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THE DUAL IMPERATIVE OF DIGITAL TRANSFORMERS – THE RELATIONSHIP BETWEEN A FIRM’S DIGITAL ORIENTATION AND INNOVATION AMBIDEXTERITY

Research in Progress

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Abstract

The disruptive power of digitalization has called into question how we think and theorize about innovation management in a digital context. To thrive in a digital world, companies need to increasingly follow the dual imperative of constantly reinventing themselves while simultaneously refining current viability, that is, achieve innovation ambidexterity. Complementing research that has theorized digitalization as context or outcome of such ambidexterity, we study how a firm’s digital orientation (DO), a strategic posture aimed at realizing vital gains from digital technologies, can function as a driver for resolving the tensions of this dual imperative. In addition, we analyze the roles of absorptive capacity (ACAP) and market turbulence as contingency factors for this relationship. In deriving our hypotheses, we rely on the resource-based view (RBV) and extend our theorizing by building on the dynamic capabilities view. Our research model is empirically tested through multi-industry survey data obtained from 1,474 German firms.

Keywords: Digital orientation, digital innovation, innovation ambidexterity, absorptive capacity

1 Introduction

The growing pervasiveness of digitalization exposes firms to highly competitive environments, in which the role of innovation ambidexterity—that is, the ability to simultaneously pursue exploitative and exploratory innovation (Jansen, Van Den Bosch and Volberda, 2006)—becomes increasingly relevant (Park, Pavlou and Saraf, 2020). In such environments, firms are more than ever required to succeed in today’s business while at the same time being on the lookout for future business models that might eventually supersede existing ones (Dixon, Brohmann and Chan, 2017; Frankenberger *et al.*, 2019; Montealegre, Iyengar and Sweeney, 2019). While achieving innovation ambidexterity has been described as a difficult task for managers, the introduction of digital technologies even increased such difficulties. Digital technologies, characterized as “editable, interactive, [and] reprogrammable”, differ from traditional technologies (Kallinikos, Aaltonen and Marton, 2013, p. 357; Yoo, Henfridsson and Lyytinen, 2010) and therefore question established theoretical assumptions on innovation (Herterich and Mikusz, 2016; Nambisan *et al.*, 2017). Accordingly, a number of studies find that digital technologies radically affect the character of product and service innovations (e.g., Yoo *et al.*, 2012; Fischer *et al.*, 2021), impact organizational and innovation strategies (e.g., Bharadwaj *et al.*, 2013; Svahn, Mathiassen and Lindgren, 2017), and even transform entire business models (e.g., Matt, Hess and Benlian, 2015; Hess *et al.*, 2016). In view of their impact on innovation processes, digital

technologies hence create novel challenges to firms' attempts to manage ambidexterity. Accordingly, previous research has explored specific factors which help firms to foster ambidexterity in the digital era (e.g., Park, Pavlou and Saraf, 2020; Müller, Páske and Rodil, 2019).

However, in many related studies, digitalization is treated as a context for, or theorized as an outcome of ambidexterity (e.g., Del Giudice *et al.*, 2021). Hence, despite the valuable insights such research has provided, our understanding of how digitally related resources can also function as an enabler of innovation ambidexterity remains limited. Studies that present exceptions in this regard (e.g., Park, Pavlou and Saraf, 2020) focus on IT-related factors, which only partially accounts for the unique features of digital technology use (cf. Nambisan *et al.*, 2017). To address this gap, this study draws on a comprehensive digital resource combination, that is, a firm's digital orientation (DO) (Kindermann *et al.*, 2021). The DO can be defined as a strategic posture that allows firms to extract value from digital technologies. In analyzing the relationship between a firm's DO and its innovation ambidexterity, we acknowledge that digital technologies can act as an enabler of operational efficiency (operand resources), but also play a strategic role for creating and capturing business value (operant resources) (Bharadwaj *et al.*, 2013; Nambisan, 2013). Based on the resource-based view (RBV) of the firm (Barney, 1991) as guiding theoretical framework, we expect that DO reflects a resource combination that influences the balance of exploration and exploitation in a digital era. Thus, our first research question is: *How does a firm's DO relate to innovation ambidexterity?* To account for the increasing relevance of external sources of knowledge on innovation management in the digital era, we examine the moderating influence of a firm's absorptive capacity (ACAP). ACAP, defined as a major dynamic capability (Zahra and George, 2002), describes an organization's ability to acquire external information, cross-fertilize, and exploit it for commercial purposes. The inclusion of a dynamic capability into our study does not only underscore the relevance of continuous adaptation of the existing resource base in a dynamic digital context, but also helps to understand the role of specific sensing and seizing abilities in transforming digital technology-related opportunities into innovation outcomes (Teecce, Pisano and Shuen, 1997; Steininger *et al.*, 2022). As a proper balancing of internal and external knowledge flows becomes increasingly central to manage rising tensions in a digital era (Rothaermel and Alexandre, 2009), we argue that ACAP strengthens the association between a firm's DO and innovation ambidexterity. We further posit that the influence of ACAP on this relationship is strengthened in markets, in which customers change their preferences regularly, based on the premise that dynamic capabilities are most relevant in turbulent circumstances (Eisenhardt and Martin, 2000). Therefore, our second and third research questions are: *How is the relationship between a firm's DO and innovation ambidexterity influenced by a firm's ACAP and how does this influence change in turbulent market environments?* To empirically validate our research model, we draw on a rich set of survey data from 1,474 top executives of German companies. We find evidence for our core proposition that a firm's DO fosters innovation ambidexterity. The positive relationship is strengthened at high levels of ACAP whereas, contrary to our expectations, this does not hold true for turbulent market environments.

With this study, we contribute to theory in three major ways. First, by establishing DO as a relevant antecedent for innovation ambidexterity, we show that the role of digitalization for ambidexterity is not just limited to the context and outcome level. We offer insights into the concrete, digitally related resources firms need to develop to achieve innovation ambidexterity in digital and competitive contexts. For that, we use a novel survey scale for DO that we operationalized in line with our conceptualization on the pervasiveness of digital technologies. Second, by introducing ACAP as a contingency factor for the DO-ambidexterity relationship, we highlight the importance of dynamically adjusting an organization's knowledge and technology base in a digital context. With this, we add to growing research on the specific role of dynamic capabilities in the digital era (Steininger *et al.*, 2022). Third, we advance the literature on digital innovation management (e.g., Yoo, Henfridsson and Lyytinen, 2010; Fichman, Dos Santos and Zheng, 2014). Following several research calls for novel theorizing on the implications of digitalization on innovation outcomes (Nambisan *et al.*, 2017; Appio *et al.*, 2021), our research advances resource-based theories for application in a digital context.

2 Theoretical background and hypothesis development

2.1 Digital orientation (DO) and innovation ambidexterity

This study builds on Kindermann *et al.*'s (2021) concept of DO. Defined as a strategic orientation, a firm's philosophy of how to conduct business (Gatignon and Xuereb, 1997), DO serves as guiding principle for firms to initiate and foster the success of digital transformation initiatives. While digital transformations are complex phenomena and only vaguely defined as organizational changes triggered by digital technologies (Hanelt *et al.*, 2021), DO describes the organizational prerequisites to leverage digital technology-enabled opportunities in four concrete dimensions: *digital technology scope*, *digital capabilities*, *digital ecosystem coordination*, and *digital architecture configuration*. In line with the RBV, strategic orientations such as DO represent collections of strategic resources, including unique assets and distinctive capabilities, that explain superior performance and innovation outcomes (Zhou, Yim and Tse, 2005; Droege, Strese and Brettel, 2019). Accordingly, DO also includes "distinct, intangible capabilities which are tied to organizational routines and practices, developed over long time periods, and therefore, cannot easily be imitated or duplicated" (Schweiger *et al.*, 2019, p. 1825). In contrast to related constructs that are linked to strategically using IT or digital technologies, such as digital customer orientation (Kopalle, Kumar and Subramaniam, 2020), digital capabilities (e.g., Yoo *et al.*, 2012; Lyytinen, Yoo and Boland Jr., 2016), or IT leveraging competence (Pavlou and El Sawy, 2006), the conceptualization of DO explicitly reflects recent theoretical discussion on the idiosyncrasy of digital technologies, particularly the affordances, openness and generativity perspectives (Nambisan, Wright and Feldman, 2019). We posit that those characteristics can create differential business value for firms. As "digital innovation does not occur in a vacuum" (Kohli and Melville, 2019, p. 202), but often in alignment with other organizational factors (Barney, 1991; Kohli and Grover, 2008), DO serves as important organizational configuration to convert those digital resources effectively and efficiently. This is in line with the original notion of the RBV that argues that firms need complementary resources and an appropriate setup for the integration of these resources to achieve competitive advantage (Barney, 1991). Focusing on innovation ambidexterity, we uncover how digitally oriented firms configure digital technologies as both operand and operant resources, while being strategically prepared to resolve competing tensions (Tushman and O'Reilly, 1996).

We argue that a firm's DO facilitates innovation ambidexterity by firstly promoting both exploitative and exploratory innovation, and by secondly resolving the contrasting tensions arising from the competition between both innovation types. On the one hand, digital technologies enable exploitation and productivity improvements by focusing on an operand dimension of digitalization (Lyytinen, Yoo and Boland Jr., 2016) through deployment of IT tools that promote collaboration or through improved communication and transparency (e.g., Kleis *et al.*, 2012; Rai *et al.*, 2012). On the other hand, pervasive use of digital technologies as operant resources leads to more generative processes or "wakes of innovation" that push digitally oriented firms to exploratory innovations (Lyytinen, Yoo and Boland Jr., 2016). Yet, since an excessive focus on either one of the two innovation types can result in undesirable outcomes, such as structural inertia when engaging only in exploitation or disruption of stable routines when engaging only in exploration (He and Wong, 2004), DO helps to mitigate disproportionate activities through a transfunctional business focus (Bharadwaj *et al.*, 2013; Garcia De Lomana, Strese and Brinckmann, 2019). Close alignment between the IT function and business side facilitates mutual accommodation of requirements to counteract a drift into a specific direction, enabling ambidexterity (Gregory *et al.*, 2015). Car manufacturers, for example, integrate digital technologies into cars to enhance current offers (e.g., advanced diagnostics), but also to enable new business models (Hildebrandt *et al.*, 2015). In this context, DO helps to take advantage of those emergent digital options, providing firms with the required organizational agility to achieve ambidexterity (Lu and Ramamurthy, 2011). Owing to the specific nature of digital infrastructures, firms are constantly confronted with competing imperatives in digital contexts (Tilson, Lyytinen and Sørensen, 2010; Montealegre, Iyengar and Sweeney, 2019). As captured by the different dimensions of DO, it is within the DNA of digitally oriented firms to effectively manage those paradoxical

demands, stimulating them to act ambidextrously (Lewis and Smith, 2014; Kindermann *et al.*, 2021). For instance, digitally oriented firms proficiently balance control and flexibility in the digital ecosystems, in which they operate, to collaborate with network partners and explore new value-creating innovation opportunities while leveraging coordination mechanisms to exploit value from ongoing innovation activities (Wareham, Fox and Cano Giner, 2014). Firms high in DO build on technology affordances to make productive use of and incrementally upgrade the digital capabilities of employees in daily routine works, while simultaneously advancing new organizational routines that foster radical product and process changes (Leonardi, 2011; Majchrzak and Markus, 2013). Digitally oriented firms further adapt internal digital architectures to respond to generative actions of external parties, while introducing cybersecurity measures that stabilize the long-term value proposition (Zittrain, 2007; Yoo *et al.*, 2012). Therefore, we argue that in enabling the balancing of such tensions, DO fosters innovation ambidexterity.

H1: DO is positively associated with innovation ambidexterity.

2.2 Moderating roles of absorptive capacity (ACAP) and market turbulence

The ubiquity of digital technologies has resulted in ever-changing organizational routines, increased interdependence of economic players, and a need of constant development (Lyytinen, Yoo and Boland Jr., 2016; Nambisan, Wright and Feldman, 2019). Given this interwoven reality for digitalization, we employ a dynamic capabilities view to complement the theoretical arguments from the RBV in a digital context. A dynamic capabilities lens specifically helps to understand how firms sense, seize, and transform opportunities and demands that are evoked by digital technologies (Teece, Pisano and Shuen, 1997; Eisenhardt and Martin, 2000; Yoo *et al.*, 2012). It further helps to explain the adaptation and reconfiguration of existing resources and capabilities in the interplay with the application of digital technologies and the types of related strategic outcomes (Warner and Wäger, 2019; Steininger *et al.*, 2022). Particularly in digital innovation, the ability to effectively leverage novel and diverse knowledge is regarded an essential success driver since the convergence of digital technologies have drastically increased quantity and heterogeneity of relevant knowledge sources (Yoo *et al.*, 2012). Thus, we argue that ACAP—the dynamic capability to “recognize the value of new information, assimilate it, and apply it to commercial ends”—serves as a moderator in the relationship between DO and innovation ambidexterity by enabling organizations to reconfigure their existing organizational DO to better address the dual imperatives that are evoked by the pervasiveness of digital technologies (Cohen and Levinthal, 1990, p. 128; Teece, 2007). In fact, the contingent role of ACAP for strategic orientations has previously been shown for related domains (e.g., Engelen *et al.*, 2014).

We argue that a firm’s ACAP firstly strengthens DO’s influence on both exploratory and exploitative innovation, and secondly supports in managing those dual imperatives for fostering innovation ambidexterity¹. The access to different sources of external knowledge allows firms with high levels of ACAP to sense and seize opportunities and experiment with newly acquired information (Flatten *et al.*, 2011), which stimulates digitally oriented firms’ exploration efforts. At the same time, the ability to internally evaluate the value-add of the new information on the basis of a large, already existing knowledge base facilitates assimilation of information and ensures efficient practice of pursuing only selected innovation activities (Zahra and George, 2002), which stimulates exploitation in digitally oriented firms. As firms might be tempted to choose either outward-looking exploration or inward-looking exploitation (Xue, Ray and Sambamurthy, 2012), a firm’s ACAP helps to mitigate an excessive dominance of one or the other and strengthens DO’s capacity to balance internal and external knowledge flows (Cohen and Levinthal, 1990; Rothaermel and Alexandre, 2009). Interacting with a variety of digital technologies, ACAP further enables firms high in DO to dynamically balance

¹ While we acknowledge a potential direct effect of ACAP on ambidexterity (cf. Schilke *et al.*, 2018; Steininger *et al.*, 2022), we do not hypothesize this relationship to retain conceptual focus on the role of digital resource combinations.

innovation activities at a speed and ease that would have not been possible in non-digital organizational surroundings (Warner and Wäger, 2019). As innovation ambidexterity requires firms to identify and respond to environmental threats and opportunities, ACAP as a dynamic capability allows those firms to sense and seize emerging opportunities and reconfigure their digitally oriented resource base accordingly, both for exploitative and exploratory purposes (Tushman and O'Reilly, 1996; Teece, Pisano and Shuen, 1997; Birkinshaw, Zimmermann and Raisch, 2016). Thus, we hypothesize:

H2: ACAP positively moderates the association between DO and innovation ambidexterity.

Previous research suggests that dynamic capabilities are most valuable when market conditions change (Teece, Pisano and Shuen, 1997). In particular, the utilization and manipulation of new knowledge is critical in turbulent markets (Grant, 1996). As customers change preferences regularly in turbulent markets, ACAP becomes more relevant for digitally oriented firms to understand emerging opportunities and exploit incremental chances, or foresee and explore arising radical market changes. The threat of missing out on important opportunities or of even becoming entirely obsolete in the marketplace is also higher in dynamic markets, intensifying the need to anticipate and dynamically adjust (Birkinshaw, Zimmermann and Raisch, 2016). Interdependencies in digital ecosystems, adaptation needs of digital infrastructures, and changes in organizational routines are also contingent on market turbulences and arising tensions might intensify (Tilson, Lyytinen and Sørensen, 2010), making efficient management of information flows even more crucial to help digitally oriented firms balance contradictory activities and eventually foster ambidexterity. Hence, we hypothesize:

H3: The positive moderation of ACAP on the association between DO and innovation ambidexterity is stronger when market turbulence is high than when it is low.

3 Methodology

3.1 Data and sample

We gathered primary data through an online survey that we conducted over a period of two months at the end of 2020. We chose Germany as a study context because it comprises a broad range of different industries and sectors, enabling the generalizability of our findings (Subramaniam and Youndt, 2005). Also, while Germany has established a growing landscape of digital start-ups and innovative companies, many traditional incumbent SMEs and the overall governmental system are still lagging behind when it comes to digitalization (DW, 2021). The chosen setup of German firms offers an interesting research context. We identified and randomly selected companies using Germany's largest professional industry databases Dafne and Bisnode. We chose companies of different sizes, ages, and industries to ensure generalizability of our findings. We targeted the chief executive officer (CEO) as they have been identified to have a good overview of the entire organization's activities (Kumar, Stern and Anderson, 1993), including its innovation initiatives (Yan, Strese and Chwallek, 2018). In total, we identified 20,100 companies that we invited to take part in our survey. We undertook several activities to increase the response rate and sent two successive reminder e-mails. We received 1,843 responses corresponding to a 10% response rate, which is typical for web-based surveys (Klassen and Jacobs, 2001). After excluding unusable answers, we ended up with a final data set of 1,474 observations. In this sample, we find a broad representation of firm sizes (with most firms employing between 50 and 1,000 employees) and firm ages. The sector distribution of all responding firms reflects the overall industry distribution in Germany.

3.2 Measures

Except for DO, our survey mostly used established scales from the literature. Multi-item measures were evaluated on 7-point Likert scales, ranging from 1 ("does not apply at all") to 7 ("fully applies"), and are reflectively specified (Podsakoff *et al.*, 2003). A systematic review of the literature on digitalization revealed that existing proxies or scales are limited in assessing the multi-dimensional implications of digital technologies on organizational functioning and strategic practices. For this

reason, we followed a thorough multi-step process to develop a new survey instrument (Churchill, 1979; DeVellis, 2012), building on the DO domain (Kindermann *et al.*, 2021). Our empirically validated DO scale is a second-order construct consisting of nineteen items across the dimensions of *digital technology scope*, *digital capabilities*, *digital ecosystem coordination*, and *digital architecture configuration*. We operationalized innovation ambidexterity as a second-order construct which is reflected by the two first-order dimensions exploratory and exploitative innovation. Following advice of prior research (e.g., He and Wong, 2004; Cao, Gedajlovic and Zhang, 2009), we multiplied exploratory and exploitative innovation to measure the combined magnitude of both variables that complement each other. Scales for exploratory and exploitative innovation were borrowed from Jansen, Van Den Bosch and Volberda (2006) consisting of six items each. We measured ACAP using Flatten *et al.*'s (2011) fourteen-item scale, which draws on the four ACAP dimensions defined by Zahra and George (2002). As suggested by Flatten *et al.* (2011), we aggregated the dimensions acquisition, assimilation, transformation, and exploitation to a second-order construct. We measured market turbulence using the five-item scale of Jaworski and Kohli (1993) that captures the degree to which the preferences of a firm's customers tend to change over time. Following the literature on digitalization and innovation ambidexterity, we included firm-specific and external control variables into our research. In line with Kortmann (2015) and Sebastian *et al.*, (2017), we controlled for firm size (measured in number of employees) and firm age (measured in years since founding). While larger firms might be able to dedicate more resources to the simultaneous realization of ambidextrous behaviors, they might also lack the flexibility to explore (Jansen *et al.*, 2009). As previous studies have shown, older firms have difficulties in keeping pace with external developments, but have also accumulated over time the expertise that advances innovation (Chen and Hambrick, 1995; Sørensen and Stuart, 2000). We further included two dummies as control variables to account for customer types (B2B vs. B2C) and industry sector (producing vs. service). Finally, we also controlled for technological turbulence (Jaworski and Kohli, 1993) to account for the influences of environmental factors (Lavie, Stettner and Tushman, 2010; Nambisan *et al.*, 2017).

4 Results

Before examining our hypotheses, we analyzed the quality of our measurement approach. We first conducted an exploratory factor analysis (EFA) and find that all items load on their respective constructs and exhibit high ($>.50$) and significant factor loadings (Hair *et al.*, 2009). Next, we conducted a confirmatory factor analysis (CFA) and can attest a good model fit (CFI=.95; TLI=.94; $\chi^2/df=3.29$; RMSEA=.04; SRMR=.05) (Hu and Bentler, 1999; Brown, 2015). In assessing internal consistency, we find that all our constructs exceed recommended thresholds for Cronbach's Alpha $\geq .70$ (Nunnally, 1978), composite reliability (CR) $\geq .60$ (Bagozzi and Yi, 1988), and average variance extracted (AVE) $\geq .50$ (Fornell and Larcker, 1981; Bagozzi and Yi, 1988). Discriminant validity for all measures is also supported, based on the premise that each construct's square root of the AVE is greater than the inter-construct correlations (Fornell and Larcker, 1981). We conclude that all our constructs are valid and reliable. To control for potential issues of multicollinearity, we followed Kalnins (2018) and compared correlations and respective beta coefficients of our core constructs. We further assessed variance inflation factors (VIFs). All VIF values were below 2.10, lower than the recommended threshold of 10 (Aiken and West, 1991). Results indicate that multicollinearity unlikely distorts our results. Next, we tested for potential biases. Following Armstrong and Overton (1977), we compared responses from early and late respondents and observe no significant differences, suggesting that non-response bias is not a concern. Further, we controlled for common method bias (Podsakoff *et al.*, 2003). We conducted several pre-tests, ensured our study participants anonymity, separated dependent and independent variables within the survey flow, and encouraged honest answers. For statistical reasons, we also included a three-item marker variable (Johnson, Rosen and Djurdjevic, 2011) and conducted three statistical tests. First, we conducted Harman's one factor test (Podsakoff *et al.*, 2003). The factor analysis revealed some factors with an Eigenvalue greater than one, however no single factor accounted for more than 34% of the variance. Having further applied the partial correlation analysis by Lindell and Whitney (2001) and the comprehensive CFA marker technique by

Williams, Hartman and Cavazotte (2010), we are confident that common method bias is not likely to affect our data. We examined our hypotheses empirically by means of a hierarchical ordinary least square regression analysis. To further reduce multicollinearity issues, we mean-centered all multi-item constructs, except for the dependent variable, before calculating the interaction terms. We included control variables, our dependent variable DO, the interaction term between DO and ACAP, as well as the three-way interaction term between DO, ACAP, and market turbulence in four regression models with innovation ambidexterity as dependent variable (*Table 1*).

Variables	Model 1	Model 2	Model 3	Model 4
Firm age	-.19** (.07)	-.15* (.06)	-.07 (.05)	-.08 (.05)
Firm size	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Industry sector dummy	-2.16*** (.62)	-4.30*** (.56)	-2.43*** (.51)	-2.28*** (.52)
Customer type dummy	4.49*** (.77)	3.47*** (.68)	3.28*** (.63)	3.38*** (.63)
Technological turbulence	2.60*** (.15)	1.04*** (.16)	.13 (.16)	.12 (.16)
H1: Digital orientation (DO)		4.40*** (.22)	2.35*** (.25)	2.36*** (.25)
Absorptive capacity (ACAP)			2.39*** (.20)	2.52*** (.21)
Market turbulence (MT)			3.39*** (.29)	3.59*** (.30)
H2: DO x ACAP			.47*** (.13)	.36* (.30)
DO x MT				-.25 (.17)
MT x ACAP				.34 (.23)
H3: DO x ACAP X MT				-.19* (.09)
Constant	20.46*** (.99)	22.47*** (.91)	20.64*** (.83)	20.58*** (.83)
F	69.23	145.20	179.00	146.40
Adjusted R-square	.23	.40	.51	.51
Change in adjusted R-square		.17***, ^a	.11***, ^b	.11**, ^b

Note: Standardized coefficients are reported; Standard errors in parentheses; * $p < .05$; ** $p < .01$; *** $p < .001$; ^a Compared to Model 1; ^b Compared to Model 2

Table 1. Results of hierarchical regression on innovation ambidexterity.

H1 predicts that DO is positively associated with innovation ambidexterity. This hypothesis is supported by model 2, which demonstrates the significant and positive relationship ($\beta=4.40$, $p<.001$). Model 3 shows that the interaction term between DO and ACAP is significant ($\beta=.47$, $p<.001$). The results of a simple slope test, following Aiken and West (1991) and Jaccard, Wan, and Turrisi (1990), confirms that the relationship between DO and innovation ambidexterity is strengthened when ACAP is high, providing support for H2. The explanatory power of our models increases when DO is introduced (ΔR^2 adj.=.17, $p<.001$) as well as when the interaction term between DO and ACAP is introduced (ΔR^2 adj.=.11, $p<.001$). Model 4 reveals that the three-way interaction between DO, ACAP, and market turbulence is significant ($\beta=-.19$, $p<.05$). To determine the direction of this moderation, we followed Dawson and Richter (2006) and conducted a slope difference test. We find no significant differences between low and high ACAP under high levels of market turbulence (simple slope: $t=.57$; $p>0.05$). Thus, H3 is not supported.

5 Discussion

The encompassing nature of digitalization has questioned long-held assumptions across a variety of research fields (Nambisan, Lyytinen and Yoo, 2020). Drawing on the RBV and the dynamic capabilities view, this study set out to study the implications of a firm's DO on innovation ambidexterity. We contribute to literature in three important ways. First, our study extends our knowledge on the drivers of innovation ambidexterity in a digital context and, to the best of our

knowledge, is the first of its kind to empirically link a strategic orientation, which concerns the application of digital technologies, with an ambidextrous innovation behavior in a multi-industry setting. Following previous research on the question of how to resolve apparently paradoxical demands of exploration and exploitation (Park, Pavlou and Saraf, 2020; Gibson and Birkinshaw, 2004; Gregory et al., 2015), we find a firm's DO to facilitate innovation ambidexterity through the development and alignment of digital technologies, related organizational routines, the emerging digital ecosystems, and its digital architecture. We add to previous research by showing that digitalization is not only a context or outcome of innovation ambidexterity, but can also function as an enabler. Our newly developed survey scale also enables other scholars to operationalize the presented conceptualization of DO and thereby advance future research in the area (Berger *et al.*, 2021). Second, we further qualify this insight as we identify the contingent role of ACAP. Our study shows that ACAP positively moderates the relationship between DO and innovation ambidexterity. This finding emphasizes the importance of sensing and seizing the ever-increasing number of opportunities and threats caused by the ubiquity of digital technologies in order to enrich the existing information and technology base and balance priorities for either exploration or exploitation (Teece, Pisano and Shuen, 1997). Hence, our study indicates the critical role dynamic capabilities play in supporting value creation and capture in the digital era, and underlines the importance of additional research in this domain (Steininger *et al.*, 2022). To our surprise, we did not find evidence that the effect of ACAP is further strengthened in turbulent market environments. A potential explanation could be that firms in turbulent market environments are tempted to place disproportionate focus on the "outward" looking dimension of ACAP, thus stimulating exploration over exploitation and thereby disrupting the balance of innovation ambidexterity (Sidhu, Volberda and Commandeur, 2004). Third, on a more general note, our findings have implications for theoretical development in the domain of digital innovation. Following several research calls (Nambisan *et al.*, 2017; Kohli and Melville, 2019; Appio *et al.*, 2021), we advance current theorizing in the field by shedding light on the innovation implications of idiosyncratic digital technology characteristics, as reflected in the comprehensive concept of DO. In that, our study adds to a fresh perspective on resource-based theories in the digital era. More specifically, we account for the multifaceted role of digital technologies not only as operand, but also as operant resources (Nambisan, 2013; Lyytinen, Yoo and Boland Jr., 2016). We find that DO represents a valuable strategic orientation which is crucial for the effective and efficient use of digital technologies in innovation activities (Barney, 1991; Kindermann *et al.*, 2021). Our research should help managers to more effectively steer digital transformation efforts and strike the right balance between exploring new business opportunities while re-vitalizing the legacy business. The multidimensional nature of the DO construct and our newly operationalized survey scale provide actionable guidelines on how to prepare an organization for those challenges in a digital era. This research is also relevant for policymakers. As digitally oriented firms contribute to higher-level impacts at the societal level by enhancing innovation outcomes, which are crucial drivers of growth for nations (e.g., Tellis, Prabhu, and Chand, 2009), policymakers are urged to create supportive conditions and incentives for fostering digitalization initiatives or providing the required infrastructure that allow those firms to further keep up with the increasing speed of digitalization.

Our study contains limitations that may also provide opportunities for further research. First, while we thoroughly justified and proficiently employed latent constructs in our study, we also acknowledge constraints of our primary data measurement approach. Future research could hence enrich survey measures with secondary data, such as computer-aided text analyses (CATA) for determining the level of DO (Kindermann *et al.*, 2021). Second, as we draw on data from German companies, our results must be considered in the context of this highly developed country. Further research should analyze the proposed relationships in less developed contexts, where technological advancements can be less mature. Third, DO is still a new construct and the broader nomological context remains to be comprehensively developed. Future studies should therefore investigate additional boundary conditions on an individual, firm, and environmental level to demonstrate that the DO-innovation relationship depends on various other internal and external contingencies.

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