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Mental Models of Leaders in Ambidextrous Leadership

Hannah Vergossen

Leuphana University of Lueneburg, Institute for Performance Management,
Universitaetsallee 1, 21335 Lueneburg
Corresponding Authors Email: hannah.vergossen@leuphana.de

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Abstract

To remain competitive, businesses must continuously adapt by exploring new markets and ex-ploiting existing ones, which require different, often paradoxical, cognitive processes from leaders. Ambidextrous leadership has emerged as a framework for managing these competing demands. Effective ambidextrous leaders balance the opposing needs of exploration and exploitation through distinct cognitive patterns, exhibiting either opening or closing behaviors. Understanding the mental models of such leaders can offer insights into how they navigate these paradoxes. This study examines the mental models of ambidextrous leaders using ZMET, through interviews with 17 leaders from German SMEs. The consensus model reveals how leaders' cognition is influenced by their organizational context and by its goals and values. Within this framework, leaders adopt strategies to balance paradoxical demands, with the restriction of the scale of innovation and the individual consideration of employees as main strategies.

Keywords: Explorative Leadership, Exploitative Leadership, Mental Models, Cognition, Zaltman Metaphor Elicitation Technique

Ambidextrous Leadership and Mental Models

Companies that manage to remain competitive and profitable in the long term excel at two things: constant innovation and efficient management of day-to-day demands (Gibson & Birkinshaw, 2004; Kassotaki, 2022; Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996). These activities are referred to as exploration and exploitation (March, 1991), and their combination as ambidexterity (Duncan, 1976).

The challenge with ambidexterity lies in the differing behaviors and cognitive demands of exploration and exploitation (March, 1991; O'Reilly & Tushman, 2004; Rosing et al., 2011, 2018; Smith & Tushman, 2005). In larger companies, a common solution to this dilemma is to separate these activities into different departments or business-units (Raisch & Birkinshaw, 2008; Smith & Tushman, 2005). Especially in SMEs, this is not always possible (Cao et al., 2009;

Lubatkin et al., 2006). In these cases, ambidexterity has to be implemented on the team and individual level (Cao et al., 2009; Gasda & Fueglistaller, 2016; Zhang et al., 2019; Keuscher & Vergossen, 2024). Furthermore, Rosing & Zacher (2023) argue that the innovation process itself depends on successfully navigating the dynamics of exploration and exploitation.

Ambidextrous leadership has been proposed as a way to integrate exploration and exploitation at the level of individual leaders. The concept has gained significant attention over the past two decades (Gebert & Kearney, 2011; Gibson & Birkinshaw, 2004; Lin et al., 2013; Rosing et al., 2011; Rosing & Zacher, 2023; Zacher & Rosing, 2015). Ambidextrous leaders deal with ambiguities, tensions and demands that are complex and often paradoxical. They have to make smart and fast decisions and balance long-term strategic vision with a sharp eye for immediate decisions to secure present revenue streams (Bledow et al., 2009). Accordingly, ambidextrous leadership involves the ability to embrace risks, experiment with new ideas, and encourage exploration, while also monitoring and controlling goal attainment and establishing routines (Gebert & Kearney, 2011; Rosing et al., 2011; Rosing & Zacher, 2023; Zacher & Rosing, 2015).

To understand how successful ambidextrous leadership emerges, factors such as personality, identity and cognition are examined (Bono & Judge, 2004; Mumford et al., 2017; Zhang et al., 2015, 2019). In terms of cognition, the demands of ambidexterity require a cognitive balancing act that is a major challenge for leaders (O'Reilly & Tushman, 2004; Schad et al., 2016; Smith & Tushman, 2005; Zhang et al., 2019) and often results in favoring one side (Poole & Van de Ven, 1989; Smith & Lewis, 2011). How successfully leaders cognitively navigate the complex demands and tensions that are inherent in ambidextrous leadership will be the decisive factor for the quality and success of their leadership.

This argument implies that successful ambidextrous leadership depends on the quality and adequacy of leaders' mental models. Mental models are cognitive structures that represent how individuals perceive and understand the world (Albert et al., 2022). Specifically, a mental model is "a concentrated, personally constructed, internal conception, of external phenomena (historical, existing or projected), or experience, that affects how a person acts" (Rook, 2013, p. 42). Mental models thus serve as lenses through which people perceive and make sense of phenomena and which shape their decisions (Collins & Gentner, 1987; Johnson-Laird, 1983, 2010; Rouse & Morris, 1986). At the core of mental models are assumptions about the causal relationships between the concepts that are part of a mental model (Mumford et al., 2017, 2019). According to Goldvarg and Johnson-Laird (2001), this necessitates that mental models include two types of information: one, abstract concepts, along with concrete exemplars of these concepts derived from experience. And two, assumptions about the causal relationships between these concepts. That is, mental models involve assumptions about how a given course of action will cause a certain outcome (Goldvarg & Johnson-Laird, 2001).

Mental models are abstracted from past experiences and are used to make decisions in situations that are similar to these past experiences, as well as in novel situations that are sufficiently similar (Goldvarg & Johnson-Laird, 2001; Mumford et al., 2019; Sax & Clack, 2015). Once established, mental models can be difficult to change, which is regarded as one factor contributing to organizational inertia (Barr et al., 1992).

Since mental models are at the core of sensemaking, decision making, and acting of any kind, they are also crucial for effective leadership (Albert et al., 2022; Combe & Carrington, 2015; Mumford et al., 2017; Partlow et al., 2015). Mumford et al. (2017) list mental models as one of nine crucial leadership skills. Depending on which mental model they rely on and how rich that model is, leaders will differ with regards to which elements in a given situation they see as causal. For example, Mumford (2006) demonstrated that charismatic leaders view people as causal factors, whereas ideological leaders see situational factors as causal. Similarly, differences in leaders' mental models influence how leaders approach specific leadership problems such as follower participation, and how effective they will be in this regard (Bedell-Avers et al., 2008). Thus, a leaders' behavior and influence on followers will differ depending on the nature of the mental models they rely on. On an interindividual basis, mental models can differ in two regards: first, how many concepts they include, and how rich those concepts are, and two, the nature of the causal links between these concepts (Johnson-Laird, 2001). In general, mental models become more adequate and more complex as a function of experience (Hmelo-Silver & Pfeffer, 2004).

However, as Genrich et al. (2022) point out, it is currently not well-understood how exactly these differences in leaders' mental models cause actual leader behavior in specific contexts. This is also true for ambidextrous leader behavior. The following literature review provides an overview over the published literature that links mental models to (ambidextrous) leader behavior.

Literature Review

The role of mental models for leadership behavior has been examined in different contexts. Leader behavior during a crisis is a relevant context for the purposes of the present study because a crisis presents leaders with complex and ambiguous situations (Mumford, 2006). In that sense, leadership during crises is comparable to ambidextrous leadership. Combe and Carrington (2015) examine the congruence of mental models of top management teams before and after a crisis and find that shared mental models emerge after crises and are seen as critical to team performance. Specifically, whereas there was considerable cognitive diversity among top management regarding the question of what the company's priorities, objectives and strategies should be before a crisis, after the crisis there was a broad consensus regarding these factors as all leaders within the company addressed the same crisis and hence developed shared mental models.

Other studies examine the role of mental models in creative problem solving. Research in this area is relevant for ambidextrous leadership because creative problem-solving forms the basis for innovation (Mumford et al., 2012; 2023; Proctor, 2019). Using concept mapping, Mumford et al. (2012) examined the role of subjective and objective differences in mental models for creative problem solving in the areas of marketing and education. They found that mental models which where subjectively and objectively richer and more complex were associated with more creative solutions.

A number of other studies deal with shared mental models in teams (Carrington et al., 2019; Dionne et al., 2010; McIntyre & Foti, 2013). These studies are relevant for ambidextrous leadership in such contexts in which ambidexterity needs to be executed on a team and/or individual level. For example, Carrington et al. (2019) demonstrated that during crises, leader

mental models converge toward follower mental models with regards to the causal factors that are relevant for solving the crisis and adapting to new conditions, rather than the other way round.

To explore mental models, researchers often work with the causal mapping technique (Markóczy, 2001; Markóczy & Goldberg, 1995) which involves three steps, from "developing a pool of constructs" to "selecting those constructs that leaders consider relevant" to "assessing the causal relationship between pairwise constructs" (Markóczy, 2001, p. 1019). Decisions generally result in behavior or at least in behavioral intentions, thus emphasizing the relationship between mental models and observable behavior (Mumford et al., 2015).

The results summarized above show that mental models influence how leaders perceive and process and respond to leadership situations. While some studies (e.g. Mumford et al., 2012) identify specific aspects of mental models relevant to behavior, no published study has examined the contents of leaders' mental models in the context of ambidextrous leadership. This is a significant research gap, since ambidextrous leadership poses several challenges in practice. First, ambidextrous leaders are regularly faced with ambiguity (exploration vs. exploitation), which can be stressful (Hunter et al., 2017; Poole & Van de Ven, 1989). Second, ambidextrous leadership poses high demands on leaders' cognition. For example, an important cognitive skill that helps leaders in the context of ambidexterity seems to be the ability to think paradoxically (Good & Michel, 2013; Kauppila & Tempelaar, 2016). This means that leaders must be able to understand both sides of a paradoxical tension as contradictory but necessary for long-term success (Smith & Lewis, 2011; Zhang et al., 2015). Good and Michel (2013) suggest divergent thinking, focused attention, and cognitive flexibility as important cognitive factors to achieve this. However, these factors are only useful insofar as the mental models they are applied to are adequate for the problem or paradox at hand. Therefore, being able to characterize the structure of ambidextrous leaders' mental models would provide valuable insights into how exactly they process information and make decisions in ambiguous or paradoxical contexts. From a practical perspective, since the richness and complexity of mental models depends on experience (Hmelo-Silver & Pfeffer, 2004), insights into these structures could enhance leaders' training and development. The aim of the present study is to explore how leaders process the demands of ambidexterity. The research question underlying this work is:
How are the mental models of leaders structured in the context of ambidextrous leadership?

Materials and Methods

A Qualitative Research Study

To answer the research question, this study employs a qualitative research methodology. Qualitative studies offer a platform to explore cognitive dimensions of leadership (Bryman et al., 1988), and are therefore an appropriate approach for examining cognitive structures like mental models. This research's aim is to address this less-explored cognitive aspect of ambidextrous leadership, focusing on how leaders perceive and manage the ambidextrous tensions inherent in their roles. In Gephart's words, my study aims to provide "thick, detailed descriptions of actual actions in real-life contexts that recover and preserve the actual meanings that actors ascribe to these actions and settings" (Gephart, 2004, p: 455) in order to better understand leaders' thought processes when being confronted with exploitative and explorative demands. I conducted semi-structured, one-on-one interviews with 17 leaders.

Zaltman Metaphor Elicitation Technique

The Zaltman Metaphor Elicitation Technique (ZMET) was used to surface the mental models of the interviewed leaders. In ZMET, it is assumed that (1) most communication is nonverbal, (2) people tend to think in images, not words, (3) metaphors are units of thought, and (4) the constructs and connections between constructs that constitute a mental model are often represented as metaphors. Therefore, by understanding the metaphors leaders bring to bear on leadership problems, one can understand the underlying mental models that underlie their decision-making and behavior in those situations (Damasio, 1989; Zaltman, 1997; Zaltman & Coulter, 1995). Accordingly, in ZMET, the interviewee is asked to select multiple images before the actual interview that in their opinion represent or symbolize the theme or problem under investigation. These images then serve as an entry point into the interviewee's mental models (Kokko & Lagerkvist, 2017; van Kleef et al., 2005; Zaltman, 1997; Zaltman & Coulter, 1995). As these images are self-selected, the interviewee decides which themes will be covered during the interview, thus uncovering mental models of real importance and meaning to the participant (Zaltman, 1997; Zaltman & Coulter, 1995).

Procedure

Pre-interview preparation. The first information session took place approximately ten days before the interview. Interviewees were told of the study's purpose, the provisions for confidentiality and anonymity, as well as of their right to withdraw. I also obtained their oral consent. They were asked to think about situations or moments in which they had to deal with "leading exploration" and "leading exploitation," while finding images that described these situations. The term "ambidextrous leadership" was put into frame to ensure that everybody had the same basic understanding of it. This first information session lasted about 20 minutes and ended with the instruction: *In the next ten days, find five–eight images that represent to you the leadership between "leading innovation" and "leading day-to-day-business". These can, but do not have to be linked to specific situations. Images (printed or digital) can be taken from any source and brought to the interview appointment.*

Interviews. In the first step, Storytelling, participants were asked to describe the images they brought to the interview and why they brought them. Each interview began with the first step of the ZMET (Storytelling), by asking the following question, meant to trigger participants' stories regarding the pictures: *Why did you bring the following pictures? What do you associate with them and why are they important to you?* Several images were linked to a participants' personal story, which offered a frame to understand their subjective reality (Zaltman, 1997; Zaltman & Coulter, 1995). In the second step (Missed Issues and Images) participants were asked to describe images they were not able to find but felt should be included. Some interviewees remembered other stories that they had not previously considered. The third step (Sorting Task) consisted of the interviewees grouping all the images. They were asked to categorize and name groups of concepts they perceived as similar, with no restrictions on the number of categories. The fourth step (Construct Elicitation) consisted of the interviewer selecting three images from different groups, and separating them into two groups (one consisting of two images, the other of one). The interviewee was then asked how the two images were similar to each other on the one hand, and how they were different from the third image on the other hand. The complete ZMET procedure involves four more steps (Metaphor Elicitation, Sensory Images, Vignette, Digital Image; Zaltman, 1997). However, in the present study, they did not produce any new results

in most cases, since interviewees struggled with these exercises. The results from these steps were therefore not considered for further analysis. This is in line with other, previous studies in which these steps did not provide any additional information either. At best, they confirmed the information gathered in previous steps (Hansson & Kokko, 2018; Kokko & Lagerkvist, 2017). The interviews were conducted in person or via a video conferencing tool (Zoom), and lasted between 30 and 90 minutes. All interviews were recorded and transcribed verbatim.

Selection of Participants

In order to gather data that offers a diverse and comprehensive understanding of ambidextrous leadership in different organizational contexts, this research involved in-depth interviews with 17 full-time leaders from German medium-sized companies. The sample size of 17 was considered appropriate, as it aligns with the typical participant range in ZMET studies of 15-20 participants (Christensen & Olson, 2002). The sampling process unfolded through several distinct steps and included purposeful sampling, which relies on transparency (Yin, 2018). First, the company network from the home university's institute served as a foundational resource for participant recruitment. This network included around 30 companies from different branches. The sampling strategy was carefully designed to ensure a heterogenous representation of leaders from different branches (Eisenhardt & Graebner, 2007). Lin et al. (2013) suggest that ambidexterity is not constrained by specific industries, justifying including leaders from different industries. The network was categorized based on industry and company size. Second, I contacted two medium-sized companies of each industry. I included only medium-sized companies to ensure comparability. In all cases, I worked with the company's human resources department or with the managing director(s) directly as an entry point into the organization. I conducted initial interviews to check whether the companies would be interested in participating in the study. Five companies expressed interest. Interviewees worked in financial services (29%), management consulting and auditing (29%), consumer goods and retail (12%), insurance (12%), and manufacturing (*18%*). The financial service firms saw themselves confronted with the disruptive influence of newer FinTechs, forcing them to innovate in order to maintain their competitive edge. The consulting firms needed to rapidly respond to evolving business scenarios to effectively advise clients. In the consumer goods sector, the companies wanted to expand their international presence. The manufacturer's recent acquisition by a US-American company triggered substantial internal changes and adaptions to new external regulations. All companies faced increasing challenges in talent acquisition, driving the need for innovative approaches to attract and retain employees. Third, within these firms and with the help of an initial contact person, I contacted leaders within these companies. The specific inclusion criteria involved selecting leaders with at least two years of experience in their respective leadership positions. This ensured a certain level of leadership expertise. All leaders also reported having to deal with both exploitation and exploration in their role, thus ensuring their suitability for the study and the comparability of the interview results within the sample. Of these leaders, 29% were female and 71% were male. They were Managing Partners, Department Heads or Team Leaders, and the size of the team they directly managed ranged from six to ten people. Table 1 provides an overview of the interview partners.

Place Table 1 about here

Analytical Approach

The transcribed interviews were analyzed through two rounds of coding. The first round consisted of open coding with the goal of developing a grounded theory (Corbin & Strauss, 2015). This first round of coding was completed using ATLAS.ti. For the second round of coding, the construction of means-end-chains that connect organizational and leadership-related conditions with actions, consequences, and goals (Gutman, 1982) was attempted, but the attempt ultimately proved unfruitful because Gutman's approach requires a rather specific interview style which aims at asking many probing questions, and which could not be implemented during data collection. As an alternative, an adapted version of the causal mapping technique was used (Markóczy & Goldberg, 1995). The causal mapping technique consists of three basic steps: (1) developing a pool of constructs that are relevant for topic or issue under investigation, (2) selection of the most relevant constructs, and (3) assessing the causal relationships between those constructs. The aggregated data from steps two and three can be represented in the form of a consensus map that shows both the central constructs and the causal relations between them. In the present study, the first step was covered through the first round of coding. For the second step, the frequency of the constructs/codes across interviews was determined in order to filter out the most frequently mentioned constructs. The fact that they were mentioned so frequently indicates that they were regarded as the most important constructs by the interviewees. After analyzing the frequency of the data, it was decided that a construct must have been mentioned by at least six interviewees (i.e., about a third of all interviewees) for it to be integrated into the consensus map. For the third step, in was analyzed how many interviewees drew connections between two constructs in their statements. It was then determined how often this specific connection was made across all interviews. If a connection between two constructs was mentioned at least three times across interviews, it was integrated in the consensus map.

Furthermore, I considered the images that participants were asked to provide during the interviews, and their descriptions of the mental models they symbolized. To increase the validity of the data, another experienced researcher in the field of leadership was involved in the data analysis. This researcher independently analyzed a subset of randomly selected transcripts, which were then compared and discussed to establish coding agreement (Burnard, 1991). Additionally, I had the chance to revisit findings with about half of the 19 participants and validated the identified themes against their own experiences (Appleton, 1995). This reinforced the credibility and offered participants the opportunity to contribute their perspectives on the findings.

Results

The coding resulted in a total of 76 constructs/codes, of which 35 remained after the second step of causal mapping. Regarding these 35 constructs, interviewees made a total of 676 connections between them. After completing the third step of causal mapping, 52 connections reached the threshold of at least three mentions. Furthermore, three constructs that were mentioned at least six times did not receive any connections above the cut-off number and were therefore eliminated from the consensus map. The resulting consensus map is shown in figure 1.

The map can be interpreted as the shared mental model of the interviewees regarding ambidextrous leadership. The constructs were sorted into conditions that influence an

organization and its leadership, goals, values, and consequences (of conditions or goals). Figure 1 doesn't indicate the direction or effect of the connections, because this direction was not always clear from the interview data. In other cases, the interview data indicated that the connection is bidirectional.
Place Figure 1 about here

Contextual Conditions Influencing Leadership
Seven contextual conditions reached the cut-off value of six, meaning they were mentioned by at least six interviewees. The most frequently mentioned conditions were Calcified or Strictly Regulated Processes, which was mentioned in *n* = 11 interviews (65%), followed by Organizational Culture (*n* = 10, or 59%), and Competition (*n* = 8 or 47%). Accordingly, those were the contextual conditions that influenced leaders and their decision-making the most. Regarding connections to other concepts within the mental map, most Conditions were connected to only one other concept, with the exceptions of Calcified or Strictly Regulated Processes (connected to three other concepts), and Lack of Adequate/Innovative Mindset (connected to two other concepts).

Goals
Three goals reached the cut-off value of six. Among those, Effectiveness and Efficiency and Profitability were both mentioned by 11 interviewees (65%), whereas the third goal, Satisfy Customer Desires was mentioned by eight interviewees (47%). This indicates that the interviewees were mostly motivated by the company's continued economic survival and by an effective use of its resources and potentials in their decision-making. Regarding their connectivity, both Effectiveness and Efficiency and Profitability were connected to two other concepts in the consensus map, while Satisfy Customer Desires was connected to one other concept.

Values
Only one value reached the cut-off value of six. Achievement was mentioned by nine interviewees (53%). This is congruent with the findings regarding leaders'/organizational goals. Achievement was connected to three other concepts in the consensus map.

Consequences of Conditions and Goals
Twenty conditions met the cut-off value of six. Among these Opening Room for Innovation: Small Projects (ORI-SP) and Individual Consideration Required (ICR) were the most frequently mentioned consequence (*n* = 14, or 82%). The former construct in particular can be regarded as the most central in the thinking and decision-making of leaders with regards to ambidextrous leadership, as reflected by the sheer number of connections of this construct with other constructs, as well as by their relative thickness (see figure 1). Compared to ORI-SP, ICR does not show the same amount of connections, and the connections are thinner on average, indicating that ICR is not as central to the ambidextrous leadership of the leaders in this sample as ORI-SP.

Other frequently mentioned constructs were Need for Innovation (*n* = 12, or 71%), Creating Guardrails: Providing Rules and Clarity (*n* = 11, or 65%), and (Lack of) Psychological Safety (*n* = 10, or 59%). Among these, Need for Innovation in particular appears to be central for ambidextrous leadership, since it is connected both to Conditions and to Goals.

Leadership Dilemma: Learning vs. Performing (LD-LP) was also mentioned frequently (*n* = 12, or 71%) and shows a high degree of connectivity. This construct is different from all other constructs (except for Leadership Dilemma: Playing by the Rules vs. Creating a Competitive Edge) in that it encapsulates the dilemma of ambidextrous leadership. It should therefore be regarded as a central construct of the mental model, too. In particular, the constructs connected to LD-LP show how leaders solve this dilemma. As can be seen in figure 1, successfully navigating this dilemma requires a leader to be ambidextrous on the individual level, and to recognize which individual employees are well-suited for any particular (explorative or exploitative) task. Furthermore, leading innovation in small projects or on a small scale (for example, in an isolated division of the company) is a main tool to navigate the dilemma between the need for innovation (learning) versus the need for successfully managing the day-to-day business (performing).

This is also where the pictures which the interviewees brought to their interviews provided helpful additional data. Specifically, participants often linked ambidextrous leadership to a dynamic balancing act. For example, interviewee no. 14 selected a picture of a gymnast balancing on a beam, and explained his thinking as follows:

"I come up with a lot of rules, I build a lot of frameworks. I see myself as the organizer. I build the framework, I also create the tools so that people can work with them, and the people themselves are the professionals."
With this statement the leader thus expressed his conviction that successful ambidextrous leadership depends on a balance between creating guardrails (the beam) and relinquishing control to employees that are appropriate for the task in question (the gymnast). This is also reflected in figure 1 in the connections of LD-LP and Leader Ambidexterity Required.
Similarly, interviewee no. 19 brought a picture showing the two hemispheres of the brain, and explained:

"On the left, you have this – let's call it a robotic arm – [and on the right] this artistic stuff, and I have to reconcile them both in my everyday life and my everyday work."
Using yet another metaphor, interviewee no. 2 linked ambidextrous leadership to the process of juggling, and interviewee no. 7 invoked tightrope walking as a metaphor, explaining:
"On the one hand, letting things happen – giving up the reins and just seeing what happens, and on the other hand, setting rules and deadlines and things like that, and somehow imposing your will, so to speak […] sometimes you decide to favor one side a little more, sometimes one side jerks around a little more, and sometimes the other side asserts itself a little."

Yet another interesting metaphor came from interviewee no. 13, who likened ambidextrous leadership to the distinctive architecture of the train station in the German town of Uelzen:
"[The train station] has to fulfill a function, it has to be a train station. And it has to be suitable for that, has to meet all the requirements… safety requirements and so on. […] But this specific building still clearly deviates from the norm. You know, usually you have this functional box [as a train station]. But here, there is room to […] use the space differently and to deviate from the norm. Sure, the stairs are straight, but the corridor downstairs is a bit crooked, a bit wavy or something like that – it's a bit more playful or something like that. In

other words, that thing fulfills its purpose, but offers enough space to […] unfold yourself [as an architect] and present a different look."

This need for dynamic balance in order to successfully lead ambidextrously was evoked in one form or another in most of the interviews. In the common mental map, it is most closely associated with the LD-LP construct, and the rest of the constructs in the Consequences category of the consensus map and the connections between them essentially show specific ways in which leaders navigate this dilemma/need for dynamic balance.

Furthermore, the consensus map shows where this dilemma originates. Namely, there appears to be a tension between the Conditions on the one hand (such as Organizational Culture, Calcified or Strictly Regulated Processes, Requirement to Keep Operating Cost Down and so on), and the Goals and Values (Effectiveness and Efficiency, Profitability, Achievement, and so on) on the other hand. Whereas the Conditions are the main sources of the day-to-day and mostly exploitative demands (with the exception of Competition, which was a driver for innovation in the present study), the Goals and Values can be regarded as the main drivers of the more innovative/explorative demands. For example, strictly regulated procedures call for tight control by the leader. However, the goal of continued profitability calls for opening rooms for innovation.

Leaders have different ways of navigating these tensions, as the consensus map shows. One of the most common ways is to restrict innovation to a small scale (ORI-SP) or to incrementally (as opposed to disruptively) change existing processes (Opening Room for Innovation: Unfreezing Existing Processes; ORI-UP). That way, the inherent risks of innovation can be mitigated, while a large part of the potential benefits of innovation can be reaped at the same time. Another way is to assign different tasks to different individual employees (Individual Consideration), based on what the leader knows about their individual preferences for exploitation versus exploration. One interviewee (Interviewee no. 1) used an image of a DISC-personality profile as a metaphor for this way of dealing with the tensions of ambidextrous leadership.

A sort of meta-way to manage the tension between managing innovation and managing the day-to-day business is to cultivate an explorative/innovative mindset among employees. Employees as a whole are fundamentally less motivated and able to engage in explorative behavior than in exploitative behavior (Eisenhardt, 1989; Gasda & Fueglistaller, 2016; Jensen & Meckling, 1979). Therefore, it makes sense to cultivate a more explorative mindset among employees (by building mutual trust, recognizing and providing opportunities to learn and experiment, and so on), so that individual employees become increasingly capable of thinking innovatively and recognizing and using opportunities for innovation. That way, some of the burden of navigating the tension between innovation and day-to-day business can be delegated from leaders to employees. Agile teams and agile work in small, innovative projects are one major way in which this sort of innovative/explorative mindset can be cultivated in employees by leaders.

Taken together, the results show different ways how ambidextrous leaders find a dynamic balance between the opposing demands for leading innovation and leading day-to-day demands, and how these are reflected in their mental models. Since this consensus map is

abstracted from individual leaders and from specific leadership situations, it can be assumed that decisions about which way of balancing these opposing demands is the most adequate in any given situation will probably hinge on contextual factors that are not included in the consensus map.

Discussion

The purpose of this study was to gain a deeper understanding of how leaders manage the complex demands of ambidextrous leadership by examining the structure of their mental models. The results show that ambidextrous' leaders' thinking and decision-making is shaped by two opposing forces: the organizational and contextual conditions of the organization on the one hand, and the goals of the organization on the other hand. This results in tensions that leaders can navigate in multiple ways, from restricting innovation to smaller scales, to delegating some of the demands that come with these tensions to employees by cultivating an explorative/innovative mindset.

With regards to the leadership literature, the present results are congruent with the finding that ambidextrous leadership often involves paradoxical demands that require a cognitive balancing act, and a unification of opposing demands – both intra-individually (cognition) and inter-individually (leader behavior) (Poole & Van de Ven, 1989; Smith & Tushman, 2005; Zhang et al., 2015). Furthermore, they extend those findings by showing how these opposing demands are reflected in ambidextrous leaders' mental models. There is also a clear connection to the paradoxical leadership literature. Specifically, as Zhang et al. (2015) point out, leaders are faced with multiple paradoxes when it comes to people management. For example, leaders need to both treat all employees uniformly, but also consider their individuality, as well as their strengths and weaknesses. This paradox is similar to what some of the interviewees reported in relation to the individual consideration of employees and LD-LP.

With regards to the organizational behavior literature, the present findings corroborate the notion of paradoxical tensions on the organizational level of analysis. For example, the LD-LP posited by Smith and Lewis (2011) was clearly reflected in the present data. The current findings show how these paradoxical tensions on the organizational level are related to paradoxical tensions on the level of the team or division, through the perception of the individual leader, and how leaders attempt to maintain a balance between these tensions. This suggests that leaders' individual ambidexterity is a core component of successful ambidextrous leadership. From a cognitive perspective (which is the most appropriate perspective for the present study, since the focus is on mental models), individual ambidexterity consists of three variables that together enable an individual to successfully manage the opposing cognitive demands that are inherent to ambidextrous behavior: divergent thinking, focused attention, and cognitive flexibility (Good & Michel, 2013). As Good and Michel (2013) showed, using the Networked Fire Chief (NFC) task as a measure for task-adaptive performance (i.e., individual ambidexterity) divergent thinking as measured by the Alternative Uses Task as an operationalization for individual explorative behavior explains 3% of variance beyond general intelligence on the NFC task. Similarly, focused attention as measured by the Go/NoGo task as an operationalization for individual exploitative behavior explained 2% of unique variance beyond intelligence in the Go/NoGo task, which was used as a measure for individual exploitation, and cognitive flexibility as measured by the Stroop task

as an operationalization for switching cognitively between task demands in real time explained 6% of unique variance beyond intelligence. The concept of individual ambidexterity could therefore be the basis that explains how ambidextrous leaders use the various paths that are shown in the consensus map in figure 1 in different leadership situations.

Thus, on a theoretical level, the study contributes to the existing literature on leadership, cognition, and ambidexterity by shedding light on the cognitive processes underlying ambidextrous leadership. It shows the various strategies that leaders use to dynamically balance opening and closing leadership behavior, and achieve the cognitive balancing act mentioned in the introduction that is inherent to successful ambidextrous leadership (O'Reilly & Tushman, 2004; Schad et al., 2016; Smith & Tushman, 2005; Zhang et al., 2019).

Regarding the practical level, another interesting aspect of the present findings is that they highlight the fact that leaders seem to understand that they and their leadership behavior have a significant impact on their followers' creative and innovative thinking and performance (Mumford et al., 2023). This can be deduced from the multiple ways in which they try to cultivate a more innovative/explorative mindset among their followers (see figure 1). The leadership literature shows that servant, agile, transformational, and ambidextrous leadership fosters employees' intrinsic motivation (Caniëls et al., 2017) and sense of meaning in work (Cai et al., 2018), as well as their innovativeness and creativity (Cai et al., 2018; Mumford et al., 2023). The different ways in which leaders in the present study attempt to cultivate a more explorative/innovative mindset in their followers, such as cultivating mutual trust, recognizing and encouraging opportunities to learn, and providing opportunities to experiment and play without any specific goal in mind are consistent with these leadership paradigms and their opening approach. This highlights the idea that in small and medium-sized firms like the ones examined in the present study, many leaders recognize that to ensure the organization's continued success, it's not enough for ambidexterity to be expressed at the level of individual leaders – a level that has been examined quite frequently already (Gibson & Birkinshaw, 2004; Lubatkin et al., 2006; Mom et al., 2007). Instead, because these smaller companies do not have the same resources as larger companies, and therefore not the same risk-tolerance and capability for structural ambidexterity (Cao et al., 2009; Lubatkin et al., 2006), ambidexterity should ideally be expressed at the level of the individual employee (Gasda & Fueglistaller, 2016). Whether the leaders in this sample are aware of the literature supporting this conclusion or not, they are acting in accordance with its conclusions.

Limitations and Future Research

The generalizability of the findings is limited due to the qualitative methodology used. I applied it to understand participants' (subjective) mental models in relation to their leadership activities. Research has shown that mental models are oftentimes shared by people living in the same social context (Thagard, 2012). I interviewed leaders from different context in terms of different industries to capture diverse mental models, and then derive an overarching, shared mental model. Nevertheless, all participants in this study were from Germany, so generalizability is limited to this context.

An open question concerns ambidextrous leadership as it concerns the leading of innovation in particular. Team innovation requires repeated, dynamic switching between exploration and exploitation, or creation and implementation (Rosing et al., 2018; Zacher & Rosing, 2015).

That is, the successful leading of innovation in itself requires effective ambidextrous leadership. However, the mental models underlying this form of ambidextrous leadership may differ from the mental models examined here, where the focus was on balancing innovation with day-to-day business. Since the conditions and goals driving ambidextrous leadership in both of these contexts are different, it stands to reason that there should also be differences with regards to cognition in these contexts – and therefore, different mental models.

Furthermore, the present study hints that internal contextual factors seem to play an important role for a leader's behavior and decision-making in any given leadership situation. These contextual factors were not captured here, however. So a deeper understanding of their impact on ambidextrous leadership may be a promising future research endeavor.
Future research should also be valuable in regards to leaders' individual differences regarding mental models, and corresponding differences in (ambidextrous) leadership performance. It has been shown in the past that individual differences regarding the structure and richness of mental models are associated with individual differences in creative performance (Mumford, Hester, et al., 2012). Since divergent thinking/creativity is an important part of individual ambidexterity (Good & Michel, 2013), it makes sense to expect the same to be true for ambidextrous leadership performance.

Finally, a practical implication concerns the use of mental models for the training and development of ambidextrous leaders. Effective mental models can be taught, for example, through the analysis of case studies or simulations (Davison & Blackman, 2005; Intezari & Pauleen, 2013). In the case of ambidextrous leadership, leadership development programs that focus on mental models could not only directly improve leadership performance, but also help future leaders and less experienced leaders to better understand the paradoxical tensions that are inherent in ambidextrous leadership, as well as the cognitive competencies required to successfully manage those tensions.

Conclusion

In coping with the complex demands of ambidextrous leadership, leaders must perform a cognitive balancing act in which they have to reconcile an explorative and an exploitative leadership style. The present study aimed to investigate the mental models underlying this form of ambidextrous leadership. Through qualitative interviews with 17 leaders from German SMEs, a consensus model was developed that shows both the conditions, goals, and values that form the framework for ambidextrous leadership, as well as the core components and connections that leaders consider with regards to ambidextrous leadership. As this mental model shows, leaders have multiple ways of striking a dynamic balance between leading innovation and leading the day-to-day business. A central component that emerged is "Opening Room for Innovation: Small Projects". This can be regarded as a prime example of a balancing strategy in which the potential benefits of innovation are in balance with the mitigation of risks. Additionally, several other balancing strategies can be gleaned from the mental models, demonstrating how leaders can adapt their behavior depending on the requirements of their current situation. On a practical level, the results show that leaders seem to be aware of the significant influence of their behavior on the creative and innovative thinking and performance of their followers. This suggests that leaders in SMEs, where structural ambidexterity is less possible due to limited resources, aim to cultivate

ambidexterity at the employee level, which is in line with research highlighting its importance for business success.

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