile. [The idea is] that when employees can feel and experience the advantages, they can bring, after the project is finished, their expertise back into their department in the main organization." (Case B, B1)

Appendix D: Different Levels of Analysis in Ambidexterity Research

The contrasting nature of exploration and exploitation has been observed in different contexts and applies to digital transformation. Pursuing ambidexterity implies that firms need to host "multiple contradictory structures, processes and cultures within the same firm" (Tushman & O'Reilly III, 1996, p. 24). To do so, companies are applying different mechanisms to balance the contradictory nature of ambidexterity. Researchers are looking at these mechanisms with "an emphasis on the organizational and individual levels" (Stadler et al., 2014, p. 175). Thus, solutions to the exploration/exploitation dilemma are associated with different mechanisms at the corresponding levels. For example, the individual level addresses the "individuals [in the company], and particularly top managers, are seen as crucial coordinators" (Stadler et al., 2014, p. 179) for the intertwining of the different activities of exploration and exploitation. Gupta et al. (2006, p. 695) find that "the mindsets and organizational routines needed for exploration are radically different from those needed for exploitation." They find that companies delegate the different activities of exploration and exploitation to subunits or groups of the organization. The organizational level comprises innovative problem-solving as well as standardized routines and procedures adapted to the different activities and enables switches between routines not limited to single individuals (Gupta et al., 2006). Table 3 in the paper depicts the DIL implementation based on mechanisms at the individual and organizational level and the transfer of employees.

Appendix E: Intensity of the Transfer of Employees

Besides the direction, the transfer of employees can also vary with regard to *intensity*. We distinguish between *low intensity*, where the transfer targets the various units and the DIL as a whole; *medium intensity*, where the transfer is with selected individuals and primarily on an as-needed basis; and *high intensity*, where the transfer provides a specific program for individual employees to transfer (regardless of their department or current project). The level of intensity reflects not only how often employees are transferred, but also how involved they are. Table E1 below summarizes the mechanisms and ambidexterity outcomes associated with each level of transfer intensity.

Table E1. Ambidexterity outcomes associated with the intensity of transfer

Intensity of transfer	Feature of DIL implementation	Ambidexterity outcome
Low	• Activities of the DIL are presented to employees outside the lab • Selective transfer of employees for presentations and sporadic interactions	• Firm benefits from exploration-based learnings in DIL • Main organization is exposed to exploration mindsets and practices from DIL
Medium	• Transfer of employees for projects is based on specific needs • Insights and experiences are shared within the DIL	• Exploration and exploitation are interlinked through joint projects • Wider acceptance in main organization for DIL's exploration projects
High	• A continuous and structured people transfer program between the DIL and the main organization • Joint work on a day-to-day basis and regular working group meetings to diffuse new insights	• High expertise of individuals in exploration and exploitation • A lasting and intense intertwining of exploration and exploitation

In the case of *low intensity*, the DIL is separated and sometimes isolated from the main organization. There may be little or no formal transfer approach, program, or joint projects. The results of the exploration phase, including new projects or digital technologies, are shared with the main organization with little explanation or integration only (Cases A, C, F).

> *[The DIL] helps write down the ideas in a management conformant way, trying to provide the right level of detail … then there is a prioritization team (CIO and CDO) who tell us which topics to deal with in the near future. … After 10 to 12 weeks, the idea must be completely matured so that the main organization can say they want the idea or not.*
>
> *What comes out in the end is a handover to one department [of the main organization], which means that we have shown that his idea can work and it requires the following topics to continue.* (Case C, C4)

There is minimal transfer of employees and they usually provide just presentations to update the main organization on the DILs exploration activities. These firm-wide programs are usually very generic and offered to a wide audience. During short interactive occasions and events, employees from the main organization are exposed to the mindset and working practices of the DIL, but there is no collaboration.

At *medium intensity*, employees are transferred between units in the DIL and units in the main organization based on needs—for example, in order to support a project or to explore new opportunities (Case E). Depending on the resources available, DIL members can provide expertise regarding a digital technology or new work methods. Likewise, if a DIL project requires specific expertise or skills, the DIL asks for employees from the main organization. Joint projects with mixed teams intertwine exploration (projects in the DIL) and exploitation (projects in the main organization) and the resulting insights into and experiences with applying digital technologies are shared with and benefit the entire unit (Cases B and E). This makes exploration projects better understood and more readily accepted.

At *high intensity*, transfers happen also independently of ad hoc project assignments. To ensure a stable number of employees in the DIL, companies transfer employees between the DIL and the main organization as part of a regular, formally structured program (Cases D, G, and I). The program at Case I transfers employees in four tranches per year, with three employees rotating into the DIL each quarter. The units encourage people to "apply voluntarily and … bring a good mix of backgrounds" (Case I, I3).

> *Rotation employees [join] from the main organization, they come for 3 months, apply voluntarily, get a week of intensive methods training, and then work eleven weeks on the [DIL] project. They learn with us*

> *and have 1 day a week with their focus topic, which they have chosen to work on, which they then will take back to their organizational unit. They go then back to the organization and become [the DIL's] methods ambassadors. That worked out quite well to do that with a voluntary self-application, we get about 150 applications for the 15 slots in the DIL. We always make sure to have a good mix of head office, back office, front office, if possible with diverse backgrounds—to get a diverse team.* (Case I, I1)

Often, the "rotation program presents the diamond" (Case I, I1) of the DIL as the intense temporary transfer leverages the strengths of exploration and exploitation very effectively. Employees who experience exploration and exploitation at such an operational level gain a profound understanding of the importance of innovating in day-to-day operations—the essence of ambidexterity. To allow for joint work in projects, Case I's transfer program includes a training week to align work methods. High intensity is not only achieved by continuity but also by a high level of involvement. DIL members support projects in the main organization by "taking the time and working [with the team] for an entire day" (Case D, D1). The high involvement in exploitation projects allows DIL members to "act as moderators, recommend solutions, and teach the team new methods. … As team members, [the DIL members] infuse creativity and motivation" (Case D, D1). Furthermore, the intensity is also high before and after the actual transfer of employees. After employees are transferred back to the main organization from the DIL, "they act as change agents or as a multiplier and [the DIL members] keep supporting the multipliers" with seminars and workshops (Case B, B2) to ensure long-term, sustainable impact.

Appendix F: Main Organization

The main organization focuses primarily on exploitation. As digital innovations are often novel to the company and build on new technologies, it is advantageous to transfer employees with different backgrounds from the main organization to the DIL in the exploration phase to co-discover the practical implications, potential value propositions, and exploitative substance of the digital innovations early on.

> *So, if I say now, I want to have different expertise [in the DIL], a data analyst, programmer, and someone who does something else, ... For this, of course, you need strong people who are also able to handle knowledge gaps and uncertainty [at the beginning of the project]. The experts must be able to identify the right tasks themselves. Doing so allows [us] to put together different expertise in one team and still be able conduct the [innovation] project.* (Case E, E3)

> *The experts can assess the innovation outcome and decide if "the expectations are not met one hundred percent to redirect the project and request another expert from a different unit." ... This [also] allows [us] to quickly know if the project outcome cannot be used because of security concerns or insufficient scalability."* (Case E, E2)

This enables high commitment to digital innovations and minimizes the risks associated with the handover from exploration to exploitation. Employees transfer from their home base in the main organization to the DIL team and "work for three months together. If there is positive feedback [on the innovation], employees are reintegrated into the company" (Case G, G1). Participation of employees from the main organization ensures that digital innovation in the context of digital transformation serves the needs and contributes to the value propositions of the business.

Appendix G: Mechanisms of Ambidexterity

Table G1 provides an overview of ambidexterity mechanisms that have been discussed in extant literature at both the organizational and individual levels. In our research, we observed those mechanisms as guiding principles to reorganize the companies and support the strengthening of exploration and exploitation and their balance. One example of strengthening exploration similar to structural ambidexterity is implementing a DIL as a distinctive unit for exploring digital innovation. Enabling employees to work on exploitation *and* exploration follows the logic of contextual ambidexterity and is enabled by the transfer of employees.

Table G1. Mechanisms of Ambidexterity in the Context of Digital Transformation

	Mechanisms of ambidexterity	Indications in the ambidexterity literature	As notably observed in the case sample
Differentiation approach			
Organizational level	(M1) Separating exploration and exploitation to increase focus.	a, b, c, g	Cases E, F, H
	(M2) Establishing boundaries between exploration and exploitation activities to enable differentiation.	a, b	Cases E, H
	(M3) Focusing on either exploration or exploitation without shared responsibility.	e, f	Cases A, C, F
Individual level	(M4) Transferring employees full-time to support exploration.	N/A	Cases E, G, F, H
	(M5) Gathering employees to pool skills and knowledge for exploration (and exploitation separately).	f	Cases C, E, H
	(M6) Establishing distinctive processes, work modes, and cultures for employees active in exploration or exploitation activities.	b, d, f	Cases C, G, F, I
Integration approach			
Organizational level	(M7) Integrating exploration and exploitation through employee transfer.	e	Cases D, E, F, H, I
	(M8) Providing flexibility for employees to switch back and forth between exploration and exploitation.	e	Cases B, D, G, I
	(M9) Management supports investing time to share information about innovation across the organization.	f	Cases A, D, G, H
	(M10) Organizational design supports handover from exploration to exploitation.	e	Cases D, E, H, I
Individual level	(M11) Transferring employees together with their innovation outcomes to ensure successful integration.	N/A	Cases D, E, I
	(M12) Limiting the duration of employees' assignments to exploration/exploitation to foster exchange.	a, g	Cases D, H, I
	(M13) Providing employees with different formats to integrate exploration and exploitation in their work.	c, e	Cases A, B, C
	(M14) Integrating employees with different backgrounds during exploration to increase variety in viewpoints and ideas.	c	Cases B, D, E, H
Ambidexterity literature **a** (Duncan, 1976), **b** (Tushman & O'Reilly III, 1996), **c** (Jansen et al., 2009), **d** (Benner & Tushman, 2015), **e** (Gibson & Birkinshaw, 2004), **f** (Gupta et al., 2006), **g** (Christensen & Bower, 1996)			

Appendix H: Addressing the Competing Concerns with Ambidexterity

"Digital innovation has grown steadily to become the primary driver of business innovation" (Fichman et al., 2014, p. 331). Yet engaging with digital innovation poses new challenges for incumbents, which Svahn et al. call "competing concerns" (Svahn et al., 2017, p. 239). In the following, we examine how ambidexterity in the context of digital transformation can help address each of them.

Innovation capability: One challenge of digital innovation is to leverage existing capabilities while simultaneously building up new ones (Svahn et al., 2017). "This creates tensions between employees who seek to bring about change and those whose capabilities have become core rigidities" (Svahn et al., 2017, p. 239). Using DILs offers lean innovation processes and cross-collaboration, allowing companies to pursue the exploration of digital innovation with little resistance and bureaucracy (Leifer et al., 2001; Svahn et al., 2017). Identifying new ideas for digital innovation within the established organizational context (Henfridsson & Yoo, 2014) requires "an appropriate combination of existing and requisite capabilities" (Svahn et al., 2017, p. 246). The creation of digital innovation commonly happens at the nexus of such different areas of expertise (Yoo et al., 2012). To address this, contextual ambidexterity typically recommends exploring new capabilities within the main organization and providing employees with options to transfer. However, this can aggravate the tension between exploring new capabilities and exploiting extant capabilities. In the context of digital innovation, the creation of a DIL reduces these tensions by forming a "transient initiative" that avoids competition between existing and new units (Svahn et al., 2017, p. 241). The DIL creates a setting to test new combinations of cross-functional capabilities from within and beyond the firm. While structural ambidexterity provides a dedicated unit, its teams are generally not cross-functional or flexible, their knowledge may be narrow, and expertise from firm units is underutilized. Scholars have shown that digital innovation is supported by engaging different types of expertise (Nambisan et al., 2017; Yoo et al., 2012). Therefore, people transferred to a DIL leverage new, cross-functional expertise, thus utilizing both factors for exploration in the context of digital innovation: a dedicated unit and flexible team composition enabling cross-functionality.

Innovation focus: A second challenge of digital innovation is to focus on both product and process. Innovations are commonly created without a long-term focus and seek to overcome the risk of short-sightedness (Christensen, 1997). Ambidexterity supports innovating, steering the allocation of resources, and allowing firms to "focus on the process of innovation—separate it from its outcome—to embrace digital innovation" (Svahn et al., 2017, p. 248). Implementing DILs underscores the process focus of innovation, but the main organization is focused clearly on the product. These competing concerns must be addressed to avoid potential disruption in the main organization (Svahn et al., 2017). While structural ambidexterity enables simultaneous exploration and exploitation, it separates the activities. The lack of exchange between exploration and exploration units may make the main organization less willing to accept and adopt new capabilities and innovations. Gaining support from the main organization is essential to ensure that the focus of innovating is not only directed towards the process but aims to deliver a meaningful product. Contextual ambidexterity enables sequences of exploration and exploitation, with people working only part-time in exploration and no focus on advocating the product across exploration and exploitation in a way that limits the support from the main organization. Ambidexterity in the context of digital transformation dedicates some people full-time to the process of innovation while retaining a strong focus on the product. By transferring people along with the innovation from exploration to exploitation, people stay in charge and can pave the way for acceptance of the innovation process and adoption of the product across different units of the main organization.

Innovation collaboration: A third challenge of digital innovation is balancing internal and external collaboration. Our conceptualization, based on the ambidexterity literature, focuses on the internal collaboration and the interaction between the DIL and the main organization. However, our empirical data also provides evidence on the interaction *across* firm boundaries since DILs are often used to integrate external partners or add external people to the rotation cycles between the DIL and the main organization. Germonprez et al. (2020) show how innovation builds on interwoven engagements and connecting people in shared activities. Creating digital innovation requires engaging with knowledge and expertise from various industries (Yoo et al., 2010, 2012). "Firms must develop the skills and relationships of the people operating within internal work arrangements while also engaging external partners and resources" (Svahn et al., 2017, p. 240). This can lead to blurred organizational boundaries and cause competing concerns between internal and external work processes (Nambisan et al., 2017). DILs provide a useful platform to draw in external actors, if needed, and integrate and experiment with their skill sets and insights without rigid process restrictions (Svahn et al., 2017). DILs utilize flexible transfer to integrate experts from other locations in the DIL teams. Since contextual ambidexterity does not provide dedicated units, there is a high chance of contextual ambidexterity being ineffective in facilitating fruitful collaboration between internal and external actors at separate locations. Structural ambidexterity allows for external actors, but its fixed team composition does not support fruitful short-term collaboration between external experts and internal cross-functional project owners. Digital innovation also requires the ability to keep design spaces open (Henfridsson et al., 2014). Ambidexterity in the context of digital transformation exhibits an intense and full-time transfer of people enabling permeable boundaries between a dedicated DIL team and the units in the main organization needed to keep design spaces open for ongoing exploration in the DIL as well as an intertwining of exploration and exploitation.

Innovation governance: A fourth challenge of digital innovation is that it requires firms "to negotiate a balance between control and flexibility to afford exploration of digital options" (Svahn et al., 2017, p. 240). However, firms generally tend to drift toward exploitation over time and lose focus on exploration (Christensen, 1997; Eisenhardt et al., 2010). Having a dedicated exploration unit separated from the organizational pull toward exploitation keeps exploration in focus (O'Reilly III & Tushman, 2008). In the context of digital innovation, DILs focus on exploration and flexibility to explore digital options (Svahn et al., 2017). In structural ambidexterity, the exploration unit may be highly flexible and focused on exploration, but it commonly fails to translate innovations from the initiating phase of innovations in the DIL to the more controlled growing phase in the main organization (Montealegre et al., 2019). In contrast, ambidexterity in the context of digital transformation has a high degree of team permeability between the DIL and the main organizations, which supports this translation and can pave the way for later exploitation. Since innovations are carried from the DIL to the main organization by the same people involved in the exploration, these people understand the control restrictions and, as ambassadors of the innovation within the main organization, can ease the adaption to a high-control environment and make the digital innovation succeed (Svahn et al., 2017). Thus, ambidexterity can help overcome the competing concerns of digital innovations and puts firms in a favorable position to exploit the full potential of those innovations.

About the Authors

Friedrich Holotiuk is an information systems scholar researching digital transformation and organizational design. He holds a PhD in information systems from the Frankfurt School of Finance & Management in Germany. His research interests include digital innovation, the adoption of new technologies, and organizational design to enable ambidexterity. By studying management actions that support innovation, Friedrich has gained deep expertise in how firms are set up and how they can nurture capabilities to develop digital innovations and create new products and services from these innovations. His research has been published in IS journals (such as *Journal of the Association for Information Systems*, *Information & Management*, and *Technology Analysis & Strategic Management*) and in the proceedings of leading international IS conferences (e.g., ICIS, ECIS, AMCIS, PACIS, HICSS). Besides his academic research, Friedrich is an experienced IT management consultant for digital and cloud transformation. He advises clients on technology strategies, IT operating models, transformation capabilities, and the organizational design of the IT function.

Daniel Beimborn is a full professor of information systems and the dean of studies at the University of Bamberg in Germany. Previously, he was a professor of information systems at Frankfurt School of Finance & Management, where he still serves as a visiting professor. His research on organizational aspects of digital innovation and digital transformation, outsourcing management, service-oriented architectures, standardization, and IT governance has been published in journals such as *MIS Quarterly*, *Journal of Management Information Systems*, *Journal of Strategic Information Systems*, and *Journal of Information Technology*. He is a senior editor for *The Data Base for Advances in Information Systems* and an associate editor for the *Journal of the Association for Information Systems* and *Business & Information Systems Engineering*.

Axel Hund holds a PhD in information systems from the University of Bamberg, Germany. His research on digital innovation, transformation, and entrepreneurship has been published in leading IS journals such as the *Journal of Strategic Information Systems*, *Journal of the Association for Information Systems*, and *MIS Quarterly Executive*, and in the proceedings of leading IS conferences (e.g., ICIS, ECIS, AMCIS, PACIS, HICSS). In his role as a management consultant, he combines insights from academic research with practical experience to advise clients in the areas of IT strategy, digital innovation, and transformation management.