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RESEARCH ARTICLE

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Top managers in the digital age: Exploring the role and practices of top managers in firms' digital transformation

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This study explores the role and facilitating actions of top managers in response to the digital transformation. Building on 27 in-depth interviews with top managers and close associates from large German firms, we find that top managers respond to the digital transformation by engaging in three key actions: understanding digitalization, setting the formal context for digitalization, and leading change. Moreover, findings emphasize that top management team support is essential in firms' digital transformation. Overall, this study contributes novel insights about the consequences of top managers for firms and establishes an initial foundation for investigating top managers in the digital age.

"In times of change, the greatest danger is to act with yesterday's logic."

Peter Drucker (1909–2005)

1 | INTRODUCTION

The digital revolution is currently transforming entire industries and the overall competitive landscape. Established business models are challenged by changing customer expectations and behaviors, as well as new and rapidly growing market entrants with disruptive digital business ideas (Verhoef et al., 2019). A representative example for these changing market dynamics includes, for instance, digital streaming services, which redefined customers' way of listening to music and watching movies (e.g., Spotify or Netflix). Another example is sharing ventures, which grant access to products and services without requiring formal ownership (e.g., Uber or Airbnb). Significant challenges are also observable inside of firms, as digital technologies change the way products are produced and the way employees work and collaborate (Schwarz Müller, Brosi, Duman, & Welpel, 2018). In order to keep up with the development and remain successful, firms need to adjust and

respond to these changing realities. The term 'digital transformation,' which Verhoef et al. (2019) define as 'a change in how a firm employs digital technologies, to develop a new digital business model that helps to create and appropriate more value for the firm' (p.1), reflects and emphasizes the implications at the firm-level.¹ For top managers, who are considered as firms' key decision-makers (Finkelstein & Hambrick, 1996; Hambrick & Mason, 1984), the digital transformation means an altered decision-making context and unprecedented challenges. In fact, given the novelty of the digital transformation, top managers cannot rely on proven approaches, requiring them to assess the firm's situation comprehensively in order to develop tailored responses.

Despite the decisive role of top managers for strategic decision-making in firms and the growing awareness regarding the digital transformation in practice, our empirical understanding of top managers' role therein is very limited. The role of top managers in corporate environments has mainly been discussed within upper echelons theory (Hambrick & Mason, 1984) or strategic leadership research (Finkelstein, Hambrick, & Cannella, 2009). Even though a large volume of studies has contributed toward a comprehensive understanding of top managers' role in and influence on firms, only very few studies in this research area addressed digital aspects. Nevertheless, extant studies provide initial indications pointing toward the leading position that top managers assume in firms' digital transformation processes. In fact, prior research found significant relationships between top managers and firms'

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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commitment to the status quo (Hambrick, Geletkanycz, & Fredrickson, 1993) and corporate strategic change (Wiersema & Bantel, 1992). Besides, scholars suggest that top managers play a crucial role in firms' innovation efforts (Damanpour, 1991; Smith & Tushman, 2005; Wrede & Dauth, 2020). We assume that all these aspects represent critical elements in the digital transformation, too. Given the growing prevalence of digitalization in the public debate as well as the growing pressure for firms to adjust to changing market conditions, it is essential to generate a theoretical understanding of the role and practices of the top management team (TMT) in the digital transformation. With this study, we aim to contribute relevant empirical insights by investigating the question 'How do top managers respond to and facilitate the firm's digital transformation?'

The study draws on 27 in-depth interviews with representatives from large stock-listed German firms that can provide informed answers about the behaviors and decision-making at the top of the corporate hierarchy. To answer the research question, we specifically focus on top managers' roles and concrete actions in response to the changes brought about by the digital transformation. Our interview partners are top managers themselves and individuals that are in a close position to top managers in their respective firms. By relying on a sample of large, stock-listed German firms, we investigate a particularly interesting research setting for our study. More specifically, the core characteristics of our sample firms (i.e., large and stock-listed) imply that all firms are incumbents—a type of firm for whom 'the digital transformation is particularly relevant' (Verhoef et al., 2019, p.4). Because incumbent firms build on established structures and processes, they often need to make decisions involving a trade-off between new and existing business practices (Christensen, Bartman, & van Bever, 2016; Markides, 2006). The decisions made by top managers thus play a significant role in defining a firm's digital transformation path.

The main contribution of this study is an emerging theoretical framework for the role and facilitating actions of top managers in firms' digital transformation. Our analysis reveals that top managers rely on three distinct sets of action: understanding digitalization, setting the formal context for digitalization, and leading change. Overall, our findings emphasize the significant role that top managers assume in firms' digital transformation processes, in that their commitment and support at the top is needed to enable change processes and targeted actions throughout the entire organization. By delineating the specific role and actions of top managers in the context of firms' digital transformation processes, this study provides novel insights about the consequences of top managers for firms. More generally, it establishes an initial foundation for the further investigation of top managers in the digital age.

2 | THEORETICAL BACKGROUND

2.1 | Digitalization—Transforming the way business is done

With the emergence of digital technologies (e.g., the Internet, smartphones, and cryptocurrencies) began, the revolution of

established business models and of the way in which business is done, ever since the nature and scope of competition, as well as the behavior of customers, has fundamentally changed (Verhoef et al., 2019). For instance, competition has become increasingly international, and relatively young digital firms challenge the long-time successful business models of incumbents. In 2004, the most valuable firms on the S&P 500 index were General Electric, Exxon Mobil, Microsoft, Citigroup, and Walmart (ETF Database, 2004)—only one of which represents a truly digital firm. Fifteen years later, the index components have changed significantly, with five digital and information-rich firms, that is, Apple, Microsoft, Alphabet, Amazon, and Facebook, taking the lead (Siblis Research, 2019). Digital influences are also perceivable in terms of consumer behavior. In particular, consumers increasingly shift their purchases to online channels, as reflected in the growing volume of global e-commerce sales. While the proportion of e-commerce to total global retail sales marked 14.1% in 2019, it is projected to grow to 22% in 2023 (Statista, 2019). Among others, changes in consumer behaviors and experiences are facilitated by the rising number of digital touchpoints, such as the increasing reliance on social media, apps, new AI-supported technologies, and smart devices like Apple's Siri, Google Home, or Amazon's Alexa (e.g., Hoffman & Novak, 2018; Lemon & Verhoef, 2016). Additionally, mobile phones are popularly used to compare offline and online offers (Gensler, Neslin, & Verhoef, 2017). In response to this significantly changing context, firms striving to maintain or enhance their competitive position need to make fundamental adjustments throughout the organization.

Despite the tremendous impact of the digital transformation on firms and its broad coverage in the media, 'the academic literature has so far paid surprisingly little attention to these [digital] developments' (Verhoef et al., 2019, p.1) though. Reasons for this lack of research include, for instance, that the digital transformation is a relatively recent phenomenon, and the rapid technological advancement impedes the timely and broad investigation of contemporary phenomena (Schwarz Müller et al., 2018). Additionally, in line with the multi-dimensional nature of the digital transformation, the extant literature is highly fragmented, which limits our ability to understand the consequences of this complex development comprehensively and to detect larger change patterns (Hausberg, Liere-Netheler, Packmohr, Pakura, & Vogelsang, 2019; Schwarz Müller et al., 2018; Verhoef et al., 2019).

On a broad level, prior literature suggests that the digital transformation progresses in phases. It begins with the simple conversion of information from an analog into a digital format (i.e., 'digitization') (Loebbecke & Picot, 2015), evolves into the use of digital technologies to change existing business processes (i.e., 'digitalization') (Li, Nucciarelli, Roden, & Graham, 2016), and finally mounts in the adoption of a new business logic for value creation (i.e., 'digital transformation') (Pagani & Pardo, 2017). Because the digital transformation affects firms in their entirety, changes and adjustments will be observable at different levels of the organization (Hausberg et al., 2019). Consistent with this notion, prior research on digitalization aspects was mostly carried out within specific business disciplines (Nambisan, Wright, & Feldman, 2019). In their systematic literature review and citation network analysis, Hausberg et al. (2019) suggest that the

extant literature on digital transformation is dominated by three specific research streams: finance, marketing, and innovation management. The specific research foci range from the implications of big data and analytics for trading and market prediction (finance), to social media effects, digital advertising, and customer relationship management (marketing), to business model innovation as well as the adoption and diffusion of innovations (innovation management). Research on digital transformation notably lacks in the fields of accounting, sustainability, and human resource management (Hausberg et al., 2019).

An aspect that has been widely neglected throughout the academic discourse is the role and actions of top managers in response to the digital transformation. Prior studies claim that top management support is vital for the digital transformation to unfold, as it is the executive team that shapes the necessary context and provides resources (Cortellazzo, Bruni, & Zampieri, 2019; de la Boutetière, Montagner, & Reich, 2018; Matt, Hess, & Benlian, 2015). Although various studies across different academic disciplines and specifically within the practitioners' literature underline the relevance of top managers in firms' digital transformation processes, a comprehensive understanding is still absent. Following the call of Verhoef et al. (2019) for a more in-depth investigation of board compositions as an influencer of digitalization and related firm performance, this study aims to contribute relevant insights. By analyzing top managers' involvement in the digital transformation, we not only address a significant gap in the academic literature but also offer valuable knowledge to practitioners, top managers, and organizations that are navigating through the seemingly uncertain spheres of the digital transformation.

2.2 | Top managers—The shapers of firm strategy

The influential role of top managers in firms has been a key concern in strategic management research. In particular, research building on the upper echelons theory (Hambrick & Mason, 1984) has produced a large body of knowledge on the antecedents and firm-specific consequences of top managers. Relevant studies specifically focused on top managers' characteristics (e.g., demographic characteristics, personality traits, or values) to proxy for underlying cognitive bases (Carpenter, Geletkanycz, & Sanders, 2004; Hambrick, 2007). The strategic leadership literature presents another important theoretical perspective on top managers in firms. Studies within this field concentrate in particular on the different functions carried out by leaders that are intended to have strategic implications for firms (Finkelstein et al., 2009; Samimi, Cortes, Anderson, & Herrmann, 2020). The foundational assumption underlying both research streams is that 'top executives matter' (Hambrick & Mason, 1984, p.194) for a wide range of firm-level outcomes. More specifically, scholars found that through their decision-making power and leadership they provide to the firm, top managers have a significant influence on firm strategies and performance (e.g., Certo, Dalton, Dalton, & Lester, 2006; Finkelstein et al., 2009; Finkelstein & Hambrick, 1996; Hambrick, 2007). The ability of, or more precisely, the extent to which top managers exert influence on firm-level

outcomes has formally been captured by the concept 'managerial discretion' (Wangrow, Schepker, & Barker, 2015). According to several researchers, top managers' discretion, and especially that of CEOs, has significantly increased in recent years (Quigley & Hambrick, 2015), emphasizing the need to explore the consequences of top managers' choices and behavior in more detail. In present times, top managers are particularly challenged to ensure the competitiveness of their firm by formulating and executing a business strategy that considers the opportunities and risks of the digital transformation (Hess, Matt, Benlian, & Wiesböck, 2016).

When taking a closer look at the academic literature, however, it becomes evident that studies investigating the antecedents and consequences of top managers' characteristics and behaviors have considered digitalization aspects only rarely. An overview of relevant studies is provided in Table 1. Existing empirical studies directly associating top managers with digitalization aspects investigated, for instance, dedicated digitalization-specific roles within the executive team (Horlacher & Hess, 2016; Medcof, 2008; Singh & Hess, 2017) or the nature of leadership (Cortellazzo et al., 2019; Schwarzmüller et al., 2018). In general, these studies jointly highlight the vast and multifaceted impact that the digital transformation has on firms as well as its top managers. Additionally, they demonstrate the need for further research into this far-reaching and increasingly relevant topic.

Despite the scarcity of research, related research foci provide initial indications for top managers' role in the digital transformation, such as studies associating top managers with innovation outcomes or change processes. For example, innovation scholars found that TMTs directly influence innovation in firms by determining the firm's innovation strategy (Elenkov, Judge, & Wright, 2005; Talke, Salomo, & Kock, 2011; Talke, Salomo, & Rost, 2010) and resource commitment (Wrede & Dauth, 2020). Additionally, they recognize new business opportunities (Shepherd, McMullen, & Ocasio, 2016; Yukl, 2010). Furthermore, top managers have been associated with firms' commitment to the status quo (Hambrick et al., 1993), corporate strategic change (Wiersema & Bantel, 1992), and risk-taking (Wright, Kroll, Krug, & Pettus, 2007). Moreover, prior research suggests that top managers play a critical role in business model innovation (Christensen et al., 2016) and in leading organizational change processes (Oreg, Bartunek, Lee, & Do, 2018; Venus, Stam, & van Knippenberg, 2019). Finally, López-Muñoz and Escribá-Esteve (2017) highlight the relevance of TMT support and commitment for firms' value creation from information technologies. Because the digital transformation is grounded in concepts like change and innovation, these studies underline the relevance of the study's topic and provide initial reference points for a deeper investigation of top managers in firms' digital transformation processes.

3 | DATA AND METHOD

3.1 | Research context

In order to explore the role of top managers in firms' digital transformation processes, we carried out an inductive research study

TABLE 1 Existing studies associating top managers with the digital transformation

DIRECT associations			
Study	Title	Main focus	Key insights on the association between top managers and digital transformation
Singh and Hess (2017)	How chief digital officers promote the digital transformation of their companies	Functional roles (CDO)	<ul style="list-style-type: none"> •Chief Digital Officers (CDOs) are increasingly included in top management teams (TMTs) of firms that go through a digital transformation •Main drivers for the employment of CDOs: (1) market pressures for firms to digitally transform and (2) high internal complexity in coordinating transformation efforts throughout the firm •Three role types that CDOs mainly play: entrepreneur, digital evangelist, and coordinator •Key skills and competencies: IT competency, change management skills, inspiration skills, digital pioneering skills, and resilience
Medcof (2008)	The organizational influence of the chief technology officer	Functional roles (CTO)	<ul style="list-style-type: none"> •Chief Technology Officers (CTOs) striving for influence in their firms should build their power bases on a deep understanding of the firm, its business and overall context, social network internal and external of the firm, and ownership position in the firm •The influence of the CTO is moderated by the CEO's leadership style
Horlacher and Hess (2016)	What does a chief digital officer do? Managerial tasks and roles of a new C-level position in the context of digital transformation	Functional roles (CDO)	<ul style="list-style-type: none"> •CDOs act as catalysts for change in their firms •Main responsibilities: Strategy (i.e., develop and execute digitalization strategies) and communication (i.e., act as spokesperson and leader to oppose cultural resistance) •In case of coexistence, CDOs and CIOs work closely together
Schwarz Müller et al. (2018)	How does the digital transformation affect organizations? Key themes of change in work design and leadership	Nature of leadership	<ul style="list-style-type: none"> •Competency requirements for leaders in the digital transformation: intercultural and language competencies; leading from a distance (i.e., globally dispersed and virtual teams); effectively managing uncertainty, complexity and change; and IT competencies and life-long learning •Leaders are expected to lead in a more participatory way (i.e., grant more autonomy to followers, trust employees, inspire, and motivate followers) •There is an increased importance of relationship-oriented leadership (i.e., promoting employee behavior through coaching and enabling behavior, consider employees individual needs and lead accordingly, broaden network, teambuilding)
Cortellazzo et al. (2019)	The role of leadership in a digitalized world: A review	Nature of leadership	<ul style="list-style-type: none"> •Leaders actively shape the development of a digital culture by building relationships with various and diverse stakeholders •Leaders need to facilitate collaborative efforts in complex environments while considering critical ethical aspects

TABLE 1 (Continued)

INDIRECT associations			
Study	Title	Main focus	Key insights on the association between top managers and digital transformation
López-Muñoz and	An upper echelons perspective on information technology business value		<ul style="list-style-type: none"> •The value of information technology (IT) outcomes increases when the firm's TMT is deeply involved in actions involving IT (i.e., TMT-IT imbrication) •TMT demographic traits, IT competence, and internal processes (e.g., participatory decision-making and strategic consensus) are suggested to influence the TMT-IT imbrication
Wrede and Dauth (2020)	A temporal perspective on the relationship between top management team internationalization and firms' innovativeness	TMTs and innovation	<ul style="list-style-type: none"> •Firms with internationally experienced TMTs are associated with a higher level of innovativeness •The relationship between international TMTs and firm innovativeness is influenced by the CEO's age
Elenkov et al. (2005)	Strategic leadership and executive innovation influence: An international multi-cluster comparative study	Leadership behaviors and innovation	<ul style="list-style-type: none"> •Strategic leadership behaviors (e.g., vision development, inspirational motivation, individual consideration, or management by exception) positively affect executive influence on product-market innovations as well as administrative innovations •This relationship is contingent on the level of TMT tenure diversity
Hambrick et al. (1993)	Top executive commitment to the status quo: Some tests of its determinants	Commitment to the status quo	<ul style="list-style-type: none"> •Top managers' tenure in an industry positively influences their commitment to the status quo (CSQ). This impact is even stronger than that predicted by tenure in the organization. •The better the performance of the firm, the less top managers intend to make changes to the firm's strategy and leadership profile
Garms and Engelen (2018)	Innovation and R&D in the upper echelons: The association between the CTO's power depth and breadth and the TMT's commitment to innovation	Functional roles (CTO)	<ul style="list-style-type: none"> •Firms add Chief Technology Officers (CTOs) in their TMTs to ensure the visibility of and appropriate funding of R&D- as well as innovation-related topics •Innovation commitment is higher if the CTO has greater structural power (i.e., autonomy, legitimate power) within the firm •Innovation commitment rises if the CTO is passionate about and fully focused on innovation and R&D-related topics; vast scientific expertise decreases innovation commitment
Christensen et al. (2016)	The hard truth about business model innovation	Business model innovation	<ul style="list-style-type: none"> •To prevent failure of business model innovation, top managers need to understand the common (and predictable) stages through which business models develop •Over time, business models become more resistant to change

that builds on the Gioia methodology (Gioia, Corley, & Hamilton, 2013). Theoretically, the study mainly draws on upper echelons research and insights from the strategic management and leadership literature. While digitalization topics have rarely been addressed in top management research overall, we are also not aware of any research study that has empirically explored the broader role and actions of top managers in the digital transformation yet. The few existing studies focus on leadership behaviors

(e.g., Schwarzmüller et al., 2018) as well as functional roles within the TMT (e.g., Singh & Hess, 2017). Consequently, the pursuit of obtaining an empirical understanding of the role of top managers in firms' digital transformation, as well as their related actions that aim to deal with this change process, remains at its outset. An exploratory research design thus represents a reasonable approach to collect first insights and to develop a basic theoretical framework.

3.2 | Sampling logic and data collection

Our empirical study relies on 27 in-depth interviews. In line with Carpenter et al. (2004), who state that top managers are often identified based on their title or position, 17 out of the 27 respondents were defined as top managers (i.e., individuals with job titles that include the designations 'Chief' (Cxx), 'head,' '(senior) vice president,' and 'director'). The remaining 10 respondents had very close proximity to top managers and were very familiar with the top managers' tasks and decisions (e.g., executive assistants or other immediate reports). The interviews were conducted during a period from September 2019 until December 2019, either in person or via phone calls. To identify the sample firms, we relied on purposive sampling (Patton, 2015), which ensured that our selection of firms includes those that may provide us with comprehensive insights about the digitalization-related actions and decisions of top managers in large German firms. In particular, we limited our sampling frame to stock-listed firms located in Germany with at least 500 employees and that have been existing for 10 years or longer. By drawing on firms fitting this profile, we specifically target a group of firms that we expect to have made conscious efforts to address digitalization topics. The revolutionizing nature of digitalization changes the way of doing business for firms and entire industries (Verhoef et al., 2019) and promises gains in efficiency, innovation, and competitiveness (Parida, Sjödin, & Reim, 2019). Consequently, it is reasonable to expect that top managers of incumbent firms think of suitable strategies that address the firms' changing conditions in order to meet the expectations of shareholders.

Our resultant sample comprises firms from a broad range of industries: aviation (AVIA), automotive (AUTO), chemicals (CHEM), conglomerate (CONG), consumer electronics (ELEC), energy (ENER), fast-moving consumer goods (FMCG), insurance (INSUR), logistics (LOGI), mechanical engineering (ENGI), media (MEDIA), pharmaceuticals (PHAR), retail (RETAIL), software (SOFT), and telecommunications (TELE). Next to covering firms from diverse industries, the size of the firms in terms of the number of individuals employed worldwide also varied significantly from 800 up to 650,000 employees. By gathering valuable information from such an extensive and diverse set of organizations, we can obtain a broad understanding of the digital transformation in large German firms. To obtain meaningful and comprehensive insights about the role of top managers in the digital transformation as well as their digitalization-related actions, we purposively interviewed either top managers directly or subordinates that have close ties with the top managers and can report about their responsibilities, decisions, and actions based on their personal observation and experiences.² By targeting these specific individuals, we ensure the knowledgeability of our informants and thereby enhance the richness and credibility of our findings (Eisenhardt & Graebner, 2007; Flick, 2018). In addition, by interviewing both direct (i.e., top managers themselves) and indirect (i.e., close subordinates) informants at a broad range of firms, we obtain responses that illuminate the focal phenomenon from diverse perspectives. In this way, we limit the possibility of biases that are associated with interview data, such as retrospective sensemaking (Eisenhardt & Graebner, 2007).

The interviews were conducted using a semi-structured interview guideline. The questions addressed to the interviewees particularly targeted the relevance of the digital transformation for the firm and themselves, the management team's role and behavior in the digital transformation, and specific actions emanating from top managers that aim to foster the digital transformation. The interviews lasted 40 min on average. To enable an in-depth analysis of the data, we recorded and transcribed the interviews. The identities of the sample firms and interviewees in the data were disguised to ensure confidentiality. The data collection was completed as soon as we were confident that the collected verbal accounts describe the focal phenomenon with sufficient depth and magnitude (Flick, 2018). Table 2 provides an overview of the firms and related respondents included in our study sample.

3.3 | Data analysis

To analyze our data, we relied on an iterative process. Following the principles of grounded theory to code our data, we consistently alternated between the collected verbal accounts and the emerging theoretical concepts (Corbin & Strauss, 2015; Glaser & Strauss, 1967). Throughout this process, the qualitative research software ATLAS.ti aided in systematically documenting, coding, and analyzing our interview data. This analysis included an in-depth assessment of individual cases as well as a cross-case comparison across the entirety of cases (Yin, 2009). Three distinct phases characterize this analytical process, reflecting the methodology of Gioia et al. (2013). An overview of all phases is provided in Figure 1.

3.3.1 | Phase I—Identifying first-order themes

In the first analytic phase, we followed an open coding procedure and attached first-order codes to the original pieces of evidence (Strauss & Corbin, 1998). The codes describe emerging empirical themes in the data. More specifically, we first identified salient themes regarding the role of top managers in firms' digital transformation in each interview transcript. Along this process, we began to compare the separate themes with those from the other transcripts, searching for possible commonalities and inconsistencies across all cases. As a result, we reevaluated the themes and recoded the separate pieces of evidence in order to eventually condense them into a representative and refined set of empirical themes.

3.3.2 | Phase II—Constructing second-order conceptual categories

In the second phase, we summarized the empirical themes in clusters of higher-order (Strauss & Corbin, 1998). The resultant structure represents the thematic framework that defines the indications for involvement and practices of top managers in firms' digital

TABLE 2 Summary of firms and respondents in the data collection

Firm	Industry	Founded in year	Number of employees	Interviewee position
AUTO-1	Automotive	Before 1950	10,000–50,000	VP Product Strategy
AUTO-2	Automotive	Before 1950	>100,000	Executive Assistant to the CIO
AUTO-3	Automotive	1976–2000	10,000–50,000	Head of Global Purchasing
AUTO-4	Automotive	Before 1950	10,000–50,000	Project Leader
AUTO-5	Automotive	1950–1975	1,000–10,000	CEO
AUTO-6	Automotive	Before 1950	>100,000	AI- & Service Management Strategist
AVIA-1	Aviation	1950–1975	>100,000	Senior Director
BANK-1	Banking	1976–2000	10,000–50,000	CDO
BANK-2	Banking	1976–2000	10,000–50,000	Director Brand & Marketing Communications
CHEM-1	Chemicals	Before 1950	>100,000	Director Digital Transformation
CHEM-2	Chemicals	After 2000	10,000–50,000	CDO
CONG-1	Conglomerate	Before 1950	>100,000	Global Head of People Analytics
ELEC-1	Consumer electronics	1976–2000	50,000–100,000	Head of the CEO Office
ENER-1	Energy	1976–2000	10,000–50,000	Director Corporate Transformation - Digital
ENGI-1	Mechanical engineering	Before 1950	1,000–10,000	Head of Innovation Management/Corporate Development
FMCG-1	Consumer goods	Before 1950	50,000–100,000	Director R&D Management & Digitalization
FMCG-2	Consumer goods	Before 1950	10,000–50,000	Project Manager Marketing & Technology
INSUR-1	Insurance	Before 1950	>100,000	Head of COO Office/Functional Lead Change
LOGI-1	Logistics	1976–2000	>100,000	SVP Transformation/Global Sourcing
LOGI-2	Logistics	1976–2000	>100,000	Head of Digitalization & Technology
MEDIA-1	Media	After 2000	1,000–10,000	Head of Innovation
PHAR-1	Pharmaceuticals	After 2000	>100,000	Head of Financial Reporting & Planning (incl. Digitalization)
PHAR-2	Pharmaceuticals	Before 1950	50,000–100,000	Project Lead—Portfolio & Innovation Management
RETAIL-1	Retail	Before 1950	1,000–10,000	Head of E-Commerce
SOFT-1	Software	After 2000	1,000–10,000	Unit Owner
TELE-1	Telecommunications	1976–2000	<1,000	Head of Corporate Communication
TELE-2	Telecommunications	1976–2000	50,000–100,000	Assistant to the Managing Director

transformation. Using the same approach, we further consolidated these themes into conceptual categories that may 'help us describe and explain the phenomena we are observing' (Gioia et al., 2013, p.20). For instance, after having carefully examined interviewees' statements about corporate culture, we clustered the themes 'promoting a firm culture of learning and openness for mistakes,' 'reassuring employees about their job perspectives,' and 'investing in digital training offerings tailored to employees' individual needs' into the conceptual category 'building trust and commitment.'

3.3.3 | Phase III—Condensing into the aggregate dimensions

In the third phase of the analysis, we further condensed the conceptual categories into aggregate dimensions. The dimensions build the core of the resultant empirically grounded theoretical framework, which specifies and reflects the three distinct involvement indicators of top managers in firms' digital transformations. Throughout this process, we

verified the fit of our theoretical framework by continuously going back to the original quotes and revising the emerging theoretical themes.

4 | FINDINGS

Our thematic analysis served as the basis for obtaining a better understanding of the role of top managers in firms' digital transformation. Figure 1 shows the resultant data structure, which reveals three key actions emanating from top managers as a response to the firm's digital transformation. We labeled these key actions 'understanding digitalization,' 'setting the formal context for digitalization,' and 'leading change.'

Our analysis of the collected evidence reveals that top managers' practices in response to the digital transformation are particularly discernible in the organization at three different levels: top manager-level, firm-level, and employee-level (see Figure 2). Respectively, the corresponding impact emanating from top managers is personal (i.e., individual understanding), formal (i.e., organizational structure

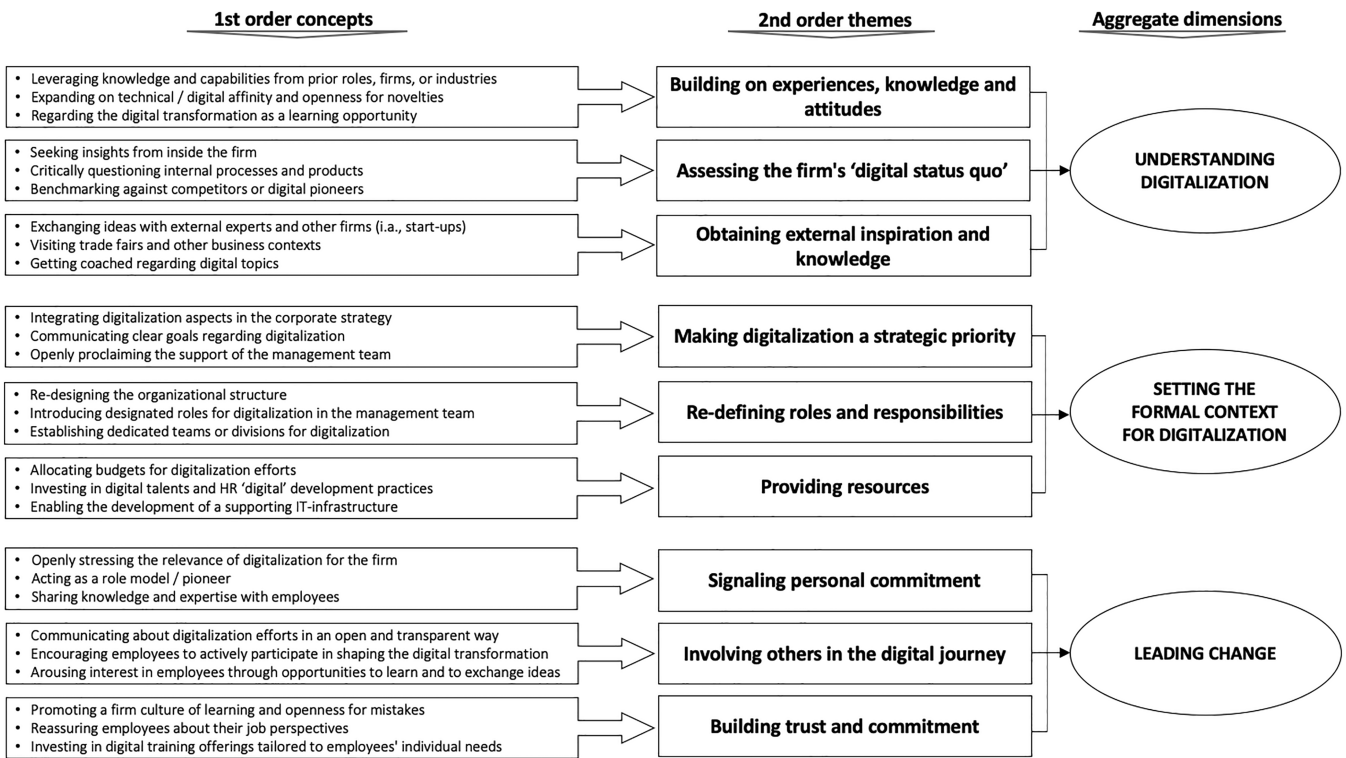


FIGURE 1 Actions of top managers as a response to the digital transformation

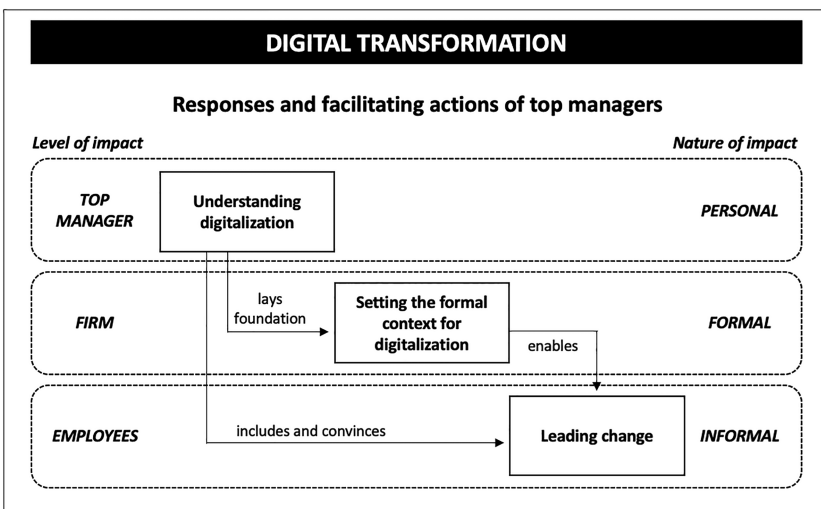


FIGURE 2 A model of top managers' practices to promote the digital transformation

and processes), and informal (i.e., communication and persuasion) in nature. Overall, the three levels reflect the sequence based on which decisions in response to the digital transformation are formed at the top management level and gradually take effect throughout the entire firm.

The distinct actions of top managers are explained in detail below. Representative interview quotes enrich this discussion and lend empirical support for our interpretations. Additionally, in Table 3, we show primary data excerpts, which reinforce our explanations of the

three key themes and provide empirical grounding for the conceptual categories in our theoretical framework.

Overall, our data underline that firms are aware of the opportunities and challenges of the digital transformation. Because digital transformation is a new phenomenon and entails significant levels of uncertainty, the strategic responses by the firms in our sample reflect a somewhat cautious approach. In fact, the digital transformation concept is hard to grasp, as mirrored in the general questions raised by the firms: 'What does the digital transformation mean for the firm?'

TABLE 3 Data supporting the interpretation of second-order themes

Aggregate dimension	Conceptual category	Exemplary quote	
Understanding digitalization	Building on experiences, knowledge, and attitudes	We built a digitalization department ... At first glance, it seems to work out really well, because the position of the boss was not filled by an internal person, but by a relatively illustrious person with lots of experience in the digitalization field. That is a renowned manager, who previously filled a similar position at IBM. (AUTO-1)	
		Relating to Person XY, it is very interesting because he has never been a technician, he is an economist ... He acquired his understanding about digital topics just out of enjoyment and curiosity. (TELE-1)	
		We got Person XY in the management team, who is responsible for digital topics. Since he comes from this field and has his background in there, he can describe and communicate things with a high level of authenticity. (AVIA-1)	
		Our CEO is very open by mentioning in every internal speech: "I need to learn every day. Especially the digital transformation is completely new to me. The newly arising technology has never been there before. This means that I need to spend some time to understand what we need to do."(CHEM-2)	
		Assessing the firm's 'digital status quo'	Digitalization has become a firm part of our firm strategy and we strive to be the leader in our industry with regard to digitalization. (LOGI-1)
			One needs to think customer-centric. And for me the customers are also the employees, so I need to see how to get close to them ... So we went into the production for 24 hours—early/late/night shift. We talked to the people and obtained a lot of input. (CHEM-2)
	Very inspiring are the American firms. Be it Amazon, Salesforce, etc. Those are firms that provide the possibility for orientation, to look what their corporate culture is like, what the set-up of the firm is, and what we can do ourselves, what our firm can learn from them. (AUTO-2)		
	He is very self-critical and asks a lot of critical questions. He is nobody, who says, "We have always done it this way," the classic. He is a person, who constantly questions things and also does not hesitate to frequently restructure. (AUTO-4)		
	We also sat together with researchers from Company XY (i.e., a large chemical firm and supplier) to find out how they go about the digital transformation. From that side, one can already see where we do particularly well and where we are relatively inferior... We also do internal benchmarking in terms of what do our colleagues at department X do? What does department Y do? We look at that very intensively. What is going on externally? What do we need to do? (FMCG-1)		
	Obtaining external inspiration and knowledge		If you have been in the digitalization field for quite some time ... then you have built up a network to others—executives of other firms or the CIOs of other firms—where regular exchange occurs. (AUTO-2)
		We are members of the association XY, in which firms exchange ideas. There are lectures, events, exchange platforms. The association XY pushes the topic of digitalization very strongly. (ENGI-1)	
		My boss frequently visits the Silicon Valley to obtain inspiration and knowledge. He takes a look at the newest technologies. In addition, he visits lectures at universities and listens to expert talk there. He talks with start-up people, with people who work for large tech companies. And this is not only what he does, but also all other top managers, including our CEO. (TELE-2)	
The car trade show is currently ongoing in Düsseldorf. I will go there after our conversation. There is also a partner of me, who will stand on our stage. He has founded the probably most progressive AI firm in the Silicon Valley. And we are doing product development with him now. (CHEM-1)			
Of course, there are web trainings, but our executives also receive real "classroom trainings" where they are familiarized with certain topics and			

(Continues)

TABLE 3 (Continued)

Aggregate dimension	Conceptual category	Exemplary quote
		<p>also obtain practical tools regarding how to deal with the fears and concerns that come along with the digital transformation. So really practical assistance. (LOGI-1)</p>
Setting the formal context for digitalization	Making digitalization a strategic priority	<p>We clearly integrated the topic digitalization in our strategy, which all executives jointly revise every five years ... There is a very clear commitment from the executive board. (AUTO-4)</p> <p>The digital strategy, which we just released, actually writes the red thread through our group strategy. (LOGI-2)</p> <p>As of this year, the topic digitalization truly arrived in the corporate strategy. And in this context, it was raised to the very highest level of the agenda. (FMCG-2)</p>
	Redefining roles and responsibilities	<p>Every quarter, we have at least one employee event for our division ... Last summer, it was the clear statement of my boss to set the goal that "All printers will be removed." (AUTO-2)</p> <p>We went down from 6, 7 hierarchies down to 2, 3, which is simply inevitable. If you want to act fast, you need less votes, short ways and flat hierarchies. (SOFT-1)</p> <p>There definitely is a lot of movement noticeable—away from the classical hierarchies, away from the classical departments and divisions, more toward agile, flexible teams. (TELE-1)</p> <p>The chairman of the management board initiated the recruitment of the Chief Digital Officer (CDO). (AUTO-3)</p> <p>The CDO is really the heart of the digital transformation. He is the push to the executive board, again and again, to keep the topic on the agenda. He administers and pushes the investments related to this topic. (FMCG-2)</p>
	Providing resources	<p>In our firm, the commitment is so large that the CEO announced already that we will invest approximately 2 billion dollars into the digital transformation. This is, of course, a large commitment. (LOGI-1)</p> <p>We have various internal funding mechanisms, so that we explicitly put a certain amount of money aside for digitalization efforts. That is a considerable amount, based on which distinct digitalization initiatives can be fostered more quickly than it would be the case for the regular formal process in our firm. (AVIA-1)</p> <p>We centrally educate digital trainees, who, with some kind of "street ability," are deployed all over the corporation. (LOGI-2)</p> <p>We expanded in many IT divisions internally, that is with regard to human resources. As part of this process, we also try, of course, through some kind of "employee transformation" to develop employees away from divisions, where old technologies gradually die off. (AUTO-1)</p> <p>We have developed a platform, on which you can find all information, digitally stored, with video material, podcasts, etc. (TELE-2)</p>
Leading change	Signaling personal commitment	<p>Especially our CDO absolutely passionately emphasizes the topic again and again and again, and he is absolutely enthusiastic about moving the topic forward. (FMCG-2)</p> <p>We as management team need to live the topic every day. Otherwise, the transition is too stark for the organization. The people would not believe in it, they would quickly lose courage to assume responsibility themselves. (SOFT-1)</p> <p>Our executive board member has an influencer account on LinkedIn and she is very mindful about bringing specific topics into the discussion. (LOGI-2)</p> <p>He regards himself and the IT department as the spearhead of the digital transformation. In fact, he said (regarding the removal of printers from offices) "we will exemplify this, we will do this now, we will do this as a pilot project." (AUTO-2)</p>

TABLE 3 (Continued)

Aggregate dimension	Conceptual category	Exemplary quote
	Involving others in the digital journey	<p>Change always means a dramatic necessity to communicate. Among many others, we do so-called “digital mornings,” for which we invite people from the digital world. (CHEM-2)</p> <p>We give away employee awards with specific award categories that shall honor digital ideas. (BANK-2)</p> <p>You need to create the context in order to excite people, especially young talents. You need to create the working environment, where all this (i.e., digitalization) is lived. (SOFT-1)</p> <p>In certain parts of the production, we have run trials to shift toward a paperless production. This means that the employee only uses a large monitor and a tablet. In this context, we collaborated very intensively with them. We conducted interviews with the colleagues in the production, asking “what would be useful for them.” I believe it is a good way to involve the employees early on... because the employee close to the process truly knows how the process actually functions... Involving people, creating this together with them, is essential in my opinion. Then one also wins their commitment, then people join in early on. (ENGI-1)</p> <p>Digital transformation can only work out, if the employees are taken along ... This means, of course in terms of employee communication ... for instance, that Mr. X already started setting up large formats many years ago. We call it “digital sessions” ... These are 90 minutes and interested colleagues from all over the world come together in Munich or join the session via a livestreamed web conference... Logically, our various executives also communicate about these topics on all kinds of channels—both internal and external ones. (INSUR-1)</p>
	Building trust and commitment	<p>You can sense that he is absolutely enthusiastic about the topic and that he trusts his people. Once he has the confidence in you, he will fully support you, no matter what you do. That is indeed pretty cool; you can learn a lot ... If someone has an awesome idea, then he/she will get funding for it and full support, no matter which level on the hierarchy that person is. Honestly, that is very, very inspiring. (FMCG-2)</p> <p>For colleagues, who prefer a different mode of learning, we also have a global partnership with LinkedIn. This means that every employee, intern, student assistant or executive can compile his or her individual digital learning paths. (INSUR-1)</p> <p>The sentence that struck me most recently was in a conversation with our CEO about the digital transformation. He said, “Well, we should not forget that throughout the organization we have some kind of cross section. And we need to find a solution for all employees.” (AUTO-1)</p> <p>The impact on our employees is that we say, “the job you do today will not be there anymore tomorrow.” This is what unsettles people initially, they are afraid of change. Everyone has that ... What we do is a “cultural change project,” which runs over several years and through which, in the first place, we make our employees understand where their strengths lie. (AUTO-5)</p>

and ‘How to respond to it?’. Insecurities related to the digital transformation's actual meaning, scope, and effects are also reflected in the lack of a unified definition or description. What many respondents consistently explained, though, is that digitalization occurs on two distinct levels: (1) product (i.e., customer-driven responses) and (2) internal processes (including administration and production). Another important insight is that the commitment and support from the TMT are indispensable to enforce and realize digitalization efforts

throughout the firm. In the following, the distinct practices of top managers in response to the digital transformation are explained.

4.1 | Understanding digitalization

Understanding digitalization reflects top managers' approach to obtain a deeper understanding of the opportunities and challenges that the

digital transformation entails as well as the role of firms therein. Because the digital transformation is a novel phenomenon, it is not possible to rely on an established set of common knowledge and a long history of tested approaches (Earley, 2014). Consequently, top managers first need to make sense of the phenomenon themselves in order to develop targeted actions and responses that prepare their firm for the challenges posed in this dynamic environment (Gioia & Chittipeddi, 1991; Weick, Sutcliffe, & Obstfeld, 2005). Our analysis shows that top managers inform and educate themselves regarding the digital transformation by building on the following practices: 'building on experiences, knowledge, and attitudes'; 'assessing the firm's "digital status quo"'; and 'obtaining external inspiration and knowledge.'

As regards the building on experiences, knowledge, and attitudes, top managers expand on various personal and external factors that help them to obtain a deeper understanding of the digital transformation and its impact on the firm. Our data show that top managers' existing knowledge base and experiences from prior roles, firms, or industries help them to make sense of the digital transformation and derive targeted conclusions. This finding aligns with upper echelons theory, which suggests that prior personal and professional experiences, as well as knowledge fundamentally shape top managers' perceptions and subsequent strategic choices (Hambrick, 2007; Hambrick & Mason, 1984). Our respondents regarded a professional background in the digitalization field or prior experiences with change processes as particularly helpful, as these backgrounds provide top managers with the necessary intellectual foundation and capabilities to accurately assess the situation, to decide on appropriate measures, and 'to communicate these (to the workforce) (...) with a high level of authenticity' (AVIA-1). While existing knowledge serves as a steady basis for top managers to build on, many respondents also emphasized the role of top managers' drive and attitude as a critical driver of firms' digitalization efforts. Top managers' affinity for the topic and curiosity push him/her to grow the existing knowledge base and to seek new insights about recent technologies and opportunities. A desire to learn about these new topics reinforces this ambition, as described by this interviewee:

One can sense my boss's pure lifeblood and absolute passion for the topic of digitalization. And also the topic of lifelong learning, to permanently deal with this topic and to permanently call for the topic to be moved forward, to push it, and to not lag behind. (AUTO-2)

In order to obtain a more fine-grained understanding of digitalization, top managers also look inside their firm and critically assess the firm's 'digital status-quo'. This internal reflection is an essential activity, as the shift toward digital often requires fundamental changes to an incumbent's established business model and thus a deviation from the status-quo (Teece, 2010; Verhoef et al., 2019). In our data, we observe that top managers actively seek insights not only from digitalization experts within their firm but also from individuals familiar with and deeply involved in the processes and business areas affected by the digital transformation. As part of this overall assessment, top

managers also rely on benchmarks internal (e.g., inter-departmental comparisons) and external to their firm. External points of reference include digital pioneers (e.g., digital start-ups and other leading, more established firms) and regular partner firms. Related research suggests that competitive benchmarking is essential to achieve superior performance (Shetty, 1993).

Finally, our evidence shows that top managers strive to 'obtain external inspiration and knowledge.' Related research has indicated that external advice seeking enhances exploratory innovation in firms, as it helps TMTs to expand organizational boundaries, to acquire new knowledge and to shape their recognition of opportunities in the external environment (Alexiev, Jansen, Van Den Bosch, & Volberda, 2010; Kaplan, 2003). According to various sample respondents, consultancies and specialized coaches formally train top managers regarding digitalization topics and provide them with insights about the current digital landscape. Sometimes, top managers also listen to lectures at leading universities or visit trade fairs. Furthermore, top managers learn about other firms' digitalization approaches through internal firm events with digitally progressive firms. Another significant source of inspiration is the personal exchange with various kinds of people, such as other firms' executives with similar roles, digitalization experts from large tech companies, or start-up members. Different geographic contexts—primarily innovation hubs like Silicon Valley, Tel Aviv, or Shenzhen—were also mentioned as particularly attractive places for this exchange to occur. The following quotation underlines this notion:

[Our top managers] regularly fly to (...) other countries or cities that extremely push the topic [of digitalization], that are very advanced and that have vast knowledge about it. (TELE-2)

4.2 | Setting the formal context for digitalization

Setting the formal context for digitalization relates to the formal organizational structures, processes, and resources put in place to enable the digital transformation to unfold. According to prior research, flexible organizational structures encompassing independent business units separated from the headquarters, agile organizational forms, and digital functional areas are particularly favored for firms' digital transformation (Sklyar, Kowalkowski, Tronvoll, & Sörhammar, 2019; Verhoef et al., 2019). Our data suggests that top managers set the formal context for digitalization by 'making digitalization a strategic priority,' 'redefining roles and responsibilities,' and 'providing resources.'

Throughout our interview process, respondents emphasized that digital transformation is essential to remain competitive. By making digitalization a strategic priority, which was the case for the vast majority of our interviewed firms, the TMT lays an essential foundation for the future and specifically for all subsequent digitalization efforts. A necessary action here is the integration of digitalization aspects in the firms' general strategies. Hess et al. (2016) highlight the value creation benefits of a separate digital transformation strategy,

which 'coordinates the many independent threads of digital transformation and helps [firms] navigate the complexity and ambiguity of identifying their own digital "sweet spots"' (p.125). According to our data, firm strategies increasingly include digitalization aspects—a phenomenon that is especially observable in firms where the TMT revised and approved the firm strategies only recently. Many interviewees also report that digitalization now even represents 'a major building block' (AUTO-4) in their firm's corporate strategy. By openly stressing the relevance and role of the digital transformation for the firm and by continually mentioning the topic across various communication channels, top managers testify its strategic importance, as explained by the Chief Digital Officer (CDO) of a large chemicals firm:

We have a very visionary CEO, who made the digitalization his subject, who often stands with me on stage, who, over the past two years, never missed mentioning the word "digitalization" in his internal presentations and speeches. (CHEM-2)

In addition to making digitalization a strategic priority, our analysis reveals that top managers redefine roles and responsibilities within their firm to pave the way for the digital transformation. This redefinition includes changes to the organizational structure and the introduction of digitalization functions at the individual and team levels. Prior research suggests that rapid technological progress requires fast responses from firms so that more agile work modes and low levels of hierarchy will be favorable (Eggers & Park, 2018; Verhoef et al., 2019). Many interviewees corroborate this notion by reporting that firms' digital transformation is often accompanied by dramatic changes to the mode of working together. Commonly mentioned terms in this regard were 'new work,' flexible, and agile. Formally, this transition is perceivable in the organizational structure, as reflected in a general shift toward flatter hierarchies (Schwarz Müller et al., 2018). Furthermore, dedicated roles and entire teams with a specialized digitalization focus are introduced throughout the firm. At the TMT level, many respondents reported that the role of a CDO was created 'to carry the topic into the firm' (FMCG-1). This finding aligns with Singh and Hess (2017), who highlight the rising establishment of CDO roles in upper echelons and the CDOs' principal responsibility to make digitalization a strategic priority in the firm. Although many firms regard the CDO as a central player in firms' digitalization efforts, other interviewees explained that the introduction of a CDO is only an initial step and impulse toward a broader coverage of the topic; in the long term, digitalization aspects should be integrated across the entire firm, making the CDO role eventually redundant. Next to dedicated individual functions at the top of the organization, significant adjustments are also perceivable at other organizational levels. For instance, dedicated teams or divisions are often created to foster firms' digitalization efforts. The nature of these entities in terms of size, responsibilities, and people involved differed significantly across our sample. Often top managers are also involved in those bodies:

We have a specific committee, a dedicated digital board, within which all kinds of decisions with a digital relation are discussed every six weeks and funds are released. Three out of six group management board members are part of this digital board. (AVIA-1)

In addition to these measures, our findings suggest that top managers set the firm's formal context for digitalization by providing resources that enable the realization of targeted actions. As one respondent claims, it is the role of the management team 'to prioritize [digitalization] topics and correspondingly, to free capacities and resources to drive the digital transformation forward' (LOGI-1). The provided means mentioned relate to financial, human, and IT resources. Many firms in our sample allocate particular budgets for digitalization initiatives and install various funding mechanisms, which ensures that the necessary funds are readily available when needed (AUTO-1). To match the increased demand of employees knowledgeable about IT and digitalization topics, our sample firms make significant efforts to recruit such individuals. Because the market for digitally skilled personnel is rather small, though, some firms have created entities that specialize in the recruitment and development of this digital workforce. Complementing these efforts, firms also invest in training programs for existing employees, which ensures that employees acquire the essential skills needed in the future. In terms of IT resources, firms invest in a digital infrastructure, which supports the firms' digitalization efforts from a technical standpoint. In particular, firms supply state-of-the-art devices and hardware to employees and invest in software that facilitates the communication and collaboration among the workforce (e.g., Microsoft Teams, Office 365), knowledge storage and exchange (e.g., online platforms that bundle information and other resources), and learning (e.g., online training).

4.3 | Leading change

Our data analysis further reveals that top managers actively participate in the digital transformation by leading change. Because the digital transformation implies significant changes to organizations, but human beings generally 'value a sense of coherence, consistency, or continuity over time' (Venus et al., 2019, p.667), employees may perceive it as a threat (Diamond, 1986; Kotter, 1995). Consequently, they tend to resist change processes, which adversely affects the success of intended organizational changes (Bovey & Hede, 2001). In this context, it is a key responsibility of top managers to promote acceptance among employees in order to ultimately win their commitment (Shamir, 1999; Venus et al., 2019; Yukl, 2010). Our respondents reported that top managers lead through the digital transition period and win the support of their employees by 'signaling personal commitment,' 'involving others,' and building trust and commitment.

In the case of signaling personal commitment, top managers show that digitalization is an essential topic for the firm and that they are convinced about the firm's chosen path. Leadership research suggests that leaders' communication of a change vision, which describes the

organization in a possible future state within which the organizational identity will endure, is an essential medium to mobilize followers toward change support (Venus et al., 2019; Yukl, 2010). Our data reveal that top managers signal their commitment to the firms' digital transformation by constantly addressing the topic, openly stressing its relevance, and highlighting lighthouse projects in various communication formats, such as 'speeches, employee mailings, (...) internal networking occasions, (...) etc.' (TELE-2). Top managers also testify their commitment to the digital transformation by persistently pushing the topic despite obstacles or other's skepticism (FMCG-2) and by acting as a role model or pioneer. A representative indication for this behavior is the sharing of knowledge and expertise with employees, as described in the following quotation:

As soon as he talks with somebody and they get to a certain topic, one can truly sense the fire in his eyes. (...) He immediately begins to show or explain people certain things or does a follow-up. (AUTO-2)

Furthermore, we observe that top managers make explicit attempts to *involve others* in the firm's digital transformation. Because digital transformation means massive changes for firms and their employees, many interviewees stressed the urgent need for open and transparent communication. According to prior research, regular credible communication in both words and deeds is essential in change processes, as it eases employees' perceptions of change, reduces resistance, and fosters their commitment (Christensen, 2014; Kotter, 1995; Schulz-Knappe, Koch, & Beckert, 2019). Besides, our analysis shows that top managers try to arouse interest in digitalization topics among the workforce and to encourage their active participation. For example, one respondent described that the TMT offers digitalization experts and departments the responsibility, budget, and freedom to unfold their know-how and develop solutions themselves. This 'is a very attractive context (for the digital transformation) and increases the probability of success for (ideas and solutions) to be implemented' (ENGI-1). Another popular practice is top managers' active encouragement for employees to express their digital ideas as well as special awards that honor this commitment. Our data also uncover that top managers try to create excitement and win the commitment of their coworkers by offering a range of events (e.g., start-up pitches and expert talks), networking (e.g., roundtables and social communities), or learning opportunities (e.g., digital learning platforms and workshops).

Given that change processes usually entail uncertainty and fears, our evidence emphasized that top managers strive to confront this challenge by building trust and commitment among the workforce. Scholars suggest that trust in leaders fosters employees' openness and readiness for corporate change processes (Rafferty & Simons, 2006; Stouten, Rousseau, & de Cremer, 2018). Additionally, trust enhances leaders' credibility when communicating the reasons for the proposed organizational changes, which in turn facilitates employees' acceptance and support thereof (Rousseau & Tijoriwala, 1999). In our interviews, we observed various actions of top managers that reflect efforts to build trust and commitment. For

instance, top managers promote a firm culture that fosters learning and in which 'nobody has to be afraid of making a mistake' (AUTO-4). Because the digital transformation will render many existing jobs obsolete in the future, top managers try to remove these fears by reassuring employees about their job perspectives. Not only are top managers aware of this changing reality but also try to address this challenge by openly communicating with the workforce (AUTO-5) and by 'searching for a solution for all employees' (AUTO-1). For example, respondents reported about investments in training offerings that cater to the employees' individual needs and preferences and that foster their digital competences (e.g., FMCG-1). In this way, employees acquire essential skills and knowledge that will be increasingly demanded along the firm's digital transformation process. Consequently, this training will ensure the employees' qualification for jobs that will eventually replace the current ones. The following quote sums up this overall notion:

The digital transformation requires a high level of authenticity. (...) The most decisive factor is not technology but change management. Taking people by the hand, taking away their fears, convincing them that digitalization will extremely change and transform our working world. But of course, new jobs will emerge. (LOGI-1)

5 | DISCUSSION

The digital revolution has a fundamental impact on the way in which business is done. To remain effective and competitive in the long term, firms have to respond to these changing dynamics and pave the way for digitalization efforts to unfold. Top managers assume a particularly important role therein, because they are the key decision-makers in firms and set the firms' strategic direction (Finkelstein & Hambrick, 1996). Despite the growing awareness of the topic in practice, digitalization topics have rarely been touched in the academic literature about top managers. To address this gap and to obtain an empirically grounded understanding about this important topic, our study explores the particular role assumed by top managers in firms' digital transformation processes. To this end, a thematic analysis of the collected evidence sheds light on the specific responsibilities, decisions, and actions top managers carry out to facilitate digitalization efforts in their firms. Our results reveal that top managers respond to the challenges posed by the digital revolution in three distinct ways: understanding digitalization, setting the formal context for digitalization, and leading change. The resultant framework theoretically substantiates the role of top managers in firms' digital transformation processes and delineates the specific practices through which top managers enable the digitalization efforts to evolve across the organization. After having identified and assessed the implications of the digital revolution for the respective firm, top managers take action and integrate the entire organization through formal and informal measures.

5.1 | Implications for theory

Our empirical analysis and resultant framework contribute toward a more fine-grained theoretical understanding about top managers and firms in the digital age in various ways. First, our study contributes to digitalization research by examining the role of top managers in large firms' digital transformation. Although the scholarly interest in digitalization topics has been growing across various business research streams, the role of top managers has been widely neglected yet. Whereas prior academic studies mostly focus on objects such as the antecedents and consequences of digital business models, digital technologies, or e-commerce (Verhoef et al., 2019), our study places the individual at the center of our analysis. By investigating the micro-level practices of top managers, this study not only responds to consistent calls for further research on digitalization aspects (e.g., Verhoef et al., 2019) but also offers detailed insights about the internal procedures in large German firms. Additionally, it extends prior research that acknowledges the significant role of top managers in firms' digital transformation processes (e.g., Cortellazzo et al., 2019; Matt et al., 2015) and re-emphasizes top managers' relevance and wide-reaching organizational impact therein. Our empirically grounded framework reflects this notion and provides a systematic overview of specific roles, decisions, and actions pursued by top managers to facilitate firms' digitalization efforts. This way, it serves as a solid theoretical basis for subsequent digitalization research.

Second, our study also provides essential insights to top management research. By investigating the question 'how do top managers deal with the digital transformation?', we are among the first studies that directly associates top managers with digitalization aspects. Consequently, our collected evidence offers valuable initial insights about top managers' digitalization-specific roles, decisions, and actions. In particular, the data underline that top managers play a key role in firms' digital transformation as they facilitate the necessary establishment of an organizational structure and culture that jointly embrace the challenges and opportunities underlying this significant period of change. The resultant framework derives relevant implications for research fields that strive for a deeper understanding of top managers in firms.

Specifically, our framework contributes valuable insights to research building on upper echelons theory (Hambrick & Mason, 1984), because digitalization aspects were touched upon within this field only rarely. By delineating the impact of top managers on various digitalization decisions and outcomes across the firm, the framework points out numerous possible avenues for further upper echelons research. Upper echelons scholars may take these insights as a basis and dive deeper into certain aspects by linking top managers' characteristics (e.g., demographic characteristics, personality traits, or experiences) with digitalization choices and/or subsequent digital performance measures. In general, our study supports the basic tenet of upper echelons theory as it reveals that top managers build on prior experiences, knowledge, and attitudes to make sense of the digitalization phenomenon. Especially top managers' digital affinity, openness for novelties and prior professional experience with digitalization

topics appear particularly favorable for moving firms' digital transformation forward. Next to contributing novel insights, this study also adds value from a methodological standpoint. In fact, qualitative methods to examine top managers in firms are—despite several encouragements (e.g., Nielsen, 2010; Priem, Lyon, & Dess, 1999)—rather rare in this research field. By choosing a qualitative research design, this study establishes an empirical basis for theorizing the digital transformation phenomenon within the upper echelons tradition. To obtain an even more fine-grained understanding of the aspects and links suggested in our framework, quantitative approaches may serve as a useful complement.

Our study also contributes valuable insights to leadership literature. Specifically, the third dimension of our framework leading change depicts leadership behaviors that act favorably in the digital transformation context, that is, signaling personal commitment, involving others in the digital journey, and building trust and commitment. Altogether, these aspects emphasize the human element in the digital transformation, which may be perceived as a threat by the workforce. Our findings underline the importance of leadership in this transition period. It is the responsibility of leaders to build an organizational culture in which change is embraced, and everyone feels included, supported, and enabled. By strengthening interpersonal relationships and knowledge exchange, creating excitement about digitalization topics among the workforce, and investing in employee development, top managers will be able to win the organization's necessary commitment to master the digital transformation. Formally, these attributes align with the participatory and relationship-oriented leadership styles, which Schwarzmüller et al. (2018) propose to be increasingly important in the digital age.

Third, our study results illustrate the multifaceted nature of top managers' role in firms' digital transformation processes. The impact of digital transformation is perceivable at different levels and in distinct ways. Top managers first (need to) develop a deep understanding about digitalization topics and the implications for the firm themselves, before making choices that affect the organization in both formal (i.e., organizational design) and informal (i.e., organizational culture and relationships) ways. The level of detail presented in our framework mirrors the phenomenon's multidimensionality, highlighting the complexity faced by firms and their top managers when dealing with the digital transformation. For instance, as comprehensively discussed within the strategic management and organization literature, top managers are constantly challenged with managing strategic contradictions, such as balancing exploratory and exploitative firm activities, to sustain their organization's performance (March, 1991; Smith & Tushman, 2005). The digital transformation presents another exemplary case in which this paradox applies, as the rapidly evolving digital environment requires firms to adapt and integrate digitalization aspects into their existing business. Our framework provides several initial insights about how top managers of large incumbents deal with these contradictions.

Finally, our framework accentuates the multiplicity of research opportunities within and across various scientific disciplines. Whereas several scholars noted that digital transformation research is highly

fragmented and mostly occurs within separate research fields (Schwarz Müller et al., 2018; Verhoef et al., 2019), the framework shows the diverse digital touchpoints top managers have across the firm. Hence, it underlines the need for further research that reaches beyond single disciplines and integrates insights from multiple thematic directions (e.g., innovation, leadership, or corporate governance).

5.2 | Implications for practice

Our study also provides valuable insights and recommendations for practice. First, the analysis of our data provides ample evidence that top managers play a decisive role in the digital transformation. Top managers identify the phenomenon's implications for the firm, define the firm's strategic direction, and provide the context within which digitalization efforts may unfold. Although the TMT is not the only party in the firm that advances the digital transformation and digitalization efforts should ultimately be integrated across the entire organization, our findings emphasize that the commitment at the top is essential for its realization and rapid rollout. Although the digital transformation involves uncertainty and requires firms to develop novel responses to this unprecedented change, our framework presents numerous micro-level practices employed by top managers of some of Germany's leading large firms. Hence, it may serve as a guidepost for top managers seeking insights on tried and tested digital transformation approaches for their firms.

Second, our data reveal that top managers need to set the context that enables the workforce to become actively involved in the movement and push digitalization forward. A first step in this direction is the prioritization of the firms' digital transformation and the integration of the topic in the firm's strategies. Dedicated digitalization functions within the TMT and across the entire firm (e.g., CDO or digitalization committees) may accompany this initiative. The provision of financial, human, and IT resources further fuels digitalization efforts. Besides, our study supports prior research that emphasizes the advantages of moving toward more agile organizational structures and flatter hierarchies, as these enable a fast information exchange and quick responsiveness to today's rapidly changing environment (e.g., Schwarz Müller et al., 2018).

Third, our evidence indicates that the most significant digitalization enabler is a firm-wide mindset shift. Because the digital transformation of firms is an enormous undertaking, it requires the input and commitment of the entire organization. Here, top managers assume a key responsibility in facilitating the organization's mindset shift through effective leadership. Because the digital transformation entails uncertainty and may evoke fears among the workforce, it is essential to 'take the employees by the hand,' understand and take their fears, and to strive for a solution that fits all. Our data suggest that a mindset shift is facilitated by involving employees early on and giving them the freedom and encouragement to participate in actively shaping the firm's digital transformation.

5.3 | Limitations and future research

Our inductive study is subject to several limitations. First, our analysis is based on the verbal accounts of top managers and close associates in large German firms. Due to our purposive sampling logic and the relatively small sample size, the generalization of our findings to other contexts is somewhat restricted. Other contexts, such as different cultural contexts (e.g., cultures scoring lower on uncertainty avoidance than Germany) and younger firms with less established structures (e.g., start-ups), may provide valuable complementary insights about top managers in the digital age. Second, the evidence about the practices of top managers is based on the interview responses of single individuals and thus may not be representative of all digitalization efforts in their firm. To enhance objectivity and obtain an even deeper understanding of the approaches and initiatives toward digitalization, it would be useful to extend the analysis by interviewing multiple individuals in the firm. In particular, interviews with individuals from different hierarchical levels, functional areas, or with dissimilar responsibilities might offer promising insights. Other sources of information, such as firms' annual reports or excerpts from top managers' internal communications, might enrich this analysis as well. Finally, given the scarcity of research associating top managers with firms' digital transformation, our research aims to generate an 'initial' understanding of underlying roles, responsibilities, and actions. Consequently, the scope of this study is very broad. Based on our theoretical framework, we encourage further research that employs a narrower scope and contributes more fine-grained insights about the framework's distinct elements.

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ENDNOTES

¹ We acknowledge that various terms exist that aim to capture the impact that digital resources have on firms. Specifically, differences exist concerning the terms 'digitization,' 'digitalization,' and 'digital transformation,' because each describe a different phase of digital transformation (Verhoef et al., 2019). In this study, we do not explicitly differentiate between the different terms' meanings but use them interchangeably for any influences of digital aspects on firms. In this way, we also match the German language and business context, in which the use of such a fine-grained definition has been largely neglected (Staudt, 2019).

² We limited our analysis to one interviewee per sample firm (i.e., either top manager or close associate) for two main reasons. First, by collecting data from a larger sample size of firms, information on top managers' roles in many heterogeneous settings can be obtained. Second, top managers are often not available for interviews. A requirement to interview 'both' top managers and associates thus would have restricted the set of firms eligible for interviews. The chosen approach ensures the broad scope that is essential to develop an initial understanding of top managers in the digital age.

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