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RESEARCH ARTICLE

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Managerial framing in light of discontinuous change: Revolutionists, evolutionists, and mediators

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This study examines the critical role of middle and frontline managers in an incumbent organization navigating discontinuous change, emphasizing the balance between exploring new opportunities and exploiting existing ones. While top managers set the strategic ambidextrous direction, the on-the-ground manifestation and tension management fall predominantly to the middle and frontline managers. We introduce a novel typology, classifying these managers as Evolutionists, Revolutionists, or Mediators, each with distinct cognitive framings. Our findings underscore the importance of understanding and moderating these cognitive framings to facilitate successful ambidextrous implementation. Key managerial implications include the need for heightened awareness of tension points, strategic resource allocation, mitigation of extreme cognitive framings, and the significant value of Mediator managers in steering ambidextrous strategies. This research paves the way for a deeper understanding of individual-level ambidexterity and provides crucial insights for organizations to innovate in times of discontinuous change.

KEYWORDS

ambidexterity, case study, cognitive framing, discontinuous change, incumbent, tensions

INTRODUCTION 1

Business environments have become increasingly characterized by volatility, uncertainty, complexity, and ambiguity (Bennis & Nanus, 1985). Given these discontinuous changes, managers of incumbent firms are confronted with the need for ambidextrous capabilities, namely, the ability to both explore new avenues and exploit existing ones (O'Reilly & Tushman, 2008). Yet, the balance and successful use of these capabilities in ever-changing environments has remained underexplored in literature and practice (Christensen, 1997; Tripsas, 2009; Tushman & O'Reilly, 1996).

To investigate these capabilities, scholars built on the foundational idea of dynamic capabilities, which emphasizes the ability to sense, seize, and reconfigure to adapt (Teece et al., 1997). Consequently, ambidexterity has emerged as a concept that encompasses the ability to simultaneously explore new opportunities and exploit existing business streams (Tushman & O'Reilly, 1996). Ambidexterity is a dynamic capability that allows organizations to adapt and navigate changing environments (O'Reilly & Tushman, 2008).

Recently, Birkinshaw et al. (2016) melded these concepts, suggesting that top-level managers play a role in guiding their subordinates in orchestrating exploration and exploitation. Frontline and middle managers are nonetheless pivotal in executing explorative and exploitative activities (Cantarello et al., 2012). However, their struggles in balancing exploration and exploitation has remained underrepresented in literature in recent years (Birkinshaw et al., 2016; Wolf et al., 2021; Zimmermann et al., 2015, 2017). While studies have focused on leaders and their contribution in enabling ambidexterity (Mom et al., 2018; Nemanich & Vera, 2009), they have neglected how non-leadership organizational members deal with the ambidexterity challenge (Tarba et al., 2020). Exploring and exploiting activities are mostly developed and implemented at

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lower levels of management. Forming the core of our investigation, we suggest that successful adaptation to discontinuous change is highly dependent on middle and frontline managers and their handling of the resulting tensions. How middle and frontline managers deal with the challenge of simultaneously exploring and exploiting is underrepresented in ambidexterity research (Fraser & Ansari, 2021; Helfat & Peteraf, 2015; Mom et al., 2009; Tarba et al., 2020; Zimmermann et al., 2017). This requires further investigation and is part of this exploratory study.

An additional contribution of our work aims at investigating the avenue for understanding these exploration-exploitation tensions through the lens of cognitive framing. Cognitive framing refers to the mental frameworks or lenses through which individuals interpret and make sense of their experiences and the world around them (Eggers & Kaplan, 2013). Understanding the variances in cognitive framing by frontline and middle managers provides unique insights into how they negotiate the dichotomy of exploration and exploitation (Raffaelli et al., 2019; Tripsas, 2009). Consequently, this understanding also helps organizations to answer the question of how to deal with the tensions of exploration and exploitation (Lin & McDonough, 2014). Motivated by these gaps and drawing upon the insights of Birkinshaw et al. (2016), we derive our research question:

1.1 | How do middle and frontline managers cognitively frame their environment in the context of the tension between exploration and exploitation?

To investigate our research question, we use an embedded single case study (Yin, 2009). Our case company "SoftCorp" is a large multinational software company that is forced to adapt to discontinuous change in its primary business. The highly dynamic environment of a software corporation contributes to the need to achieve and maintain ambidexterity, underscoring the relevance for investigating this capability (Rothaermel & Alexandre, 2009).

In summary, in order to analyze how frontline and middle managers deal with ambidexterity tensions, we use the lens of cognitive framing to understand the situation and individual complex behavioral responses to exploration-exploitation tensions (Krishnakumar et al., 2022; Lin & McDonough, 2014; Smith & Tushman, 2005). Our findings show that middle and frontline managers find themselves in a field of tension between exploring novel and exploiting existing technologies during adaptation. Within this field of tension, we propose a typology with different cognitive framings that lead to contrasting dealings with those technologies and conflicts within departments and the organization. Our investigation contributes to the research on the role and cognitive framing of frontline and middle managers as well as individual-level ambidexterity.

The remainder of this paper reviews pertinent literature, details our methodology, presents our findings, and concludes with a discussion of theoretical and managerial implications as well as study limitations.

2 | THEORY BACKGROUND

2.1 | Ambidexterity at the organizational and individual level

Incumbent firms are faced by discontinuous change triggered by the invention of new technologies. Such inventions quickly change market rules, organizational operations, and business models (Hanelt et al., 2020; Kumaraswamy et al., 2018). Existing competencies are devalued (Tushman & Anderson, 1986), existing capabilities are turned into liabilities (Leonard-Barton, 1992), and the existing business model is no longer aligned with the changing external environment (Christensen, 1997; Christensen & Bower, 1996; Christensen & Raynor, 2003). Still, customers demand and need the existing products and services (Gilbert, 2006). Thus, organizations confronted with discontinuous change often choose to simultaneously exploit the existing business while exploring the opportunities of the discontinuously changing environment (March, 1991; Tushman & O'Reilly, 1996). There is an ongoing scholarly discussion on the ideal balance between exploration and exploitation. Lubatkin et al. (2006) suggest a strategy of maximizing both poles, while Agostini et al. (2016) and Lavie and Rosenkopf (2006) argue for a symmetrical approach, giving equal importance to each. Conversely, Lee et al. (2017) suggest that an asymmetric balance might yield the best results, suggesting that the relationship between the two poles is not linear and that a more complex strategy might be required for organizational success, for example, by shifting attention between the poles (Krishnakumar et al., 2022). However, asymmetric approaches could lead to cycles of failure or success where one or the other extreme becomes dysfunctional (Levinthal & March, 1993; Ouinn & Cameron, 1988).

In these earlier works on ambidexterity, the concept was primarily studied at the organizational level (Felin et al., 2015; Gavetti, 2005). The individual level, on the other hand, has often been neglected. Only recently, scholars have been showing increased interest in filling the research gap on how individuals perceive and deal with ambidexterity and what this means for the organization (Felin et al., 2015; Mom et al., 2007, 2009; Raisch et al., 2009). Studies at the individual level also contribute to existing debates at the organizational level by providing insights into how the balance between exploitation and exploration by employees can influence and shape the overall capabilities and strategic direction of an organization (Felin et al., 2015). Essentially, understanding how individuals navigate these dual demands can offer valuable perspectives on managing similar challenges at the organizational level.

In this context, Birkinshaw et al. (2016) open an interesting research gap in individual-level ambidexterity by conceptually integrating dynamic capabilities theory and ambidexterity. By viewing the two concepts as complementary, they overlay the ideas of being able to sense and seize opportunities (dynamic capabilities) with being able to explore and exploit opportunities (ambidexterity). Thus, they equate sensing with exploring and seizing with exploiting opportunities. The remaining third capability, reconfiguration, then represents the setting of an adaptation mode in their conceptual framework. The adaptation mode involves top management's decision on whether the organization

should structurally separate (i.e., separate exploration and exploitation units), behaviorally integrate (i.e., one unit that integrates both exploration and exploitation), or sequentially alternate (i.e., exploration and exploitation separated in time) exploration and exploitation activities (Birkinshaw et al., 2016; Raisch & Birkinshaw, 2008).

With their seminal work on the integration of the dynamic capability theory with the concept of ambidexterity, Birkinshaw et al. (2016) show which actors play which roles in the establishment of ambidextrous organizations. Of particular importance to the theoretical underpinnings of this paper, they find that exploration and exploitation activities are primarily the domain of frontline and middle managers. These managers develop and implement dynamic capabilities' critical components (exploration and exploitation). In previous organizational studies, top management indeed sets the adaptation mode, but middle and frontline managers must follow within a limited range of action (Zimmermann et al., 2017). However, as Zimmermann et al. (2015) point out, middle and frontline managers play an influential role in initiating and enabling ambidexterity. They exhibit autonomous strategic behavior, experiment, and drive adaptation (Burgelman, 1983; Floyd & Lane, 2000). Thus, they do carry out the ambidextrous activities (Cantarello et al., 2012) and manage the dualities that influence business performance in dynamic environments (Wolf et al., 2021). Frontline and middle managers determine how exploration and exploitation activities are handled, taking into account the initial strategic decision on the adaptation mode made by top management (Birkinshaw et al., 2016; Zimmermann et al., 2017).

Using the ambidexterity perspective introduced by Birkinshaw et al. (2016), we aim to address how frontline and middle managers handle exploration and exploitation activities in a discontinuously changing environment. To the best of our knowledge, this has rarely been reflected in previous research (Christofi et al., 2021; Fraser & Ansari, 2021; Helfat & Peteraf, 2015). To explain how individuals cope with ambidexterity, it is necessary to understand the consequences of simultaneous exploration and exploitation as ambidexterity tends to generate different tensions (Andriopoulos & Lewis, 2009), which will be discussed below.

2.2 | Exploration-exploitation tensions

The concept of ambidexterity was first articulated by March (1991) in the organizational learning literature. March (1991) distinguishes exploration and exploitation as two distinct organizational activities. Exploitation improves efficiency, selection, and implementation, while exploration involves searching, experimentation, and innovation. Pursuing both exploration and exploitation requires a balance between two activities that compete for scarce resources, require different skills, and exist in a state of tension. Tensions include the need for short-term benefits through exploitation while investing in long-term exploration (Kunieda & Takashima, 2021). There are also tensions between process standardization and creativity, experimentation, and learning (Gibson & Birkinshaw, 2004). Managers must balance the tension of allocating resources to either incremental improvement or radical innovation (O'Reilly & Tushman, 2013).

As these tensions imply, exploration and exploitation appear to be inherently incompatible, meaning that the simultaneous pursuit of the activities is impossible (Gupta et al., 2006). This supposedly presents managers with an either/or-decision between exploration and exploitation activities. From this perspective, ambidexterity is basically only possible if the activities are strictly separated. Yet both activities are necessary to keep organizations viable in the present while preparing them for the future (Levinthal & March, 1993). Some organizations choose to integrate both exploration and exploitation activities in one department by creating a context that integrates the divergent activities using behavioral, cognitive, and social means. This is an adaptation mode called behavioral integration (Birkinshaw et al., 2016; Eisenhardt et al., 2010; Gibson & Birkinshaw, 2004), However, behavioral integration can lead to tensions for individuals in the organization, accompanied by cognitive dissonance. Cognitive dissonance is an uncomfortable emotional state that occurs when an individual has multiple or incompatible cognitions, which are mental events associated with an evaluation (Festinger, 1957; Hinojosa et al., 2017).

While a balance between these two poles is necessary to ensure sustainable success (March, 1991), it creates tensions that lead to cognitive dissonance. Thus, there is a conflict between maintaining balance and managing tension. The discussion leads us to the question of what these tensions mean for frontline and middle managers who, as explained above, are caught in the middle of these exploration– exploitation tensions because they are the ones to perform the exploratory and exploitative activities.

2.3 | Cognitive framing and ambidexterity

Illustrative studies of the influence of the framing of a failed business model such as the failure of Polaroid (Tripsas & Gavetti, 2000) or the effect of the framing of online media as threat or opportunity on the resource commitment of newspapers (Gilbert, 2005, 2006) show that these interpretive processes have been studied at the organizational level. Furthermore, recent studies show that the concept of cognitive framing can be broken down to the individual level as a lens to explore how frontline and middle managers deal with ambidextrous tensions (Fraser & Ansari, 2021).

Decision making in times of discontinuous change is accompanied by high levels of uncertainty and divergent perspectives among organizational members (Kaplan, 2008). Performance measures and business impacts of new technologies can only be estimated (Kaplan, 2008; von Krogh, 2018). New technologies add complexity, have novel features, abstract functionality, and enable new and unprecedented forms of business models and collaboration (Bailey et al., 2010; Nambisan et al., 2017). How a new technology and the changing external and organizational environment are perceived and interpreted is determined by individuals' interpretive schemes or cognitive framing (Cornelissen & Werner, 2014; Hahn et al., 2014).

Cognitive framing is a mental structure that shapes how individuals perceive and interpret information (Hahn et al., 2014). It acts as a filter, limiting perceptions based on the individual beliefs and 688 WILEY-

understandings of organizational members (Giorgi, 2017). These differences in how individuals cognitively frame their environment lead to differences in how they perceive and handle situations such as exploration–exploitation tensions.

Ambidexterity necessitates a delicate balance between exploiting current capabilities and exploring new opportunities, inherently leading to managerial tensions. These tensions stem from the divergent processes, structures, and mindsets that exploitation and exploration each demand. When managers attempt to navigate these opposing forces, cognitive dissonance can arise–Festinger's (1957, 1962) work provides insight into how such dissonance can prompt a shift in cognitive framing to reconcile conflicting beliefs and actions. Specifically, in an ambidextrous context, managers may experience dissonance when their belief in optimizing existing operations (exploitation) clashes with the imperative to venture into new, uncharted territories (exploration). To alleviate this psychological discomfort, managers might alter their cognitive framing-thus their interpretive lens-shifting perspectives from viewing new technologies as threats to recognizing them as opportunities, thereby realigning their approach from exploitation to exploration, or vice versa.

Scholars have found that how individuals cognitively frame their environment is best examined at multiple levels, including the organizational environment and inner-organizational levels. (Andriopoulos & Lewis, 2009: Fraser & Ansari, 2021: Raffaelli et al., 2019). When middle or frontline managers are in a situation of tension caused by the ambidextrous organization, they may perceive and thus frame their environment, organization, and department in a particular way. In management literature, researchers have identified different reactions of individuals to tense situations: When managers look at their environment, they may lack faith in the commercial viability of newer technologies (Tripsas & Gavetti, 2000) and, depending on their predisposition, pay more attention to either the old or the new technology (Eggers & Kaplan, 2009). Perceiving their organization's response, they want to hold on to existing power (Kaplan, 2008), or show a visionary attitude (Rosenbloom, 2000). Looking at how well their department is handling the situation, they may assume the role of the ambidextrous manager, a multitasker able to bring together different individual framings, manage emerging contradictions, and refine and renew their knowledge, skills, and know-how (Eisenhardt et al., 2010; Mom et al., 2009). Thus, there is evidence that these explorationexploitation tensions can be framed differently, resulting in different conflicting views of the situation that explain the tension and may also have a self-reinforcing effect.

3 | METHODS

3.1 | Research setting

The software industry is characterized by high volatility, rapidly changing technologies, and frequent discontinuous changes (Khanagha et al., 2014; Suarez, 2005). Therefore, it is ideally suited to investigate our research question. Advances in processor

performance, the proliferation of computing devices, and their interconnection through an increasingly faster internet have led to discontinuous change through the emergence of cloud technologies, specifically the transition from on-premises and existing cloud solutions to cloud-native computing. Therefore, it is critical for incumbents like SoftCorp to address the emergence of cloud-native computing. This requires not only new business models but also a break from their on-premises past — without alienating or even losing customers (Tripsas & Gavetti, 2000).

SoftCorp began as an integrated off-the-shelf software package that soon became the core offering for a wide range of industries and customers. Today, through numerous acquisitions, SoftCorp is a multi-product, multinational company. It transitioned to cloud computing with its first acquisition of a Software-as-a-Service (SaaS) cloud services company. Although this entry into cloud computing coincided with the great hype surrounding the technology in 2009 (Gartner, 2009), SoftCorp did not begin to comprehensively transition its business units until years later. However, several acquisitions over the past decade (i.e., since 2010) have helped the company gain a foothold in the cloud market. The acquisitions were initially pursued in separate units or companies rather than integrated into the company. This resulted in a fragmented and confusing product portfolio. While numerous acquisitions had enabled SoftCorp to cover a wide range of cloud markets, there was no clear focus. With a recent change in leadership, this strategy has changed radically. The new CEO began to abandon an aggressive acquisition strategy and focus on integration and building a comprehensive product portfolio. On top of that, there was increasing pressure from cloud-native applications that competitors were already offering.

However, many existing customers are still satisfied with SoftCorp's established software and see no need to move to cloud solutions. In addition, SoftCorp is contractually obligated to continue to support the solutions it sells, including upgrades to current security standards. As a result, significant resources are still required to maintain existing customer contracts. This resource drain is due in part to SoftCorp's history of introducing new technology: During its transition to the cloud, SoftCorp introduced three different technology foundations, called Runtime One, Two and Three, all of which were developed in response to the multiple discontinuous changes in the environment caused by cloud computing. Runtime Three is the first true cloud-native technology foundation, representing the latest technological step in cloud computing. The adaptation to cloud-native computing with Runtime Three is by far the most radical change for SoftCorp and involves an accumulation of several missed adaptations in the past.

To handle this radical step organizationally, SoftCorp has created an ambidextrous department ("Unity department") to deal with its technological past and explore its future. The department simultaneously explores new technologies and exploits existing technologies without a structured separation of exploration and exploitation activities. Thus, ambidextrous activities are manifested in everyday behavior without a formal structure, allowing individuals to manage the conflicting demands on their own (Birkinshaw & Gibson, 2004; Gibson & Birkinshaw, 2004). Consequently, the department's form of ambidexterity can be considered as behavioral integration. This adaptation mode attempts to bring together the existing and the new within a department (Birkinshaw et al., 2016). Members of such business units must be able to balance the competing demands of exploration and exploitation while dealing with the different cognitive framings. Thus, in our case study, we explore this department's emerging tensions and its members' cognitive framing.

3.2 | Research design and sample

Our study uses a qualitative research design to obtain in-depth data and to understand both the adaptation to discontinuous change and individual framing in the tension of ambidexterity (Cornelissen, 2017; Yin, 2009). It is reasonable to apply an inductive case study approach as research on frontline and middle managers' roles and cognitive framing is rare (Cornelissen, 2017; Eisenhardt, 1989; Yin, 2009). Following influential studies on cognitive framing (Khanagha et al., 2014; Tripsas & Gavetti, 2000), we use an embedded single case design (Yin, 2009, p. 50) to examine how organizational members given their differences in cognitive framing deal with the tension between exploration and exploitation when adapting to discontinuous change. Frontline and middle managers are particularly involved in ambidextrous situations (Birkinshaw et al., 2016) and are therefore well suited to examine different framings in light of the exploration–exploitation tension.

Thus, our embedded multiple units single case design is chosen as a research design to extend the theory (Yin, 2009). The unit of analysis is the Unity department, which is responsible for laying the technological foundation for cloud services. Embedded units are frontline and middle managers. SoftCorp is stuck in the innovator's dilemma (Christensen, 1997) and had a change in leadership that initiated the business unit under study. Furthermore, adapting to cloud-native computing, ambidextrous organizational context, and emerging tensions occur in a definable, traceable, and short period of time (Khanagha et al., 2014; Yin, 2009).

3.3 | Data collection

In order to triangulate meaningfully (Jick, 1979), 26 interviews were conducted with different perspectives and hierarchical backgrounds within and adjacent to the focal department. The interview outline can be found in the Appendix. 18 of the interviewees came from the Unity department, which is responsible for the implementation of the foundational technologies of the organization (see Table 1), to gain deep insights into the focal department. Eight interviews were conducted in an adjacent cross-sectional department (see Table 2) to get an external view from managers who work at least partially with members of the Unity department. The semi-structured interviews lasted between 30 and 90 min.

Semi-structured interviews were chosen to obtain more open and reflective responses than would be possible with a closed survey

TABLE 1 Data collection in the Unity department.

Interviewee role	Interview date	Duration (minutes)
Vice president cloud native strategy	21.09.21	90
Product manager	06.10.21	50
Director IT	12.10.21	40
Development manager	13.10.21	30
Senior software developer	25.10.21	30
Chief architect	29.10.21	40
Vice president and chief product owner	02.11.21	40
Product manager	05.11.21	50
Product Expert	24.11.21	50
Development architect	07.12.21	40
Head of runtime two	08.12.21	60
Chief product owner	09.12.21	40
Chief architect	10.12.21	50
Chief product expert	05.01.22	50
Chief product expert	05.01.22	40
Chief architect	21.01.22	40
Product expert	26.01.22	70
Head of engineering runtime three	28.01.22	50

TABLE 2 Data collection in the cross-sectional department.

Interviewee role	Interview date	Duration (minutes)
Research expert	28.09.21	60
Chief architect	06.10.21	40
Senior development manager	28.10.21	50
Chief architect	03.11.21	30
Product manager	15.11.21	40
Senior development manager	03.12.21	30
Chief product expert	09.12.21	40
Senior manager	02.02.22	30

technique (Mayring, 2003). In addition, additional data was collected for triangulation: Seven interviews were conducted with two customers of the focal company with different technological requirements and varying degrees of novelty. These interviews were conducted to gain deeper insights into the context and background information of the focal company. In addition, a comprehensive set of data (e.g., archival data, presentations, letters to shareholders) was collected to gain insight into the organizational context in particular, for example, to support the creation of the context description and the symbolic approximation shown in Figure 1. ⁶⁹⁰ WILEY-



FIGURE 1 Emergence of tensions. [Colour figure can be viewed at wileyonlinelibrary.com]

3.4 | Data analysis

Case study analysis helps to reveal complex relationships between perception and response to discontinuous change (e.g., Gilbert, 2005). In order to develop theory from the case study research, all data were collected and analyzed according to Yin' (2009), p. 2 ff., six-step process. After planning and designing the research, preparing a theoretically useful case, and collecting the data, the data were examined. In this step, the findings are explored in an in-depth case study analysis (Yin, 2009, pp. 156–160).

The interviews were first cleanly transcribed and then coded as part of the data preparation and the subsequent thematic analysis (Braun & Clarke, 2006) using MAXODA 2022 (Dresing & Pehl, 2013; Kuckartz, 2010; Lincoln & Guba, 1985). We familiarized ourselves with the data using a predefined set of codes derived from theory. This predefined set of codes includes the following categories: boundary conditions including the resource allocation and timing, ambidextrous activities, that is, explorative as well as exploitative activities, and cognitive framing, each including the framing levels environment, company, and department. Thus, we build separated code categories for managers' framing and their operational activities. These initial codes were applied systematically across the dataset. While going through the transcripts, salient passages were commented and new codes including in vivo codes were added either as new code category or subcode to the code categories that were derived from theory. As we delved deeper into the data, we refined and expanded these codes during the process of thematic analysis (Braun & Clarke, 2006). Thus, we added codes concerning the framing of exploration-exploitation tensions and its reasons within and across the three framing levels. Further, by using MAXQDA's coding comparison tools, we could derive the framing typology within and across the respective framing levels and were able to code the segments accordingly. The codes were compared with existing literature to find additional theoretical avenues and further refine the codes.

This approach allowed us to identify a critical phase of cognitive dissonance due to the unequal allocation of resources to new and

existing developments, which explains the tensions faced by frontline and middle managers. Thus, they can be classified into different types with different cognitive framing at the environmental, organizational, and departmental levels.

We have remained open and sensitive to the contradictions and inconsistencies of the theory (Kuckartz, 2010). The analysis was adapted by the empirical reality and not applied as an unchangeable interpretive framework (Kuckartz, 2010). Inter-coder reliability was achieved by involving the authors of this article in the analysis (Lincoln & Guba, 1985). The following case study presents SoftCorp's Unity department, which is responsible for the company's future and past technology infrastructure. The findings include a description of the department itself and the tensions it faces. Focusing on the individual level, the cognitive framing of middle and frontline managers of the technology environment, the strategic direction of the company, and the Unity department itself are presented.

4 | FINDINGS

4.1 | Unity Department and emerging tensions

In an unprecedented effort to integrate the disparate technology environments SoftCorp had amassed through acquisitions and homegrown development, the new CEO decided to make a radical shift in strategy, according to one Chief Architect:

> "The new CEO came and said we have been talking about integration for such a long time. But we need to do it which means that it should be part of the road map. It should be part of the budget and staffing. It should be part of the objectives. That helped a lot. I'm seeing a shift in mindset."

The Unity department was created to integrate previously separate business units resulting from acquisitions of cloud companies and to bring the fragmented technology portfolio onto a common technology foundation. The goal was to move customers from legacy cloud and on-premises solutions to a state-of-the-art platform. The cloud evolution took place in three phases. In the first phase, SoftCorp developed an in-house runtime environment. "Runtime One" is hosted on in-house servers and provides a Platform-as-a-Service (PaaS). With the increasing availability and power of open-source software, SoftCorp decided to move away from the proprietary path. A few years after Runtime One, the second technology environment, Runtime Two, was introduced in the mid-2010s. Runtime Two is a turnkey, open-source platform for application developers that makes it easy to deploy and run applications. After the launch of Runtime Two and the change of CEO, Runtime Three was in the starting blocks. The development of Runtime Three and the new CEO did not coincide, but Runtime Three is part of the radical change in strategy. Previously, top management did not see Runtime Three as the future, according to the Vice President of Cloud Native Strategy:

"The decision-level did not understand why [Runtime Three] is the right solution."

It took a lot of convincing from the cloud-native computing departments for top management to see the technology's potential. This is because Runtime Three has the potential to merge the existing technological past. Three is more flexible, more extensible, and the first truly cloud-native environment. It gives developers more flexibility while requiring more complex development work. As one Chief Architect explains, with Runtime Three,

> "[...] we are going to essentially rethink how we do cloud so that we actually get on a sustainable trajectory."

Not only were Runtime One, Two and Three developed and offered to customers in rapid succession, but they were based on different technologies. SoftCorp has sold the three solutions to customers, selling each individually as future-proof. However, since the existing solutions work well for most customers, many do not want to move to a new Runtime environment. This creates a resourceintensive need for SoftCorp to maintain existing and new technologies in parallel, putting the company in an innovator's dilemma (Christensen, 1997). The Unity department's objective, as described by interviewees, is to merge the three different technologies into a cohesive hybrid solution. The Head of Engineering Runtime Three about the beginnings of the Unity department:

> "We immediately started working on a common strategy to unify the three runtimes."

The ultimate goal is for the customer to be oblivious to the use of different technology bases and to purchase only one service, regardless of the technology base. Because all three environments are discontinuous changes in their own right, they each have their own barriers to adaptation. These include different mindsets, resources, and skill sets. According to the Head of Engineering Runtime Three, bringing the three technology bases together

> "[...] is the central question for change. Historically, of course, there have been different teams, some of which think differently and even think against each other."

To address these issues, the unit integrates resources from its three cloud technologies as well as additional technologies. At this stage, the department is ambidextrous, as it involves both exploratory and exploitative activities. It performs cloud-based development, iterates, takes risks, and experiments with the newer technologies (exploration), while still serving the interests of existing customers, refining, and implementing existing products (exploitation). Individuals must engage in both exploitative and exploratory activities, some at the same time. Thus, the mode of adaptation is behavioral integration (Birkinshaw et al., 2016; Gibson & Birkinshaw, 2004). In this context, tensions lead to questions of resource allocation to the new technology (i.e., resources for exploration activities) or to the technology being replaced (i.e., resources for exploitation activities). In an attempt to provide a symbolic approximation of the situation at SoftCorp, we have created Figure 1. This figure makes no claim to represent an exact allocation of resources to new and existing technologies over time. However, it is intended to supplement the situation description so that the critical phase of cognitive dissonance is easier to grasp. It also shows the impact of the timing difference between a recent tension between Runtime Two and Runtime Three, the foundational technologies for cloud-native applications, and the long-standing general transition to the cloud

As can be seen from the figure, tensions arise not only between all the above exploration and exploitation activities but especially within the activities related to the exploitation of Runtime Two and the exploration of Runtime Three. This poses significant challenges to the department members, which can be attributed to the different individual cognitive framings within the department. Interestingly, and in contrast to the behavioral integration of the Unity department, many exploratory activities at SoftCorp are structurally separated. In contrast to the ambidextrous tensions between Runtime Two and Three, the basic exploratory results of designated labs are recognized and accepted by the members of the Unity department.

The adaptation process starts with the allocation of most resources to the Runtime Two technology, with just a few resources allocated to Runtime Three. As soon as more resources will flow to the new technology in the form of people, funds, and skills, we assume a reduction of tensions. We argue that this is based on tensions ceasing between on-premises and cloud solutions in the broader context of the cloud transition (see Figure 1). Organizational members are aware of the cloud being the main technological basis, so we noticed little to no tension on this issue. Thus, the "tension" as the course progresses is usually between Runtime Two and Three. In addition to the tension between the two technologies, there is agreement about the direction of SoftCorp, as the Runtime Two Leader points out:

> "I do not think there's that much disagreement about the right direction and what's needed for it, but the tension comes from the ability to execute. What can we get done? How can we take care of the customers and still do the new things? And how do we get the right balance there? [...] It's better to describe it as tension than conflict, because it's not a conflict of goals, but rather a balancing act."

This clarity about the right technology choices may also stem from the clear direction set by SoftCorp's new leadership. SoftCorp's new CEO has established a revolutionary approach, the Director of Product Management noticed:

> "One of the main guidelines by the management was not to evolve, but to have a revolution. So, it's not to use existing means to solve new problems, rather to come up with new means. An earthquake brings a lot of opportunities."

The revolutionary approach of the top management team sets a clear focus on rapid exploration of the new technology. The simultaneous and resource-intensive exploration of Runtime Three and exploitation of Runtime Two (including Runtime One and legacy on-premises environments) creates significant tension.

In summary, data indicate that day-to-day operational changes, such as the adoption of certain cloud-native technologies, may be more prone to generate tensions than the general need of moving to the cloud.

4.2 | Framing typology in the Unity Department

The Unity department, a confluence of diverse competencies due to various acquisitions, exhibits a range of cognitive framings as noted by a Senior Development Manager. The manager notes that the required mindsets are

> "[...] completely different. You have to get that end-to-end mindset into people when you are building a piece of code, whether it's in the database or as a service around it. We always say we are trying to teach a whale to fly."

These differences in individual cognitive framing are particularly evident in adapting to new Runtime environments. For example, the acceptance of Runtime Three and the preference for older environments were observed to correlate with these diverse cognitive frames.

Looking at cognitive framing in detail, it appears on different levels: environment, company, and department. Cognitive framings are found on a spectrum with polar extremes at these levels. Highlighting the difference in cognitive framing among individual frontline and middle managers, we find three different types of individuals with a specific cognitive framing at each level (see Figure 2). Thus, in this section, we will go through the perspective of three cognitive framing types: The Evolutionist, the Revolutionist, and the Mediator. Different types can be found through the Unity department and inside the teams. This concerns a combination of Mediators and either Revolutionists or Evolutionists. It should be noted that the extremes of the spectrum are rarely found in reality in their pure form as discussed here (Hahn et al., 2014).

4.2.1 | Evolutionist

First, the Evolutionist considers technology to be of secondary importance. At the same time, they reject the strategic approach because they find it too radical. The reason is given by a more evolutionary Development Senior Manager:

"The evolutionary path is actually the path that ultimately satisfies most customers."

Runtime Three is seen as one, but not the only, technology that will satisfy customers in the future. This view explicitly takes into account the needs of customers, who are concerned that they may discontinue their relationship with SoftCorp due to constant changes in the technology base. Another Chief Architect is concerned about Runtime Three:

> "We have also received feedback from customers that the migration is not as easy and that they do not welcome it as they did in the past and with [Runtime One] and [Runtime Two]. That meant a lot of effort and cost."

As a result, the radical direction taken by top management tends to be perceived as a threat to the business, which from their perspective is doing well as it is. In addition, this type claims that critical infrastructure cannot simply be upgraded to new technologies. As a result, customers would prefer to have a choice of technologies or not care at all, as a Senior Development Manager notes:

"The user, frankly, does not care where it runs."

In their view, management ignores that SoftCorp depends on the existing customer base, and vice versa. For example, a Senior Development Manager expressed concern about safety-critical machines running cloud-native technologies:

WILEY $\downarrow 693$





"It's very critical. It's something you do not necessarily touch. And if, for example, you are now running a blast furnace and then someone comes along and says 'I have a super cool cloud solution here, you can start up and shut down the blast furnace at home.' Then you think twice about whether you really want to do that."

It is also important for them to remain open to the technology of cloud environments and to consider the diversity of customer needs. In summary, combined with framing Runtime Three as a minor technology, the top management approach is perceived as too radical. It is therefore rejected by the Evolutionist.

The Evolutionist also feels good about the department's development state because things are moving at the right pace. They find allocating resources and competencies in Runtime Three problematic. They get caught up in framing innovation in terms of the organization's past rather than its possible future.

The departmental framing concerns perceptions of the department's progress toward cloud-native computing. The cognitive framing of the department's development status has fewer extreme polarities among middle and frontline managers. The Evolutionists' cognitive framing of departmental development tends toward good perception. From their perspective, there is already a lot of knowledge and competence about Runtime Three in the department. A Vice President and Chief Product Owner provides a comprehensive summary of the assessment, specifically addressing how quickly Runtime Three is being implemented from his perspective:

> "I would rate it four, because I think that we are in a good shape, [...] I think that in less than six months or so we have [...] a working structure and a solution from a very chaotic definition to a workable solution that that's a very good way of working. So, the wheels worked really well."

4.2.2 | Revolutionist

In stark contrast to the evolutionist's perspective, the Revolutionist has a wholly different viewpoint on SoftCorp's technological direction. The Revolutionist sees Runtime Three as highly critical, representing SoftCorp's future and vital to the company's survival. They believe that customers will otherwise move to other, more modern platforms. They see the discontinuously changing environment as a threat running through the current business model, which is largely based on older cloud environments as well as on-premises solutions. In this framework, the fastest possible focus on new technology is seen as a way out of SoftCorp's dilemma of satisfying legacy customers and keeping up with new, fast-moving competitors. From their technology-focused view of the environment, they see a need for SoftCorp to become a cloud-native service company, untethered from past technology developments. A Chief Architect on embracing Runtime Three:

"This is, I think, definitely the right step to take in the long run."

However, even the Revolutionist tends to reject the actions of top management. They see the more revolutionary approach of top management as not radical enough because they are deeply involved in the technology and, hence, have a knowledge advantage over top management. Revolutionists see enormous potential that cannot be realized with the current approach. Thus, a Chief Development Architect rates development as poor, except for his small team in the department:

"The team is certainly a speedboat, while [SoftCorp] as a whole is an oil tanker."

In their view, the full potential of Runtime Three has not yet been realized. Too many resources are still going into maintaining old ⁶⁹⁴ WILEY-

systems or even developing the wrong ones, as a Vice President Cloud Native Strategy notes:

"Good money is thrown after bad."

In summary, with the environmental framing of Runtime Three as crucial, the rejecting framing sees the current top management commitment to the new technology as not going far enough. Like the Evolutionist, the Revolutionist rejects top management's strategy.

There are two reasons for the Revolutionists' perception of the department as leaning poor. First, resource constraints, as the Head of the Runtime Two team notes:

"We are already making very slow progress because we cannot invest much in the new."

The second reason is some teams' technological background in the two-year-old department, as one Senior Software Developer notes:

> "Our team is somewhat composed [...] of two former teams. One half has only dealt with [Runtime Three] since the beginning of existence and the other half has only dealt with [Runtime Two]. And they were then merged and mixed together."

They argue that too many people do not know enough to meet the demands of a department that wants to bring everything to the Runtime Three technology base.

4.2.3 | Mediator

Finally, the Mediator brings the two sides together. They do not have a clear environmental and departmental framing. In contrast to the Revolutionist and the Evolutionist, their corporate framing is usually supportive of top management's approach and strategy. According to one mediating Development Senior Manager, whales may actually be able to fly:

> "You just have to bring lots of little microservices aka balloons to the whale, and it will fly. Of course that's not nice, because actually it would be nicer if you could turn the whale into dolphins. But that's not possible."

Mediators support SoftCorp's strategy because they see no reason to complain about the top management's direction. The strategy can be described as radical, breaking with old habits and focusing on cloud-native technologies. Technologies such as Runtime One and Two will be phased out in the medium term. At the same time, existing contracts and customers will be encouraged to migrate to cloud-native infrastructures as part of a packaged service offering. According to one Senior Product Expert, internal and external feedback seems to be positive:

> "You also get internal [and external] feedback that the strategy ultimately makes sense the way we have it now and that this is welcomed. [...] You make the services independent. You offer a set of services on a multi-cloud foundation and then in the future you can also better bring innovation into the platform."

Thus, the reasons for the Mediator's cognitive framing at the company level are, on the one hand, a transparent, comprehensible procedure and, on the other hand, positive internal (e.g., from colleagues) and external (e.g., from customers) feedback on the strategy.

5 | DISCUSSION

5.1 | The role of middle and frontline managers in organizational ambidexterity

When an organization adapts to discontinuous change by organizing ambidextrously, managers face a tension between exploiting the existing business and exploring discontinuous opportunities (Raisch & Birkinshaw, 2008). Often neglected in ambidexterity research, exploration and exploitation activities are performed by middle and frontline managers, while top managers play a more orchestrating role (Birkinshaw et al., 2016; Birkinshaw & Gibson, 2004; Smith & Tushman, 2005; Zimmermann et al., 2017). By orchestrating exploration and exploitation, top managers design organizational solutions. that is, adaptation modes (Birkinshaw et al., 2016) to tackle tensions. As we find in our study and in line with other studies on the role of frontline and middle managers (e.g., Zimmermann et al., 2017), tensions remain to be resolved at the middle and frontline management levels. We also find that these managers face a field of cognitive dissonance with the different demands of performing exploration and exploitation. Thus, middle and frontline managers have to deal with the tensions and resulting cognitive dissonance that result from the need for simultaneous exploration and exploitation. We propose that the task of top managers would therefore not only be to orchestrate exploration and exploitation and to define an adaptation mode, but also to reduce the field of cognitive dissonance to manage tensions. However, they must prevent the tensions from becoming so great in the first place.

Firms that overemphasize one extreme over the other can become trapped in cycles of failure or success (Levinthal & March, 1993). The cycles can negatively reinforce each other until one or the other extreme becomes dysfunctional (Quinn & Cameron, 1988). As middle and frontline managers play an important role in the execution of exploration and exploitation activities, they also contribute to the success or failure of their organization's ambidextrous approach.

5.2 | Cognitive framing of exploration-exploitation tensions

We contribute to the framing literature (Gilbert, 2006; Hahn et al., 2014; Kumaraswamy et al., 2018; Raffaelli et al., 2019; Spieth et al., 2021) by viewing middle and frontline managers and their handling of exploration-exploitation tensions through a cognitive framing lens. The framing lens allows us to identify what managers must deal with individually when faced with simultaneous exploitation and exploration. We found that the tension between exploitation and exploration led middle and frontline managers to cognitively frame their environment, company, and department differently. According to Festinger (1962), and consistent with our findings, the different cognitive framings result from the cognitive dissonance, which leads managers to blindly believe what they want to believe. Thus, our finding that frontline and middle managers have rather extreme positions in the tension fields supports Festinger's (1962) assumption. The tensions and the resulting cognitive dissonance can lead to extreme positions and allow us to create the typology. However, the extreme positions represent end points of a tension field. As Hahn et al. (2014) show, cognitive framings may lie outside the polar extremes shown here. The resulting typology encompassing Revolutionists, Evolutionists, and Mediators attempts to cluster how most middle and frontline managers cognitively frame within the ambidextrous situation. This typology not only adds granularity to the concept of cognitive framing (Kaplan, 2008; Raffaelli et al., 2019) but also illustrates the dynamic interplay between individual cognition and organizational strategy in navigating technological transitions (Spieth et al., 2021). Thus, our findings elucidate the environmental triggers of cognitive framing and reveal that managers' tensions are often related to their framing of technological change as either incremental or radical. This distinction influences their propensity to engage in either exploitative or explorative activities, a finding that aligns with and extends the work of Gibson and Birkinshaw (2004) and Raisch and Birkinshaw (2008). By showing that cognitive framing can influence managerial motivation, our study offers a nuanced perspective on how individual cognition affects organizational ambidexterity performance. Additionally, it contributes to understanding the spectrum of managerial attitudes toward innovation, complementing the findings of studies on strategic innovation and ambidexterity (Birkinshaw et al., 2016; O'Reilly & Tushman, 2013). Last, our findings also contribute to the discussion of the impact of cognitive diversity on strategic innovation processes and the resulting tension management (Andriopoulos & Lewis, 2010; Hahn et al., 2014).

We suggest that middle and frontline managers who cognitively frame the environment as a minor technological step will be more motivated to perform exploitative activities, while framing it as a major technological step will help motivate them to perform exploratory activities. We also suggest that the need to design an ambidextrous organization arises from the bottom-up and is not just a top-down decision, which is consistent with the findings of Zimmermann et al.'s (2015, 2017) research on the bottom-up initiation of ambidexterity. **Proposition 1.** Middle and frontline managers who perceive incremental technological changes are more inclined to engage in exploitative activities, optimizing existing competencies and resources. Conversely, managers who view technological changes as radical or disruptive are more inclined to engage in exploratory activities, seeking novel solutions and innovations.

Proposition 2. Middle and frontline managers' cognitive framing of exploration and exploitation activities is crucial in preventing the escalation of tensions that can lead to organizational dysfunction.

Proposition 3. The success or failure of an organization's ambidextrous approach is significantly influenced by the cognitive framing of middle and frontline managers, as they are key to the execution of exploration and exploitation activities.

5.3 | Typology of managers: evolutionists, revolutionists, and mediators

Interestingly, middle and frontline managers cognitively frame in polar extremes. Data show a variation in cognitive framing among managers, with a minority displaying more differentiated framing approaches. Nevertheless, we could identify three different framing types: The more extreme Revolutionists and Evolutionists and the Mediators between the polar extremes. With this finding, we combine individual reactions that were previously considered in isolation: The Evolutionist is characterized by a lack of belief in the commercial viability of newer technologies (Tripsas & Gavetti, 2000), a desire to hold on to existing power (Kaplan, 2008), or more attention to the old technology (Eggers & Kaplan, 2009). The Revolutionist, on the other hand, is characterized by a high attention to new technologies (Eggers & Kaplan, 2009), and a visionary attitude (Rosenbloom, 2000). The Mediator clearly corresponds to the ambidextrous manager, a multitasker capable of bringing together two extreme poles, managing emerging contradictions, and refining and renewing their knowledge, skills, and know-how (Eisenhardt et al., 2010; Mom et al., 2009).

Our typology contributes to the literature on how managers perceive threats from discontinuous technologies (Gilbert, 2005; König et al., 2021). A low novel technology threat perception and the resulting resource rigidity (Gilbert, 2005) clearly reflect the minor-technological-step-framing of the Evolutionist that is not content with allocating resources to the newest technology. Likewise, Revolutionists, who are suggestively high in threat perception (Gilbert, 2005), would prefer to allocate the most resources to the latest technology because they see it as a crucial yet threatening technological step. Thus, this research contributes to the understanding of what individual cognitive framing might underlie a particular threat perception.

By showing the cognitive complexity and high polarization of middle and frontline managers facing discontinuous change, we also contribute to the question of why ambidexterity is so difficult for higher-level management to deal with. Higher-level management must deal with these circumstances of lower hierarchical levels if they want the transformation to succeed. This also shows how critical the individual management of ambidexterity is for being successful on the organizational level. Without ambidexterity management, a successful implementation of organizational ambidexterity might be impossible.

The role of the Mediator deserves a special mention at this point, as they seem to find themselves in the position of the ambidextrous manager. Mediators are critical to successful implementation, even though they come from lower levels. Mediators share the characteristics of ambidextrous managers who need to understand both the new and existing business (O'Reilly & Tushman, 2004). As this work suggests, those managers also exist at lower levels. Executive leaders should pay special attention to this "rare, but essential breed" (O'Reilly & Tushman, 2004, p. 9), especially when the organization is in the critical phase of cognitive dissonance. Thus, Mediators are the ones who, at least in this context, support the top management approach.

Proposition 4. The cognitive framing of middle and frontline managers as Evolutionists, Revolutionists, or Mediators determines their motivational orientation towards either exploratory or exploitative activities.

Proposition 5. The cognitive framing of middle and frontline managers as Evolutionists, Revolutionists, or Mediators impacts the strategic direction of ambidexterity within and success of the organization confronted with discontinuous change.

Proposition 6. The role of the Mediator is pivotal in mitigating the phase of critical cognitive dissonance and, hence, in resolving exploration–exploitation tensions.

5.4 | Individual-level ambidexterity

In organizational level ambidexterity research, scholars debate whether the exploration-exploitation poles should be maximally exploited (Lubatkin et al., 2006), treated equally (Agostini et al., 2016; Lavie & Rosenkopf, 2006), or whether an asymmetric optimum (Lee et al., 2017) should be found between the poles. Our findings at the individual level contribute to this discussion. For example, the power and balance of Revolutionists and Evolutionists as well as the presence of Mediators have important implications for success. The polar framing of Revolutionists and Evolutionists may affect how exploration and exploitation are balanced at the organizational level. The presence of different cognitive frames may create a context that facilitates ambidextrous outcomes (Lin & McDonough, 2014). Hence, our work supports previous research that links successful ambidexterity management with the ability to balance and shift attention between exploration and exploitation activities (Krishnakumar et al., 2022). This suggests that executives may even use the polar framings as the necessary requirement to manage ambidexterity.

Proposition 7. The extreme cognitive frames of middle and frontline managers can be leveraged by executive leaders to manage the tensions of ambidexterity successfully.

6 | CONCLUSION

This study delved into the cognitive framing of middle and frontline managers within the ambit of organizational ambidexterity, examining their response to the dichotomy of exploration and exploitation activities. Through our analysis, we identified distinct cognitive framing types – Revolutionists, Evolutionists, and Mediators – that characterize managers' approaches to discontinuous changes and strategic challenges. We found that these cognitive frames significantly influence managers' motivations and are indicative of their actions towards either incremental improvements or radical innovations. Our research contributes to the framing literature by linking cognitive perspectives of individual managers to their operational choices, shedding light on the complex interplay between cognition and strategic behavior in organizations confronted with discontinuous change.

6.1 | Managerial implications

Our findings offer four key implications for managers. First, our conceptual consideration highlights the main occurrence of tensions in the critical phase of cognitive dissonance. This involves resource allocation to new but also existing technologies. This framework enhances managerial awareness of critical situations, outlining when and how to strategically respond, such as deploying Mediators in pivotal roles. Also, more resources for a new technology and simultaneously less for the existing technology can flatten the curves, so that the critical phase becomes shorter and more attenuated (see Figure 1).

Second, ambidextrous tensions at middle and frontline management are situated at the question of resource allocation for exploring the novel and exploiting the existing technology. Also, tensions start arising around the subject of how threatening the new technology (i.e., the environment) is cognitively framed. This has consequences on how corporate strategy is supported. In other words, there is a split in the perception of the novel technology with consequences for the acceptance of top management decisions at the frontline or middle management levels. This supposedly has implications for how well an ambidextrous organization can work. Third, one major difficulty of managing ambidexterity seems to stem from the extreme cognitive framings. We can show that the individual ambidexterity handling at middle and frontline management levels is quite unstable and extreme into one or another direction; that means that a main objective of managing ambidexterity should be cutting the possibility of framing in such extremes at lower levels and support a more balanced view.

Lastly, we find typologies that enable managers to identify members for composing an ambidextrous department in times of discontinuous change. In doing so, they should pay special attention to Mediators. According to our findings, they are the ones who, at least in this context, support the top management approach.

Overall, our findings help to understand the complexity and resulting tensions between and within middle and frontline managers. In this way, we enable leaders to better respond to these tensions and, where appropriate, to embrace the diversity of different expressions of tension. We thus help to successfully navigate through the tensions of discontinuous change.

7 | LIMITATIONS AND FUTURE RESEARCH

There are some limitations that also open up avenues for further research. First, a single-case study design limits the scope of the study, as generalizations are difficult to make. Second, our case involves a multinational software company. It may be interesting to investigate the research question in other environments.

Third, because of the exploratory nature of our study, the data collection initially covered a large field of literature on dynamic capabilities, ambidexterity, cognition, and framing. The empirical study of such a complex topic makes data collection difficult in terms of interview timing and coverage of all relevant elements. Although the interviewees had different expertise and experience, a deeper dive into different framings and framing typologies would be fruitful for future studies.

Fourth, we mainly found cognitive framing and thus the existence of the different types. Future studies could investigate further correlations, such as the threat perception of different types.

A fifth point that we cannot fully answer with this study is the resolution of extreme framings. Future research should address the question of how extreme framing is resolved and mediated. The relevance of investigating such questions is further enhanced by the fact that ambidexterity in middle management is still underrepresented in research. We believe that the Mediator in our typology could be a fruitful role for future research. Scholars could explore the role of the Mediator and its similarities to the ambidextrous manager. Another fruitful endeavor is the question of how leaders can leverage the existence of polar framing as a prerequisite for successfully navigating ambidexterity.

Lastly, future studies should be context sensitive. In our case, while this added complexity through multiple levels of analysis, it also provided insights that would not have been possible otherwise. It was the only way to see that ambidexterity in this case is different from what has been found in other studies. However, this also leads to the limitation that this may also be related to the context of our case. Future studies should examine this more closely.

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APPENDIX I: INTERVIEW OUTLINE A

- A.1 | Introduction
- 1. Acknowledgement
- 2. Open questions
- 3. Admission approval

A.2 | Guided interview questionnaire

1. Role and change over time

- 1.1 In which department do you work?
 - 1.1.1 Which hierarchy level best suits your position?
 - 1.1.2 Employee, Middle level, Senior level or Higher level?
- 1.2 What is your role in the department?
 - 1.2.1 How long have you been in this role?
 - 1.2.2 How has this role and its responsibilities changed over time?
- 2. Departmental and corporate perception
 - 2.1 Are there currently two or more existing/replacing and new technologies in your department?
 - 2.1.1 What are they?
 - 2.1.2 How does this manifest itself in the organizational structure?
 - 2.1.3 How does the interaction of the different technological paradigms work?
 - 2.2 What challenges do you face with the presence of different technologies?
 - 2.2.1 How do you balance new and old?
 - 2.2.2 What challenges arise regarding communication within the team or between individual players in the department?

- 2.2.3 How do you feel about the current handling?
- 2.3 How does the company as a whole deal with technological paradigms?
 - 2.3.1 How do you interpret this interaction?

2.3.2 How do you deal with it?

- 2.4 How would you rate the department in terms of developments around [new technology] from 1 (very poor) to 5 (very good)?
 - 2.4.1 Why?
 - 2.4.2 From your perspective, how have activities developed with respect to the [new technology] compared to the [existing technology]?
- 3. Environmental perception (exploration)
 - 3.1 How are technological innovations tracked down?
 - 3.1.1 How did you personally initially interpret these trends/ news?
 - 3.1.2 What is your contribution?
 - 3.2 When you think about the company's environment (technologies, network, customers, partners, service providers, competition etc.)
 - 3.2.1 ...what opportunities/risks do you personally see?
 - 3.2.2 ...how do others in the department perceive the environment compared to you?
- 4. Alignment of department, company and environment (exploitation)
 - 4.1 How would you rate the department's current use of technology?
 - 4.1.1 How do you personally feel about it?
 - 4.1.2 To what extent did you make the decision to do this?
 - 4.2 How safe did you feel using this technology when you think about the current environment?
 - 4.2.1 To what extent do you personally weigh organizational risk against uncertainty before using/recommending?
 - 4.3 To what extent were existing department experiences/routines/capabilities used for development and implementation?
 - 4.3.1 To what extent have these experiences/routines/skills been sufficient?
 - 4.3.2 Also, were there existing employee/company skills that could be reused in another form?
 - 4.3.3 To what extent are experiences/routines/skills from other departments accessible for new development?
 - 4.4 Which technological innovations or environmental changes do you deliberately not use in the department?
 - 4.4.1 How do you feel about it?
 - 4.4.2 Have you made this decision?
 - 4.4.3 If no, in what ways would you have chosen to do so?
 - 4.4.4 In this case, to what extent do they proceed in a comparable way (in terms of risk assessment and uncertainty) as they do with the innovations/changes that are then actually used?
- 5. Conclusion: Is there anything else that was not asked but comes to mind on this topic?