VALUE CREATION THROUGH STRATEGIC INVESTMENTS IN DIGITAL TECHNOLOGIES: THE ROLE OF ORGANIZATIONAL AGILITY

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VALUE CREATION THROUGH STRATEGIC INVESTMENTS IN DIGITAL TECHNOLOGIES: THE ROLE OF ORGANIZATIONAL AGILITY

Research in Progress

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Abstract

The impact of traditional information technology resources on organizational agility and performance has been extensively studied. However, strategic information systems research still lacks a deeper understanding about the value creation mechanisms of strategic investments in emergent and innovative digital technologies like analytics, big data, cloud, social media and mobile platforms. Drawing on the digital options theory and dynamic capability theory, we propose a conceptual model in which the positive effect of digital business intensity on competitive advantage is mediated by sensing and responding agility, two underlying dimensions of organizational agility. Empirical analyses of survey-based data from 342 German firms suggest that digital business intensity is positively related to both sensing and responding agility. Moreover, sensing and responding agility mediate the relationship between digital business intensity and competitive advantage. Consequently, this study contributes to the literature by shedding light on the value creation mechanisms of strategic investments in digital technologies.

Keywords: Digital business intensity, organizational agility, competitive advantage, digital options theory, dynamic capability theory.

1 Introduction

Prior research argues that organizational agility, a firm’s ability to sense and respond to emerging opportunities and threats quickly, constitutes a critical dynamic capability to succeed in today’s dynamic environments (Overby et al., 2006; Sambamurthy et al., 2003). Accordingly, the strategic information systems (IS) literature discusses the enabling role of established information technology (IT) and emergent digital technologies for organizational agility (e.g., Nazir and Pinsonneault, 2012; Schilke et al., 2018; Tallon et al., 2019). However, critical gaps regarding antecedents and mediating effects of sensing and responding agility, two core dimensions of organizational agility (Overby et al., 2006; Yang and Liu, 2012), remain.

First, the enabling role of established IT resources as generator of digital options is increasingly questioned by some scholars, which call to re-direct academic attention towards emergent digital technologies (e.g., analytics, big data, cloud, social media and mobile platforms). Nwankpa and Datta (2017, p. 472) argue that such technologies can shift “an organization’s portfolio of assets, processes and [value creation] paths”. At the same time, Appio et al. (2018, p. 2) note that “how digital technologies sustain—and change—the foundations of […] dynamic capabilities […] remains underexplored.” Second, dynamic capability theory posits that dynamic capabilities translate the value inherent to resources (e.g., digital technologies) into competitive advantage (Eisenhardt and Martin, 2000; Teece, 2007; Teece et al., 2016). Yet, empirical proof is needed to validate this theoretical
mechanism in the context of strategic investments in digital technologies and organizational agility (Tallon et al., 2019). Similarly, managers need academic insights about whether to invest in digital technologies and sensing and responding agility to outperform their competitors in fast-paced markets. This study aims to substantiate whether digital options theory and dynamic capability theory can explain the link between a firm’s level of strategic investments in digital technologies (i.e., digital business intensity), sensing and responding agility, and competitive advantage. Hence, this study aims to answer the following research questions: How does a firm’s digital business intensity relate to its ability to sense and respond to opportunities quickly? Do sensing and responding agility mediate the relationship between a firm’s digital business intensity and competitive advantage? To address these questions, we performed an empirical study based on survey data obtained from mid-level managers from 342 medium and large-sized firms located in Germany. Our study contributes to strategic IS research in three ways. First, we add to the literature by theorizing and empirically validating a firm’s digital business intensity as an antecedent of sensing and responding agility. Thereby, we illustrate how strategic investments in digital technologies can generate novel digital options, providing further arguments for the explanatory role of digital options theory in the context of organizational agility research (Fichman, 2004; Richardson et al., 2014; Sandberg et al., 2014). Second, we enrich the discussion on the mediating role of dynamic capabilities (Schilke et al., 2018) by demonstrating how sensing and responding agility translate the value embedded in digital technologies into competitive advantage. Third, we add to the debate on the operationalization of organizational agility (e.g., Park et al., 2017) by highlighting that nuanced insights can be achieved by focusing on sensing and responding agility.

2 Theory and Hypotheses

The strategic management literature focuses intensively on dynamic capabilities as source for competitive advantage in fast-paced environments. Dynamic capabilities represent a firm’s ability to sense environmental changes, seize opportunities, and reconfigure its resource base (Teece, 2007). Building on this theoretical foundation, strategic IS researchers characterize organizational agility as a specific type of dynamic capability that enables firms to sense and respond to environmental changes quickly (Nazir and Pinsonneault, 2012; Overby et al., 2006). Research highlights that different conceptualizations of organizational agility exist (sensing and responding agility, market and operational adjustment agility, etc.) (Conboy, 2009; Lu and Ramamurthy, 2011; Tallon and Pinsonneault, 2011). This study focuses on sensing and responding agility, which are considered as core underlying dimensions of organizational agility by some authors (Liu and Yang, 2020; Overby et al., 2006). Second, organizational agility is specifically relevant in dynamic markets; thus, speed is a key element of sensing and responding agility (Roberts and Grover, 2012).

The strategic IS literature highlights the enabling role of IT resources for dynamic capabilities (Macher and Mowery, 2009; Pavlou and El Sawy, 2010). Sambamurthy et al. (2003) posit that information technologies serve as a platform for organizational agility by generating digital options. Digital options are “unique IT-enabled capabilities in the form of flexible digitized enterprise work processes and knowledge systems” (Richardson et al., 2014, p. 2) and provide firms with preferential access to opportunities (Sandberg et al., 2014). Hence, digital options theory posits that IT investments enable a firm’s sensing and responding agility by integrating information technologies into existing processes and knowledge systems (Overby et al., 2006; Richardson et al., 2014; Sambamurthy et al., 2003). Yet, some scholars question whether investments in “traditional” information technologies (e.g., ERP, SCM, CRM systems)—considering their homogeneity and ubiquity—can (still) generate digital options in today’s dynamic environments (Chae et al., 2014; Masli et al., 2011). Therefore, an emerging research stream focuses on novel and innovative digital technologies (e.g., analytics, big data, cloud, social media, and mobile platforms). Accordingly, Nwankpa and Datta (2017) define a firm’s digital business intensity (DBI) as the level of strategic investments in such digital technologies, which are adopted and used in business transactions, operations, and processes. Hence, DBI differs from the digital capabilities concept, which assesses a firm’s competence to use digital technologies.
(Lu and Ramamurthy, 2011; Nwankpa and Datta, 2017). Moreover, DBI differs from “traditional” IT capabilities, which are rooted in legacy systems and processes and constitute the base of a firm’s IT operations and business processing (Bharadwaj, 2000; Nwankpa and Datta, 2017).

Initial studies suggest a direct positive effect of digital business intensity on firm performance (Nwankpa and Datta, 2017). Yet, digital options theory and dynamic capability theory pose that IT resources (i.e., digital technologies) are only indirectly linked to competitive advantage through digital options and dynamic capabilities. As illustrated in Figure 1, this study argues that investments in emergent digital technologies create digital options that enhance sensing and responding agility (i.e., a dynamic capability), which, in turn translate a firm’s resources into competitive advantage.

![Figure 1. Research model.](image)

### 2.1 Digital business intensity and organizational agility

Sensing agility represents a firm’s ability to search and scan for, learn from, and interpret information about changing environments quickly (Park et al., 2017). Recent studies indicate that strategic investments in emergent and innovative digital technologies allow firms to create value in the form of learning and knowledge creating activities (e.g., Vial et al., 2019). For instance, Fitzgerald (2016) demonstrate how General Motors leverages Internet of Things (IoT) technologies to anticipate changing customer needs. Additionally, firms can use mobile and social media technologies to collect customer-related information (Chierici et al., 2019; Chuang, 2020; Foltean et al., 2019). Other studies show how big data analytics technologies allow firms to create insights about competitor moves and economic changes from large volumes of data (e.g., Günther et al., 2017). Furthermore, Bharadwaj et al. (2013) highlight that the use of such technologies helps managers to interpret complex environmental changes as basis for better-informed decision-making. Thus, we argue that strategic investments in digital technologies increase a firm’s ability to collect, structure, and interpret information about emerging opportunities and threats. Hence, we hypothesize:

**Hypothesis 1:** Digital business intensity is positively related to sensing agility.

Responding agility refers to a firm’s ability to quickly adjust internal resources and business and production processes, introduce new products or services, implement new pricing schedules, or create strategic partnerships to react to opportunities and threats (Overby et al., 2006). Prior research suggests that IT resources constitute key enablers of responding agility (Overby et al., 2006; Sambamurthy et al., 2003). Yet, firms can also generate digital options in the form of digitized processes through emergent and innovative digital technologies (Vial, 2019). The study of Günther et al. (2017) indicates that investments in big data analytics technologies allow firms to automate, and thus increase the speed of internal business processes. Research on digital innovation further suggests that the application of digital technologies, such as analytics or social media apps, can accelerate processes related to the development and launch of new products and services (Huang et al., 2014; Nambisan et al., 2017). Additionally, Holmström et al. (2019) describe how cloud technologies can speed up intra- and inter-organizational supply chain processes, for example through increased transparency for all parties or digital transactions. Moreover, qualitative studies by Kohli and Johnson (2011) and Fitzgerald et al. (2013) about the digital transformation of Encana Oil and General Electric
show how digital technologies facilitate quick adjustments of pricing and production processes. Thus, we argue that by increasing the degree of digitized processes within and across different functions, strategic investments in digital technologies enhance a firm’s ability to rapidly respond to emerging business opportunities and threats. Consequently, we hypothesize:

**Hypothesis 2:** Digital business intensity is positively related to responding agility.

### 2.2. The mediating role of organizational agility

According to Kane (2014) and Vial (2019), digital technologies by themselves create little value. Integrating digital options and dynamic capability theory, we argue that digital business intensity is only indirectly linked to competitive advantage. Strategic investments in digital technologies generate digital options that provide firms with a larger repertoire of competitive actions. To achieve and sustain a competitive advantage, firms can exercise these options by adapting and leveraging its digital technologies through valuable and hard-to-replicate dynamic capabilities (Eisenhardt and Martin, 2000; Felipe et al., 2020; Teece, 2007; Teece et al., 2016), such as sensing and responding agility.

Firms with a high sensing agility can leverage information created through digital technologies to identify changing customer needs or competitor activities quickly. Thus, these firms do not miss or prioritize the most valuable opportunities, enhancing their customer value and competitive action efficacy (Bhatt et al., 2010; Roberts and Grover, 2012a; Yang and Liu, 2012). Firms can also use customer insights obtained through digital technologies to pro-actively develop new value propositions, strengthening their strategic position in the market (Grover et al., 2018). Additionally, firms can identify threats (e.g., supply chain disruptions) early by leveraging information generated from digital technologies, minimizing financial risks (Ivanov et al., 2019). Hence, we argue that firms with high sensing agility can exercise digital options in the form of digitized knowledge, which are available in firms with high digital business intensity, to achieve a competitive advantage. Consequently, we hypothesize:

**Hypothesis 3:** Sensing agility fully mediates the relationship between digital business intensity and competitive advantage

Firms with high responding agility can leverage processes that are enhanced through digital technologies to respond to opportunities or threats. In fact, these firms can quickly react to changes in product demand, accelerate the speed of innovations, and expand into new markets, resulting in superior strategic and financial performance (H. Chen et al., 2012; Y. Chen et al., 2017; Tallon and Pinsonneault, 2011). Prior research indicates that firms can improve capacity utilization, operational flexibility, customer retention, and ultimately revenues while reducing costs, by leveraging digital technologies in manufacturing and supply chain processes when responding to opportunities or threats (Ghobakhloo, 2020; Gillani et al., 2020; Ivanov et al., 2019; Vial, 2019). Additionally, firms can integrate digital technologies into innovation processes to quickly develop and commercialize new products or services, strengthening their strategic position in dynamic markets (Grover et al., 2018; Kohli and Melville, 2019; Nambisan et al., 2017). Hence, we pose that firms with high responding agility can exercise digital options in the form of digitized processes, which are generated through strategic investments in digital technologies, to achieve competitive advantage. Thus, we hypothesize:

**Hypothesis 4:** Responding agility fully mediates the relationship between digital business intensity and competitive advantage.

### 3 Methodology

#### 3.1 Sample and data collection

We randomly obtained our initial sample from the LexisNexis database. To maximize the generalizability of our results, we contacted medium and large-sized firms from manufacturing (e.g., Automotive, Chemicals, Energy, Machinery) and non-manufacturing industries (e.g., Financial
Services, Software, Media) via email. The online survey targeted mid-level managers from R&D, IT, Marketing, and Strategy. These managers are informed about their firm’s decisions about investments in digital technologies, capabilities and performance (Nwankpa and Datta, 2017; Park et al., 2017). The questionnaire was pre-tested with academic and industry experts and translated following well-established back-translation methods (Dillman, 1991). To prevent common method bias, we informed the respondents that all answers are treated fully anonymously (Podsakoff et al., 2003). We completed the data collection in September 2020 with responses from 570 firms (response rate = 12%). We excluded responses with missing data and from unengaged or uninformed participants. Our final sample consisted of 342 firms. Moreover, we obtained responses from second key informants for about 30 percent of the firms to validate our results further (LeBreton and Senter, 2008).

3.2. Operationalization of constructs and validation procedures

We relied on established multi-item scales to measure our latent constructs. For digital business intensity, we used Nwankpa and Datta’s (2017) first-order construct with four items. We measured sensing agility and responding agility with the first-order constructs from Park et al. (2017) and Tallon and Pinsonneault (2011), respectively. For competitive advantage, we used Schilke’s (2014) construct with strategic and financial performance as underlying dimensions. All measures were operationalized as seven-point Likert scales, anchored at 1 (“strongly disagree”) and 7 (“strongly agree”).

Following prior studies on organizational agility and competitive advantage, we included a firm’s age, size, industry, customer focus, and technology intensity as well as organizational slack, knowledge assets, and environmental dynamism as control variables (Lin et al., 2017; Park et al., 2017). Following Chakravarty et al. (2013), we logarithmized firm age and firm size to better fit to a normal distribution. We assessed the multi-item constructs organizational slack (Danneels, 2008), knowledge assets (Lin et al., 2017), and environmental dynamism (Schilke, 2014) with seven-point Likert scales. Lastly, we used binary measures for firm industry (i.e., manufacturing vs. other industry), customer focus (i.e., B2B vs. B2C focus), and technology intensity (i.e., high vs. low-technology).

We conducted an exploratory factor analysis using SPSS and a confirmatory factor analysis using AMOS (Version 26) to test the validity and reliability of our latent constructs. Cronbach’s alpha and composite reliabilities of all latent factors exceeded the common thresholds of 0.7. The average variances extracted (AVE) were also above the 0.5 threshold (Bagozzi et al., 1991; Hair et al., 2010). We confirmed discriminant validity by comparing the square root of AVE for each factor with the respective inter-factor correlations (Fornell and Larcker, 1981). Moreover goodness of fit measures for the overall model showed good fit ($\chi^2=1.031.38; df=580; \chi^2/df=1.778; CFI=0.943; TLI=0.934; RMSEA=0.048; PCLOSE=0.777$) in the confirmatory factor analysis (Hair et al., 2010).

Lastly, we controlled for common method bias, non-response bias, and (single) informant bias. To rule out common method bias, we followed guidelines by Podsakoff et al. (2012). First, we conducted Harman’s single factor test with an unrotated factor solution. The test revealed an explained variance of 27%, which is below the threshold of 50%. Second, we applied the common latent factor (CLF) test including a marker variable. The very small differences (<0.200) between the regression weights for the models with and without CLF statistically confirmed that common method bias is not an issue in our data set (Hair et al., 2010). To assess non-response bias, we compared the first three quarters of respondents to the last quarter (Armstrong and Overton, 1977). We found no significant differences between the responses of early and late respondents, supporting that non-response bias is not a problem in our sample. To control for informant bias, we compared the means of different response groups (i.e., based on respondents’ position and function). The Kruskal-Wallis tests did not show any significant differences ($p > 0.05$) among groups for the latent factors. To test for single informant bias, we calculated inter-rater reliabilities (ICC1) based on McGraw and Wong (1996) via one-way, random effect models. The $ICC(1)$ values for digital business intensity, sensing and responding agility, and competitive advantage exceeded Bliwise’s, (1998) threshold of 0.1. These results supported that the responses from our key informants were reliable (LeBreton and Senter, 2008; Schilke, 2014).
4 Preliminary Empirical Results

Table 1 summarizes descriptive statistics and pairwise Pearson correlation coefficients for the latent factors. All coefficients were below the threshold of 0.8, indicating that multicollinearity should not be an issue. This is further supported by the analysis of variance inflation factors, which were well below the more conservative threshold of 3.3 (Hair et al., 2010).

<table>
<thead>
<tr>
<th>Construct</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Digital business intensity</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Sensing agility</td>
<td>0.36***</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Responding agility</td>
<td>0.33***</td>
<td>0.53***</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Competitive advantage</td>
<td>0.22***</td>
<td>0.46***</td>
<td>0.41***</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Knowledge assets</td>
<td>0.23***</td>
<td>0.29***</td>
<td>0.32***</td>
<td>0.25***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Organizational slack</td>
<td>0.26***</td>
<td>0.31***</td>
<td>0.40***</td>
<td>0.37***</td>
<td>0.24***</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>(7) Environmental dynamism</td>
<td>0.29***</td>
<td>0.06</td>
<td>0.21***</td>
<td>0.02</td>
<td>0.08</td>
<td>-0.02</td>
<td>1.00</td>
</tr>
<tr>
<td>Mean</td>
<td>5.30</td>
<td>5.22</td>
<td>4.36</td>
<td>4.66</td>
<td>5.00</td>
<td>5.00</td>
<td>3.65</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>1.35</td>
<td>0.97</td>
<td>1.15</td>
<td>1.18</td>
<td>0.92</td>
<td>1.34</td>
<td>1.36</td>
</tr>
</tbody>
</table>

n = 342; ***p < 0.01 **p < 0.05 *p < 0.1

Note: Correlations with other control variables (e.g., firm size and age) are not shown.

Table 1. Descriptive statistics and correlation matrix for multi-item constructs

We applied regression-based mediation analyses to validate our hypotheses. We followed guidelines from Preacher and Hayes (2008) and tested the effects of the two mediators simultaneously in one model. As shown in Table 2, we calculated the direct effects of controls (Model 1), the independent variable digital business intensity (Model 2), and the two mediators sensing and responding agility on the dependent variable competitive advantage (Model 3). Additionally, we calculated the direct effects of digital business intensity on sensing agility (Model 4) and responding agility (Model 5).

We found that digital business intensity, when considered in isolation (Model 2), is positively and significantly related to competitive advantage (b=0.092, p=0.063). Model 4 and 5 indicated significant positive direct associations between digital business intensity and sensing agility (b=0.194, p=0.000) and responding agility (b=0.150, p=0.001), confirming H1 and H2. Moreover, we found positive and significant direct effects of sensing agility (b=0.346, p=0.000) and responding agility (b=0.174, p=0.005) on competitive advantage (Model 3). The inclusion of the mediator variables eliminated the significant correlation between digital business intensity and competitive advantage, providing initial evidence for a full-mediation model (Baron and Kenny, 1986). Concerning control variables, our results showed that organizational slack was significantly related to all predicted variables, while knowledge assets was significantly related to sensing and responding agility. Also, we found a significant, positive association between a firm’s technology intensity and sensing agility.

Next, we applied the SPSS Process Macro with ten thousand bootstrapping samples to assess the proposed indirect effects. According to Hayes (2017), indirect effects are significant if the 95% bootstrapping confidence intervals (CI) do not include zero. This condition is fulfilled for both indirect effects that link digital business intensity to competitive advantage via sensing agility (CI = 0.0298–0.1106) and responding agility (CI = 0.0041–0.0555). However, the condition is not met by the direct effect of digital business intensity on competitive advantage (CI= -0.0952–0.0925). Thus, H3 and H4, which propose fully mediated relationships, are supported (Zhao et al., 2010).

We conducted three additional analyses as robustness checks. First, we controlled for potential non-linear effects. Second, we assessed whether the inclusion of (insignificant) control variables into our models affected the results. Third, we tested for potential issues of endogeneity caused by omitted
variables using the instrumental variable approach (Bascle, 2008). The three robustness tests provided further support for our findings.

<table>
<thead>
<tr>
<th>Model number &amp; Dependent variable</th>
<th>Model 1: Competitive advantage</th>
<th>Model 2: Competitive advantage</th>
<th>Model 3: Competitive advantage</th>
<th>Model 4: Sensing agility</th>
<th>Model 5: Responding agility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital business intensity</td>
<td>0.092*** (0.049)</td>
<td>0.001 (0.047)</td>
<td>0.194*** (0.039)</td>
<td>0.150*** (0.044)</td>
<td></td>
</tr>
<tr>
<td>Sensing agility</td>
<td></td>
<td>0.346*** (0.070)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responding agility</td>
<td></td>
<td>0.174** (0.062)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge assets</td>
<td>0.048*** (0.015)</td>
<td>0.043*** (0.015)</td>
<td>0.019 (0.014)</td>
<td>0.042*** (0.012)</td>
<td>0.055*** (0.013)</td>
</tr>
<tr>
<td>Organizational slack</td>
<td>0.279*** (0.045)</td>
<td>0.258 (0.046)</td>
<td>0.165*** (0.045)</td>
<td>0.133*** (0.037)</td>
<td>0.266*** (0.042)</td>
</tr>
<tr>
<td>Environmental dynamism</td>
<td>-0.009 (0.048)</td>
<td>-0.025 (0.049)</td>
<td>-0.034 (0.046)</td>
<td>-0.042 (0.039)</td>
<td>0.138** (0.044)</td>
</tr>
<tr>
<td>Firm age (log)</td>
<td>0.094 (0.070)</td>
<td>0.098 (0.069)</td>
<td>0.075 (0.065)</td>
<td>0.078 (0.055)</td>
<td>-0.025 (0.063)</td>
</tr>
<tr>
<td>Firm size (log)</td>
<td>0.034 (0.028)</td>
<td>0.031 (0.028)</td>
<td>0.030 (0.026)</td>
<td>0.026 (0.022)</td>
<td>-0.047 (0.025)</td>
</tr>
<tr>
<td>Customer focus (B2B focus)</td>
<td>0.080 (0.153)</td>
<td>0.082 (0.152)</td>
<td>0.065 (0.142)</td>
<td>-0.023 (0.122)</td>
<td>0.147 (0.138)</td>
</tr>
<tr>
<td>Firm industry (manufacturing industry)</td>
<td>-0.162 (0.142)</td>
<td>-0.098 (0.145)</td>
<td>-0.082 (0.136)</td>
<td>-0.106 (0.116)</td>
<td>0.114 (0.132)</td>
</tr>
<tr>
<td>Technology intensity (high-technology)</td>
<td>0.104 (0.134)</td>
<td>0.089 (0.133)</td>
<td>0.023 (0.124)</td>
<td>0.184* (0.106)</td>
<td>0.011 (0.121)</td>
</tr>
<tr>
<td>Intercept</td>
<td>2.689*** (0.439)</td>
<td>2.327*** (0.478)</td>
<td>0.884* (0.489)</td>
<td>3.175*** (0.382)</td>
<td>1.966*** (0.434)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.181</td>
<td>0.189</td>
<td>0.303</td>
<td>0.236</td>
<td>0.295</td>
</tr>
</tbody>
</table>

Table 2. Results of multiple regression analyses

5 Discussion

5.1 Theoretical and managerial implications

This study offers three main theoretical contributions. First, we add to the strategic IS literature by establishing a firm’s digital business intensity as antecedent of sensing and responding agility. We address calls by Tallon et al. (2019) and Vial (2019) that request further research on the value creation paths of emerging digital technologies. Our study illustrates that firms with a high digital business intensity can leverage digital technologies to quickly sense and respond to opportunities and threats. In this context, our study highlights that firms can generate digital options through strategic investments in digital technologies, supporting the explanatory role of digital options theory in the context of organizational agility research. Second, we contribute to the literature by providing empirical evidence for the mediating role of dynamic capabilities for the link between digital business intensity and competitive advantage. While Nwankpa and Datta (2017) argue for a direct effect of digital business intensity on firm performance, our study shows that firms require strong sensing and responding agility to translate the value embedded in digital technologies into competitive advantage. Hence, we
substantiate dynamic capability theory as pivotal theoretical lens to explain the mechanisms underlying a firm’s competitive advantage. Third, our study contributes to the discussion on the operationalization of organizational agility in empirical IS research (e.g., Tallon et al., 2019). Building on the conceptual definition of organizational agility (Overby et al., 2006), we demonstrate that a more nuanced understanding about digital business intensity’s impact can be achieved by focusing on sensing and responding agility.

Our study also offers various practical implications. Prior research established traditional IT and non-IT related resources as key drivers of organizational agility and competitive advantage. By highlighting the positive impact of digital business intensity, our study provides managers with an additional option in the form of digital technologies when making strategic investment decisions. Furthermore, by emphasizing more intermediate process-level outcomes (i.e., sensing and responding agility) of digital business intensity, managers can better prioritize and assess the effectiveness of their strategic investments in digital technologies.

5.2 Limitations and areas for future research

Our study entails limitations that provide opportunities for future research. One limitation relates to the chosen methodology. On the one hand, the focus on firms located in Germany could affect our finding’s generalizability. Future research would benefit from investigating the underlying phenomena in other regions. On the other hand, future studies could overcome the limitations of cross-sectional data by employing a longitudinal research design with objective performance measures from secondary data sources. Thereby, scholars could provide empirical support for the dynamic capability theory by investigating how sensing and responding agility affect a firm’s competitive advantage over time. By doing so, scholars could also generate nuanced insights about how digital business intensity and sensing and responding agility relate to the underlying dimensions of competitive advantage (i.e., strategic and financial performance). Another limitation relates to the current operationalization of digital business intensity (Nwankpa & Datta, 2017), which does not allow to entangle the specific effects of specific digital technologies (e.g., data analytics vs. cloud technologies). Hence, future research should further investigate the effects of such technologies on sensing and responding agility. A third limitation relates to the fact that we did not consider complementarities between a firm’s digital business intensity and other resources. Building on the complementarity view (Barney, 1991), future research should investigate the interaction effect between traditional IT resources and emergent digital technologies on organizational agility. Moreover, it is important to understand how contingencies affect the relationship between digital business intensity and sensing and responding agility. For instance, it would be interesting to analyze how a firm’s entrepreneurial orientation influences decisions to invest in new digital technologies, which are often associated with higher levels of uncertainty than investments in traditional IT resources (Nwankpa and Datta, 2017).

References


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