Vol. 11, No. 2, 5-19
doi:10.17708/DRMJ.2022.v11n02a01

Dynamic Relationships Management Journal

DEVELOPING DIGITAL TRANSFORMATION CAPABILITY: THE ROLE OF MANAGERIAL AMBIDEXTROUS LEARNING

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Abstract

This paper integrates the individual ambidexterity, digital transformation, and dynamic capabilities literatures to develop a framework that helps to understand the role of managerial ambidextrous learning in building the digital transformation capability of an organization. Based on a comprehensive literature review, the paper identifies competing demands in terms of managerial learning orientation serving as microfoundations of different dynamic organizational capabilities underpinning digital transformation. We adopt an ambidextrous perspective of learning and propose that managers need to balance explorative and exploitative learning to aid building digital transformation capabilities. This paper contributes to ambidexterity and dynamic capabilities theoretical perspectives through its distinctive focus on the role of individual-level learning in the context of organizational-level digital transformation. The paper enhances understanding of how firms may support digital efforts by becoming sensitive to and supporting managerial ambidexterity as a critical factor in a successful digital transformation journey. We suggest that future research efforts should investigate empirically the role of managerial ambidextrous behavior in digital efforts.

Keywords: *individual ambidexterity, digital transformation, generalist learning, specialist learning, microfoundations of dynamic capabilities*

1 INTRODUCTION

Technological advances trigger digital transformation processes that alter value-creating paths in organisations (Vial, 2019) and lead to the emergence of the fourth industrial revolution (Beier et al., 2020; Dragicevic et al., 2020). The role of managers in making digital efforts successful is critical; however, digital transformation initiatives often experience difficulties because managers experience role ambiguity and do not know how to act (Ellström et al., 2021; Fitzgerald et al., 2014). For managers to successfully navigate through the digital journey, a vital challenge is building a digital transformation capability (Ellström et al., 2021; Warner & Wäger, 2019) while at the same time keeping the continuity of business performance, satisfying customer needs, and ensuring the wellbeing of employ-

ees. Essentially, managers need to balance between the integration of new technologies (exploration) and taking care (exploitation) of the core, well-established business (Li et al., 2021; Warner & Wäger, 2019). This premise states that there is a great paradox that surrounds digital transformation processes (Purvanova & Kenda, 2018), requiring managers to deal with tensions resulting from conflicting demands such as free exploration to complement exploitative processes of business as usual (Ellström et al., 2021). Managing competing demands is becoming necessary for effective digital transformation to occur (Montealegre & Iyengar, 2021).

Competing demands at the individual level often are studied using the construct of individual ambidexterity, defined as a capacity of a manager (or another employee) to exhibit seemingly incompatible behaviors (Birkinshaw & Gibson, 2004) of performing both explorative and exploitative activities, which lead to innovation and job performance (Mom et al., 2007; Rosing & Zacher, 2017). Individual ambidexterity is suited to cope with dynamic contexts (Eisenhardt et al., 2010; Good & Michel, 2013) such as technology turbulent environments (Folger et al., 2021). Moreover, in uncertain and interdependent work contexts, managers' ambidexterity has proven to contribute to individual performance (Mom et al., 2015). Despite the promising value of investigating the role of individual ambidexterity in the digital transformation efforts in companies, the literature still lacks relevant studies of the matter. Although some recent research discussed technological change and digital transformation concerning organisational ambidexterity (Ouyang et al., 2020; Scuotto et al., 2019) and some studies connected individual ambidexterity to technology turbulent environments (Folger et al., 2021), less is known about how digital transformation is connected to the individual, and in particular managerial ambidexterity.

We contribute to bridging that gap by investigating the following research question: What type of learning is required from ambidextrous managers to develop digital transformation capability? We focused on the dimension of learning because ambidexterity is associated inherently with learning and two types of learning activities—explorative and exploitative (March, 1991) —which echo the specialist–generalist dilemma at the individual level (Bonesso et al., 2014; Kang & Snell, 2009a; Kelly et al., 2011a). For example, whereas specialist human capital favors exploitative learning (i.e., in-depth learning within a narrow field), generalist human capital fosters explorative learning (i.e., learning within different fields) (Bonesso et al., 2014). Similar to Teece (2007) and Warner and Wäger (2019), we approached digital transformation as a dynamic capability and assumed that managers can contribute to the development of such capability through their knowledge (Helfat & Peteraf, 2015; Pasamar et al., 2015). Dynamic capabilities enable continuous restoring of the firms' resources and competencies in line with environmental changes and new sources of competitive advantage (Teece, 2007). Although researchers have dealt with our topic of interest implicitly to some extent (e.g. Ellström et al., 2021; Laudien & Daxböck, 2016; Warner & Wäger, 2019), we connected the dots from various contributions into an integrated framework to establish the relationship between digital transformation as a dynamic capability and ambidextrous' managers different learning orientations.

We addressed the research aim with a literature review to integrate conceptually the theoretical streams we investigated—managerial ambidextrous learning and digital transformation as a dynamic capability—to gain understanding of how managers can make their way through ongoing business challenges (i.e., competing demands) that they face in adapting to rapid technological and market change. Accordingly, this study builds a framework that explicates managerial learning orientations (i.e., generalist or specialist) serving as microfoundations of different dynamic capabilities underpinning digital transformation. Microfoundations are primary components (e.g. individual-level practices) underlying higher-level constructs such as organizational dynamic capabilities (Felin et al., 2012; Mousavi et al., 2019).

The contributions of this study are as follows. First, the study extends the existing literature on managerial ambidexterity by explaining how the role of a manager's ambidextrous learning is related to different categories of dynamic capabilities underpinning digital transformation (i.e., sensing, seizing, and transforming capabilities). Second, we enhance understanding of how firms may support

digital efforts by becoming sensitive to and supporting managerial ambidexterity as a critical factor in a successful digital transformation journey. Accordingly, we believe that the framework may aid managers with developing and deploying digital strategies that consider important choices that managers need to make in digital efforts, namely which mode of learning on which to focus as a part of capabilities development required for successful digital transformation.

2 MANAGERIAL AMBIDEXTERITY: OVERVIEW OF THE CONCEPT

2.1 Defining Managerial Ambidexterity

Competing or conflicting demands are in management literature studied under the umbrella construct of *ambidexterity*—the exploitation and exploration dilemma, seen as the core to learning, performance, agility, and innovation across the level of analysis (Birkinshaw & Gibson, 2004; Birkinshaw & Gupta, 2013; Raisch et al., 2009). Whereas exploration aids with sensing market opportunities and renewing companies' capabilities, exploitation builds on existing opportunities and creates a return on current capabilities (Levinthal & March, 1993). Ambidexterity at the individual level is seen as having a critical role in organizational ambidexterity (Birkinshaw & Gupta, 2013; O'Reilly III & Tushman, 2013; Raisch et al., 2009). Whereas organizational ambidexterity has been a well-established construct for three decades, recently researchers have started to pay attention to individual ambidexterity, the capacity of an individual to conduct contradictory activities of exploration and exploitation toward job performance and innovation (Bledow et al., 2009; Mom et al., 2015b). We focused on managers as units of our analysis because they are expected to be more exposed to such paradoxical behavior. Accordingly, we subscribed to the definition of individual ambidexterity as "a manager's behavioural orientation toward combining exploration- and exploitation-related activities within a certain period of time" (Mom et al., 2009, p. 812).

The literature describes ambidextrous managers as multitaskers capable of engaging in complex cognitive processes such as integrative and paradoxical thinking, and capable of being involved in both routine and nonroutine activities and in different types of learning activities which both refine existing and increase the variety of their knowledge and skills (Adler et al., 1999; Mom et al., 2007, 2015; Papachroni & Heracleous, 2020). The literature provides examples of various different tensions or conflicting demands that are related to individual ambidexterity (Pertusa-Ortega et al., 2020). For example, studies have focused on the tensions between the exploration of new capabilities and the exploitation of current capabilities (Rosing & Zacher, 2017), adaptability and alignment (Birkinshaw & Gibson, 2004), exploration of new ideas and their implementation (Bledow et al., 2009), flexibility and efficiency (Yu et al., 2020), and the pursuit of new knowledge or use of the existing knowledge (Kelly et al., 2011). However, less is known about how dimensions of learning orientation (i.e., explorative or generalist and exploitative or specialist learning) can influence individuals' ambidexterity.

2.2 Role of Learning in Managerial Ambidexterity

Managerial learning is an integral part of managers' work, and it is essential for organizational change (Sollander & Engström, 2021). From a knowledge-based view, ambidexterity at the individual level includes either the deepening of one's existing knowledge or learning outside one's current knowledge domains (Keller & Weibler, 2015). Therefore, some models of ambidexterity directly connect to the human resource base and perceive these different types of learning activities as a core to building individual and organizational ambidexterity (Kang et al., 2009; Mom et al., 2007, 2015; Prieto & Santana, 2012). In particular, the explorative-exploitative learning orientation echoes the generalist–specialist learning dilemma (Kang & Snell, 2009). Whereas specialists have in-depth knowledge associated with a particular knowledge domain or function and typically occupy more narrowly defined jobs, generalists tend to have cross-disciplinary knowledge that can be enacted across different domains and hence occupy heterogeneous (boundary-spanning) jobs that require diverse skill-sets (Kang & Snell, 2009; Kelly et al., 2011). Generalists are valued for the breadth of their knowledge and entrepreneurial behavior which provides an organization with the ability to explore

new capabilities and to adapt (Kang & Snell, 2009; Shane, 2000). On the other hand, specialists are experts in a given field and are effective in gaining new in-depth knowledge within the narrow range defined by the domain.

Ambidextrous managers exhibit both generalist and specialist learning orientations. For example, Birkinshaw and Gibson (2004) suggested that ambidextrous individuals enact both types of knowledge but are typically more generalists; this stance was adopted by other authors (e.g., Mom et al., 2009). Furthermore, Kelly et al. (2011, p. 620) found that specialist–generalist demarcation is "too rigid as it does not take into account the ways in which individuals themselves may choose to shape their working lives and careers."

3 DIGITAL TRANSFORMATION IN FIRMS

3.1 Defining Digital Transformation

Digital transformation refers to "a process wherein organizations respond to changes taking place in their environment by using digital technologies to alter their value creation processes" (Vial, 2019, p. 3). Digital technologies are combinations of information, computing, communication, and connectivity technologies (Bharadwaj et al., 2013; Vial, 2019). Examples of such technologies driving digital transformation and bringing new market and operational opportunities are mobile technologies, cloud computing, blockchain, artificial intelligence, and the internet of things (IoT) (Vial, 2019; Warner & Wäger, 2019).[1] In a recent literature review, Vial (2019) identified several organizational-level outcomes that digital transformation promises to bring to organizations, such as operational efficiency (i.e., improvement of business processes, automation, and cost savings), organizational performance (i.e., innovativeness, financial performance, firm growth, competitive advantage), and wellbeing of employees. However, digital transformation also has some drawbacks, such as algorithmic control and data security issues (Kellogg et al., 2020; Vial, 2019). Some other challenges require the management of employees' heterogeneous perceptions of digitalization efforts (Schneider & Sting, 2020).

Organizations engaged in digital transformation processes need to reconfigure and innovate their practices to establish a balance between more or less radical improvements and maintaining a core business. Digitalization often serves as a prompt for organizations to experiment and reinvent their business models, including reinventing industries, changing products and services, creating new digital businesses, reshaping value delivery models, and rethinking value propositions (Westerman et al., 2014; Warner & Wäger, 2019). Companies also can use digital technologies to change their business models incrementally, i.e., "to extend, revise, or terminate existing activities in an evolutionary manner" (Cavalcante et al., 2011; Foss & Saebi, 2018; Kim & Min, 2015). Given the strategic nature of change, the efforts that digitalization efforts require, and the challenges that these efforts face, it becomes apparent that the managerial role is critical (Montealegre & Iyengar, 2021).

3.2 Digital Transformation and Managerial Ambidexterity

Underlying the digitalization attempts, tensions emerge which require managers' both explorative and exploitative activities (Montealegre et al., 2019; Warner & Wäger, 2019). Often, the emphasis on either exploration or exploitation will affect a decision regarding the type of business model change (Laudien & Daxböck, 2016). For example, managers are prompted to explore because there are changes in technologies that they potentially need to adopt to keep long-term competitiveness. At the same time, they need to exploit to maintain companies' short-term competitive pressures. Managers also need to either adjust their digital technology portfolio or acquire new technologies (Li et al., 2021). These examples show that digital transformation and digital workplaces often require performing contradictory

[1] Consider also McAfee & Brynjolfsson's (2017) study which identifies three major trends related to technology that are reshaping how the businesses are run: the expanding capabilities of machines, rise of platforms or "digital environment[s] characterized by near-zero marginal cost of access, reproduction, and distribution" (p. 216); and emergence of the crowd—"human knowledge, expertise, and enthusiasm distributed all over the world and now available, and able to be focused, online" (p. 28).

activities and switching between different mindsets and action sets (Bledow et al., 2009), and resolving paradoxical requirements of exploitation and exploration (Raisch et al., 2009). Therefore, developing managerial ambidexterity seems to be critical.

The role of managers' knowledge is an important aspect of balancing competing demands. Managers need to capitalize on previous learning and focus on activities that maintain existing performance or learn new ways of dealing with customers and other stakeholders via digital technologies, opening themselves to new (or adjusted) ways of working (Baptista et al., 2020; Warner & Wäger, 2019). However, such management of competing demands may not be easy. Managers, to deal with uncertainty and complexity arising from digital transformation pressures, sometimes choose to rely on prior expert experience and familiar choices in their decision-making rather than to explore new possibilities that would lead to change (Gavetti & Levinthal, 2000; Laudien & Daxböck, 2016; Warner & Wäger, 2019). Managers tend to exploit already-established technological assets rather than expand their search activities (Teece, 2007). Hence, managing different learning orientations (i.e., specialist or generalist) often is a (necessary) challenge.

Recognizing the value of ambidexterity research, Montealegre and Iyengar (2021) argued that central to successfully managing a digital business platform is the organizational ability to balance renewal (i.e., exploration) and refinement (i.e., exploitation).[2] We build on the premises of their study and focus on the role of the individual level of ambidexterity in digital transformation change process.

3.3 Digital Dynamic Capabilities

Due to its focus on developing mechanisms for organizations to cope with continuous (rapid technological) change and remain competitive (Peteraf et al., 2013; Schilke et al., 2018), the dynamic capabilities framework (Teece, 2007) is regarded as one of the promising underlying theoretical frameworks to study digital transformation (Vial, 2019). The dynamic capabilities framework emerged from and extended the resource-based view of firms to explicate how firms strategically renew resources and competencies to fit uncertain environments (Eisenhardt & Martin, 2000; Helfat et al., 2009; Teece et al., 1997). Continuous restoring of the firms' resources and competencies in line with changes in the organization's business environment enables new sources of competitive advantage (Teece, 2007). Teece (2007) recognized three categories of dynamic capabilities that enable this: sensing, seizing, and transforming capabilities. Sensing involves activities of gaining knowledge about the business environment to make decisions about future development; seizing includes exploitation of the sensed opportunities for the improvement of current and development of new services and products; and transforming involves activities to reconfigure resources and competencies to create better fit with the environment (Teece, 2007, 2014).

Because digital transformation requires organizational adaptation to changing business environment, a dynamic capabilities framework was adopted in some recent digital transformation studies (e.g. Ellström et al., 2021; Matarazzo et al., 2021; Warner & Wäger, 2019). For example, Warner and Wäger (2019) suggested that digital transformation is a capability, and identified digitally based dynamic capabilities and their subcapabilities required for digital transformation: digital sensing, digital seizing, and digital transforming capabilities. Ellström et al. (2021) built on Warner and Wäger's findings to suggest complementary routines for achieving digital transformation in firms. Our work to some extent builds on these studies and is distinguished from them by focusing on the role of managerial ambidextrous learning.

Table 1 provides an overview of the original dynamic capabilities framework (Teece, 2007) and the adoption of this framework to the digital transformation context (Ellström et al., 2021; Warner & Wäger, 2019).

[2] They suggested that three interrelated activities—identifying-nourishing, expanding-legitimizing, and augmenting-embedding—enable the organisational ambidexterity, i.e., "renewal and refinement in the evolution of the digital platform" (Montealegre & Iyengar, 2021, p. 2).

Table 1: Dynamic capabilities and their role in digital transformation

Framework/key reference	Type of dynamic capability		
Teece (2007)	**Sensing** Scanning, creation, learning, and interpretation of local and global technologies and markets; investment in research and related activities.	**Seizing** Improving current technological competencies; investing in new technologies and designs, developing services and products.	**Transforming** Recombining and reconfiguring competencies, assets and organizational structures as technologies or market change.
Warner & Wäger (2019)	**Digital sensing** (1) digital scouting, (2) digital scenario planning, and (3) digital mindset crafting.	**Digital seizing** (1) strategic agility, (2) rapid prototyping, and (3) balancing digital portfolios.	**Digital transforming** (1) navigating innovation ecosystems, (2) redesigning internal structures, and (3) improving digital maturity.
Ellström et al., (2021)	**Digital sensing** (1) cross-industrial digital sensing, (2) inside-out digital infrastructure sensing.	**Digital seizing** (1) digital strategy development, (2) determining enterprise boundaries.	**Digital transforming** (1) decomposing digital transformation into specified projects, (2) creating unified digital infrastructure.

4 AMBIDEXTROUS MANAGERIAL LEARNING ORIENTATIONS AND DIGITAL TRANSFORMATION CAPABILITY

4.1 Integrated Framework

Dynamic capabilities are organizational, higher-level capabilities; nevertheless, they are rooted in and emerge from individual, managerial practices (Helfat & Peteraf, 2015; Teece, 2012, 2014). We recognize that developing digital transformation capability requires managerial handling of competing demands and that the role of learning per se is critical. Researchers have considered ambidexterity to act as a dynamic capability and have recognized the role that managers have in it (Birkinshaw et al., 2016; O'Reilly III & Tushman, 2008). Therefore, we recognize that there is value in developing a framework that connects these different (yet related) theoretical streams.

Specifically, building on the dynamic capabilities, digital transformation, and individual ambidexterity literatures, we suggest a framework that describes the role of a manager's ambidexterity, by considering her or his learning orientation, in building digital transformation capability. In particular, we identify learning (knowledge-based) activities that could be classified as having either a generalist or a specialist orientation, and describe their role in different aspects of building digital transformation as a dynamic capability. We posit that these ambidextrous learning activities serve as microfoundations—or micro-level origins or basic elements—underlying dynamic capability building (Felin et al., 2012; Mousavi et al., 2019). Figure 1 illustrates the framework that lays out the conceptual integration of the selected theories. We posit that building each of the digital transformation capabilities (digital sensing, digital seizing, and digital transforming) includes tasks requiring both managerial generalist and specialist learning orientations.

In an introduction to special issues on digital work and transformation, Baptista et al. (2020) suggested three orders of effects of digital transformation on organizations: convergent change, transforming work, and transforming the organization. Convergent change refers to the appropriation of workplace technologies with immediate effects on the execution of tasks and established patterns of work; transforming work leads to a more fundamental change in the patterns and nature of work; and transforming the organization creates new understandings of work and changes the deep structure of organizations. Building on their idea, we propose that digital capabilities of sensing, seizing, and transforming (together with learning activities associated with them) could be connected with the aforementioned three order effects of digital transformation on organizations.

Figure 1: Conceptual integration of the included theories

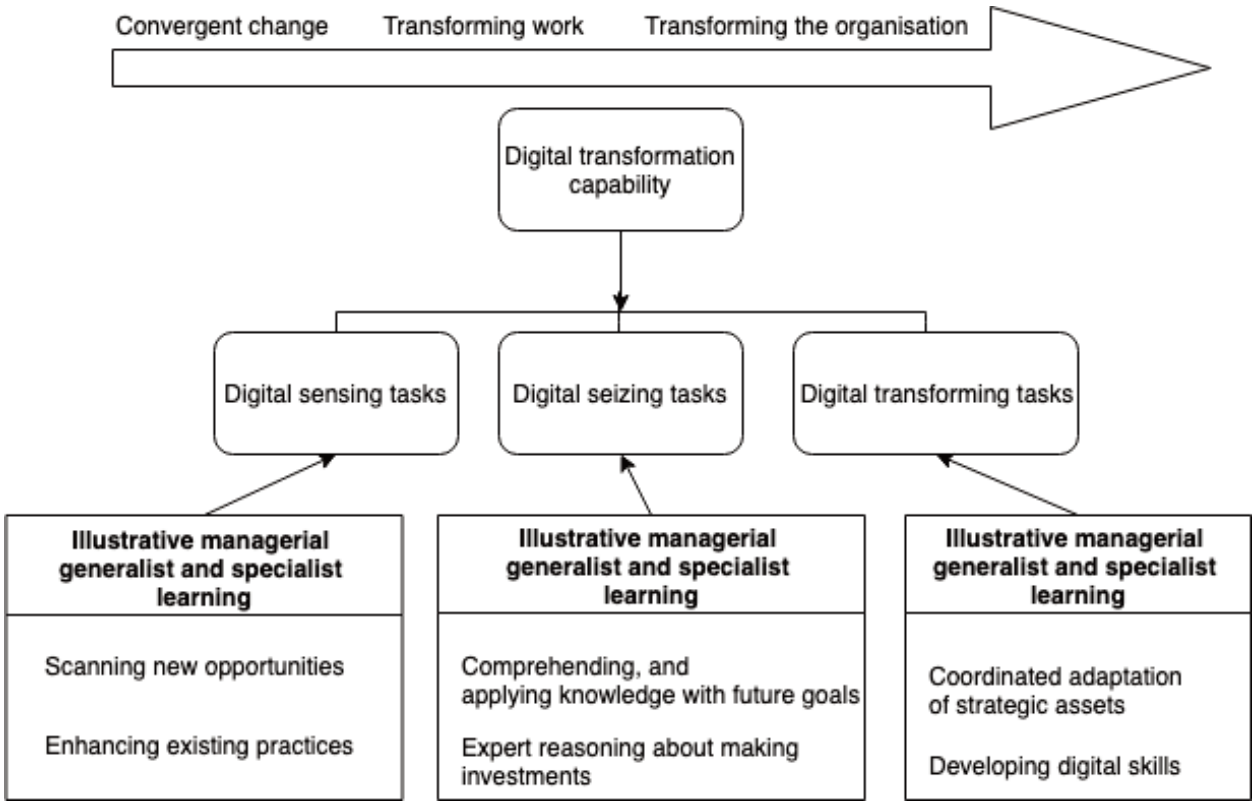

Table 2 summarizes the specifics of managerial ambidextrous learning orientations (i.e., generalists or specialists) in connection to each of the digital transformation capabilities (i.e., sensing, seizing, or transformation).

4.2 The Role of Managerial Ambidexterity in Digital Sensing

Digital sensing entails discovering new technological and market opportunities (Helfat & Peteraf, 2015; Teece, 2007), including scanning of data and information available at digital networks [ecosystems "comprised of people, data, processes, and things connected by the shared used of technologies that go beyond the scope of a single system (Henfridsson & Bygstad, 2013; Yoo; Henfridsson, & Lyytinen, 2010)"; Montealegre & Iyengar, 2021, p. 1]. Managers' explorative learning about opportunities regarding digital technologies and ways in which they may reinvent business is guided by discovering and sensemaking activities (Kirzner, 1997; Weick, 1995). Managers also have access to partners' resources and capabilities (Laudien & Daxböck, 2016), which they can use to probe technological possibilities (Teece, 2007).

Digital sensing also may involve deepening ways of knowing and executing the existing tasks. For example, awareness of available workplace technologies (Li et al., 2021) may stimulate managers to apply some of these technologies to enhance their daily practices, that is, to deepen their existing knowledge base. They may use digital technologies, such as IoT platforms, to perform their tasks more efficiently (Laudien & Daxböck, 2016; Warner & Wäger, 2019). Furthermore, managerial specialist knowledge and experience, due to its awareness of firm-specific requirements, may help with setting the initial constraints and feasibility testing of the current digital infrastructure and identified technological opportunities (Cross & Sivaloganathan, 2007; Ellström et al.,

Digital dynamic capabilities	Ambidextrous managerial learning orientation		Organizational effects of digital transformation
	Explorative learning orientation	Exploitative learning orientation	
Digital sensing *An imbalance towards generalist learning orientation*	Scanning new technological and market opportunities via a digital network (Helfat & Peteraf, 2015; Teece, 2007; Montealegre & Iyengar, 2021) by using discovering and sensemaking activities (Kirzner, 1997; Weick, 1995).	Enhancing existing practices with digital tools (Laudien & Daxböck, 2016; Warner & Wäger, 2019) Knowledge specific to the industry to set the initial constraints and test the feasibility of technological opportunities (Cross & Sivaloganathan, 2007).	First-order effects: **Convergent change**
Digital seizing *A balance between generalist and specialist learning orientation*	Decisions on a business model redesign by using digital technologies (Teece, 2007; Warner & Wäger, 2019) and which competencies to build within the firm and which to outsource (Ellström et al., 2021) Flexibility, adaption, and openness to new growth opportunities (Ellström et al., 2021). Skills of interpretations to discover, comprehend, and apply knowledge with future goals (Bunderson & Sutcliffe, 2002; Kelly et al., 2011; Shane, 2000).	Expert reasoning about making investments in digital technologies (Helfat & Peteraf, 2015) Decomposing the projects and building the business processes for effective distribution of resources and team members (Ellström et al., 2021). Eliciting expert feedback or preferences regarding digital seizing choices from internal and external stakeholders; development of detailed design (Cross & Sivaloganathan, 2007).	Second-order effects: **Transforming work**
Digital transforming *A balance between generalist and specialist learning orientation*	Managerial decision making and action regarding the coordinated adaptation of strategic assets that are critical for digital transformation (Helfat & Peteraf, 2015) Leadership, social skills, and effective communication across functions (Bunderson & Sutcliffe, 2002; Helfat & Peteraf, 2015).	Development of digital skills (Warner & Wäger, 2019) Decomposing the projects and building the business processes for effective distribution of resources and team members (Ellström et al., 2021). Overcoming the potential obstacles in building the digital infrastructure by pinpointing best practices for how come some specific challenges (regarding technology and people) may be overcome (Cross & Sivaloganathan, 2007).	Third-order effects: **Transforming the organization**

2021). They also may assist in building and assessing the routines for capturing technological information captured by digital networks (Ellström et al., 2021).

Digital sensing entails mostly a generalist learning orientation (Pasamar et al., 2015), i.e., it includes more entrepreneurial behavior, is open to discovering new possibilities, and is less confined to a certain perspective. Therefore, we suggest:

Proposition 1: Digital sensing predominantly requires a generalist learning orientation.

4.3 The Role of Managerial Ambidexterity in Digital Seizing

Digital seizing may involve business model redesign by using digital technologies (Teece, 2007; Warner & Wäger, 2019), that is, capturing the value of new growth opportunities through new products, processes, and services (Ellström et al., 2021). To pursue business model reinvention, managers need to decide which competencies to build within the firm and which to outsource (Ellström et al., 2021), as well as the form of the human resource base (Matarazzo et al., 2021). For this, they need to have skills of interpretation of varied problems and skills to discover, comprehend, and apply knowledge with future goals, which typically are generalists' traits (Bunderson & Sutcliffe, 2002; Kelly et al., 2011; Shane, 2000). Managers also may act spontaneously, without seeking permission from their superiors (Birkinshaw & Gibson, 2004) in making decisions about which technologies to pursue in developing new services and products.

Nevertheless, adjustments to business model design involve managers' specialist knowledge as well. This can entail, for example, the capacity to make well-thought-out investments in new or improved digital technologies, which requires in-depth knowledge in the field and reasoning skills [i.e., "evaluating information, arguments, and beliefs to draw a conclusion" or "using information to determine if a conclusion is valid or reasonable" (Gazzaniga et al., 2010, p. 342)] (Helfat & Peteraf, 2015). Specialist knowledge may be relevant in deciding on priorities and responsibilities for resources allocation dedicated to strategy realization (Ellström et al., 2021) and human resources hiring (Matarazzo et al., 2021). Moreover, a specialist orientation may be required in (building routines for) eliciting expert feedback or preferences regarding digital seizing choices from internal and external stakeholders, as well as for the detailed design of new digital service or product solutions (Cross & Sivaloganathan, 2007).

Because building digital seizing capability incorporates tasks requiring both generalist and specialist learning, we suggest:

Proposition 2: Digital seizing requires a balance between generalist and specialist learning orientations.

4.4 The Role of Managerial Ambidexterity in Digital Transforming

Digital transforming, for example, requires managerial decision making and action regarding the coordinated adaptation of strategic assets, that is "the selection, configuration, alignment, and modification of tangible and intangible assets (Helfat et al., 2007)" (Helfat & Peteraf, 2015, p. 12) that are critical for digital transformation. Coordination of these strategic changes requires generalist skills of effective communication across functions (Bunderson & Sutcliffe, 2002). Moreover, one of the critical aspects of developing digital transformation capability is the company's culture (Fitzgerald et al., 2014; Hartl & Hess, 2017), and employees may have heterogeneous perceptions of digitalization that may serve as an obstacle to digital transformation processes. Therefore, to overcome resistance to change, managers need both communication and social skills to induce common understanding and cooperative behaviors in their subordinates (Helfat & Peteraf, 2015). Managers need not only to create but also to communicate effectively a digital vision to inspire and support their subordinates in their digital transformation journey (Dery et al., 2017).

Exploitative learning orientation is involved in the application of specialist knowledge and using it for enhancing managers' knowledge base. In particular, managers need to develop new digital skills and/or become sensitive to support the development of such skills in their subordinates (e.g., big data analysis) (Laudien & Daxböck, 2016). Workers need to realize more deeply the potential of digital technology in their daily work practices by learning to apply artificial intelligence, IoT platforms, cloud computing, and others (Warner & Wäger, 2019). Furthermore, specialist expert knowledge may help with decomposing the projects and building the business processes for effective distribution of resources and team members (Ellström et al., 2021). Specialist experience also may aid with overcoming the potential obstacles in building the digital infrastructure by assessing the similarities from past projects and knowing the best practices for how to overcome some specific challenges (regarding technology and people) (Cross & Sivaloganathan, 2007). Expertise also may be required in establishing new functions such as digital marketing and digital reorganization (Matarazzo

et al., 2021). Because building the digital transforming capability includes tasks requiring both generalist and specialist learning, we suggest:

Proposition 3*:* Digital transforming capability requires a balance between generalist and specialist learning orientations.

5 DISCUSSION AND CONCLUSION

5.1 Theoretical Contribution

Our study contributes to the individual ambidexterity literature by investigating the role of managerial ambidextrous learning (i.e., different learning orientations) in building the digital transformation capability. Its focus is in line with the proposition that dynamic capabilities are rooted in managerial capabilities and practices (Helfat & Peteraf, 2015; Teece, 2012, 2014) and that managers [and their ambidextrous learning (Pasamar et al., 2015)[3]] have a key role in developing such capabilities. The microfoundations of dynamic capabilities for digital transformation identified and described in this paper are present to some extent in previous research that focused on the same topic (Ellström et al., 2021; Warner & Wäger, 2019). However, our work complements the existing studies by distinguishing between generalist and specialist learning orientations and recognizing their distinctive microfoundational roles in digital transformation capability building. In contrast to the arguments of Birkinshaw et al. (2016), who equated a "sensing" capability with exploration, a "seizing" capability with exploitation, and "reconfiguring" to a higher-order capability that enables a balance between the first two, we view each digital capability as consisting of both explorative and exploitative activities, and hence including both generalist and specialist learning. Nevertheless, we acknowledge that one learning orientation may prevail in the development of a specific capability. For example, as we argued in the previous sections, whereas digital sensing capability may require a greater generalist learning orientation, both seizing and transforming capability require a balance between generalist and specialist learning orientation. This balance may depend on the environmental circumstances, availability of resources, and strategic choices regarding the kind of digital transformation that will be pursued (Pasamar et al., 2015), as well as on the individual and leadership characteristics, culture, and other factors affecting individual ambidexterity (Pertusa-Ortega et al., 2020).

5.2 Managerial Implications

Because the role of managers is critical in digital efforts, firms need to build guidelines for taking into account both managers' generalist and specialist learning needs. However, managers may not be equally skilled at generalist and specialist learning. Hence, if a certain type of learning is more required for some aspect of dynamic capabilities building (i.e., sensing, seizing, or transforming), managers who have this learning orientation as dominant may provide superior aid in this aspect. Nevertheless, we believe that ambidextrous learning should be a common managerial trait, and that such duality is particularly required to foster change in organizations (Sollander & Engström, 2021). Therefore, human resource management systems should actively aim to stimulate managerial ambidextrous learning, for example, by deploying practices that specifically target building "entrepreneurial ability to identify and exploit opportunities both of experimentation and search for efficiency (Corbett, 2005; Shane, 2000; Short, Ketchen, Shook, & Ireland, 2010" (Bonesso et al., 2014, p. 402). For example, Bonesso et al. (2014) showed how broad knowledge and inter-functional and/or inter-firm work leads to a balance between exploration and exploitation. In contrast, managers' narrow prior knowledge and working experience may direct a search for opportunities for exploitation (e.g., improvement of current technologies). Following this and other studies (e.g. Mom et al., 2009; Un, 2007), we suggest that facilitating participation in cross-functional work may stimulate more-entrepreneurial managerial behavior and balanced learning. Because managers with broader prior work experience may be more likely to exhibit ambidextrous behaviors, HR practitioners in-

[3] Pasamer et al. suggested that ambidextrous learning and diverse architectures of intellectual capital are related to the development of dynamic capabilities; however, they focused on a structural approach to ambidextrous organizations, and not on an individual level as we do.

volved in the recruitment processes might take this insight as a guiding principle in their decision-making.

Furthermore, Mom et al. (2019) drew on self-efficacy (Bandura, 1982) and self-determination theory (Deci & Ryan, 2008) to put forward a set of human resource management practices that stimulate managerial ambidexterity, namely motivating (i.e., job enrichment, behavioral appraisal, and commitment-oriented rewards and compensation), ability (i.e., comprehensive training and job enlargement), and opportunity-enhancing practices (i.e., decision making, information sharing, and support for ideas). We suggest that these are relevant in the context of digital transformation. Furthermore, recent studies identified microfoundations (Warner & Wäger, 2019) and routines (Ellström et al., 2021) underpinning dynamic capabilities in support of firms' digital efforts and the realizing of the potential of digital transformation. Our study complements these works by focusing on ambidextrous learning as the core to building such capabilities. In particular, we suggest a framework that differentiates a role of either generalist or specialist learning orientation in different dynamic capabilities underpinning digital transformation (sensing, seizing, or transforming). We hold that such a framework may assist managers with creating digital strategies that take into account important learning processes underpinning managers' work in digital transformation pursuits.

5.3 Limitations

This study provides a general framework describing the role of managerial ambidextrous learning in developing the digital transformation capability. However, this study does not assume that a specific hierarchical level is associated exclusively with microfoundations of dynamic capabilities and should predominantly practice only a particular learning orientation. Birkinshaw et al. (2016) took a different approach and emphasized that sensing and seizing typically are front-line capabilities, whereas reconfiguring commonly is an executive capability. Montealegre and Iyengar (2021) proposed that the evolution of digital business platforms has three different phases (i.e., initiating, developing, and growing) and that in each phase top, middle, and operational management have different roles in balancing between renewal (i.e., exploration) and refinement (i.e., exploitation). Nadkarni and Prügl (2020) emphasized the critical role of middle managers in implementing digital transformation. Conversely, we believe that it would be beneficial to extend our study to investigate key management practices (including generalist or specialist learning orientations) related to these different management levels. We also suggest that it would be useful to investigate empirically the role of managerial ambidextrous learning in digital efforts in specific firms and across management levels because dynamic capabilities are context-specific (Birkinshaw et al., 2016). Finally, there is an increasing stream of research on the T-shaped individuals in different contexts, including digital transformation (Demirkan & Spohrer, 2018); we believe that future research on individual ambidexterity could connect fruitfully with this stream.

5.4 Conclusion

This study conducted a comprehensive literature review to connect different theoretical streams—dynamic capabilities, digital transformation, and individual ambidexterity literatures—to identify how different managerial learning orientations (i.e., generalist or specialist) underpin digital transformation capabilities (i.e., sensing, seizing, and transforming). Specifically, we build on these theoretical perspectives to offer a more comprehensive conceptualization and framework that reveals the learning mechanisms (predominantly exploitative or explorative) for achieving digital transformation. In doing this, we help to understand how each digital dynamic capability includes managerial learning-based handling of competing demands, i.e., requires development of managerial ambidextrous learning. Future research should investigate empirically the role of managerial ambidextrous learning in digital attempts because our conceptual efforts cannot capture the specific market dynamics.

Acknowledgements

This work has been supported in part by the Croatian Science Foundation under Project number UI-2020-02-8889.

EXTENDED SUMMARY/IZVLEČEK

Ta članek združuje literaturo individualne obojeročnosti, digitalne preobrazbe in dinamičnih sposobnosti z namenom razvoja ogrodja, ki pomaga razumeti vlogo managerske prilagodljivosti učenja pri gradnji sposobnosti digitalne preobrazbe organizacije. Prispevek na podlagi obsežnega pregleda literature opredeljuje konkurenčne zahteve v smislu usmeritve managerskega učenja, ki služijo kot mikrotemelji različnih dinamičnih organizacijskih sposobnosti, ki podpirajo digitalno preobrazbo. Sprejemamo dvostransko perspektivo učenja in predlagamo, da morajo managerji uravnotežiti raziskovalno in izkoriščevalno učenje, da bi pomagali pri izgradnji sposobnosti digitalne preobrazbe. Ta članek prispeva k teoretičnim perspektivam obojeročnosti in dinamičnih sposobnosti s svojim izrazitim poudarkom na vlogi učenja na ravni posameznika v kontekstu digitalne preobrazbe na organizacijski ravni. Članek izboljšuje razumevanje, kako lahko podjetja podpirajo digitalna prizadevanja, tako da postanejo občutljiva in podpirajo vodstveno obojeročnost kot kritični dejavnik na uspešni poti digitalne preobrazbe. Za nadaljnje raziskovanje predlagamo, da se empirično razišče vlogo managerskega oboročnega vedenja v digitalnih prizadevanjih.

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