

**Essays on Long-term Stakeholder Relationships in
Transition: Digitalization and Globalization in
Mittelstand Firms**

DISSERTATION

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David I. Pielsticker

Zusammenfassung auf Deutsch

Die Stakeholder-Theorie besagt, dass Unternehmen als eine Gruppe von Stakeholdern betrachtet werden können und das Unternehmen diese Stakeholder-Beziehungen strategisch auf der Grundlage ihrer Interessen und Bedürfnisse strategisch managen müssen, um einen optimalen Wert zu schaffen. Neben mangelnden Managementfähigkeiten und begrenzten Ressourcen sehen sich mittelständische Unternehmen mit neuen Herausforderungen im Zusammenhang mit der zunehmenden Globalisierung und Digitalisierung und Aspekten dieser, wie der Automatisierung und der Innovation konfrontiert, die sich auf ihre Geschäftsinfrastruktur sowie auf das Marktumfeld verschiedener Stakeholdergruppen auswirken können. Das übergeordnete Ziel dieser Dissertation ist es, aufbauend auf den 22 Interviews mit Topmanagern in mittelständischen Unternehmen und der theoriegeleiteten systematischen Literaturrecherche in Publikation 1, vier aktuelle Herausforderungen (Publikationen 2 bis 5) für mittelständische Unternehmen zu analysieren. Hierbei soll ein Verständnis geschaffen werden, wie die Beziehungen zu Stakeholdern wie Kunden, Lieferanten und Mitarbeitern bei zunehmender Digitalisierung und Globalisierung sowie bei ausgewählten Aspekten, wie der Automatisierung und der Innovation aufrechterhalten werden können.

Zusammenfassend zeigen die Ergebnisse, dass verschiedene Stakeholdergruppen von der zunehmenden Digitalisierung und Globalisierung und Aspekten dieser, wie der Automatisierung und der Innovation betroffen sind. Das Ausmaß der Auswirkungen ist jedoch kontextabhängig und wird daher von bestimmten Faktoren beeinflusst. Die Ergebnisse deuten darauf hin, dass der transformationale Führungsstil sich scheinbar positiv auf die Stabilität der Lieferantenbeziehungen auswirkt, wenn mittelständische Unternehmen einen niedrigen Automatisierungsgrad aufweisen und wenig von Globalisierung betroffen sind. Auch scheinen stärker globalisierte mittelständische Unternehmen und mittelständische Nicht-Familienunternehmen widerstandsfähiger gegenüber pandemischen Krisen, wenn sie ihr

Geschäftsmodell vor der pandemischen Krise stark digitalisiert haben. Darüber hinaus scheinen mittelständische Unternehmen mit einem hohen Grad der Ambidextrie empfänglicher für Bestrebungen zur verstärkten Automatisierung, was zu einer geringeren Stabilität der Mitarbeiterbeziehungen führt. Diese Ergebnisse legen nahe, dass mittelständische Unternehmen unterschiedlich von den Herausforderungen der zunehmenden Digitalisierung, Globalisierung und Aspekten dieser, wie der Automatisierung und der Innovation betroffen sind und die mittelständischen Unternehmen mit diesen Herausforderungen je nach Situation unterschiedlich umgehen.

Abstract in English

Stakeholder theory states that firms can be viewed as a group of stakeholders and must strategically manage these stakeholder relationships based on their interests and needs to create optimal value. Besides having limited resources and a lack of management skills, Mittelstand firms are facing new challenges related to increasing globalization and digitalization and aspects of these such as automation and innovation, which can impact their business infrastructure as well as the market environment of various stakeholder groups. The overall objective of this dissertation, building on 22 interviews with top managers in Mittelstand firms and the theory-driven systematic literature review in paper 1, is to analyze four current challenges (papers 2 to 5) for Mittelstand firms and understand how to maintain relationships with stakeholders such as customers, suppliers, and employees in the face of increasing digitalization and globalization as well as selected aspects of these such as automation and innovation.

In summary, the results show that various stakeholder groups are affected by increasing digitalization and globalization and aspects such as automation and innovation. However, the extent of the impact is context-dependent and therefore influenced by certain factors. The results indicate that transformational leadership seems to have a positive effect on supplier relational stability when Mittelstand firms have low degrees of automation and are less affected by globalization. In addition, globalized Mittelstand firms and non-family Mittelstand firms seem to be more resilient to pandemic crises if they highly digitalized their business model before the pandemic crisis. Moreover, Mittelstand firms with a high degree of ambidexterity appear more susceptible to efforts to increase automation, leading to lower employee relational stability. These findings suggest that Mittelstand firms are affected differently by the challenges of increasing digitalization, globalization, and aspects of these such as automation and innovation and that Mittelstand firms deal with these challenges differently depending on the

situation.

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List of Abbreviations

AVE	average variance extracted
CABS	Chartered Association of Business Schools
CEO	Chief Executive Officer
cf.	confer
CFA	confirmatory factor analyses
CI	confidence interval(s)
CR	composite reliability
Eds.	editors
e.g.	exempli gratia
et al.	et alii
i.e.	id est
p.	page
pp.	pages
PCA	principal component analyses
RoA	Return on Assets
U.S.	United States
VIF	variance inflation factor(s)

A Introduction

A.1 Motivation of the Research Topic and Research Model

Mittelstand firms represent the majority of all firms in German-speaking countries but also play a decisive role in the international economy (Ayyagari et alii (et al.), 2007; Beck & Demirguc-Kunt, 2006; De Massis et al., 2018). In line with De Massis et al. (2018), Mittelstand firms can be defined as those that are generally small to medium-sized, are globally active, describe themselves as Mittelstand firms and are often controlled and owned by a family. Mittelstand firms adopt value chains characterized by many highly specialized firms, thereby forming a network of stakeholders (exempli gratia (e.g.), buyers and suppliers) with which they develop long-term, collaborative relationships (Heider et al., 2021).

De Massis et al. (2018) and Heider et al. (2021) found that Mittelstand firms usually show high levels of entrepreneurship and are sometimes characterized as having specific benefits such as high innovativeness (De Massis et al., 2018). However, Mittelstand firms also have limitations such as limited resources (Audretsch & Elston, 1997; De Massis et al., 2018; Pissarides, 1999) and low resource capacities due in part to their small firm size (De Massis et al., 2018; Heider et al., 2021). In particular, scarce financial resources (Audretsch & Elston, 1997; Beck & Demirguc-Kunt, 2006; Beck et al., 2005; Pissarides, 1999) and a lack of managerial skills seem to be the primary limitations of Mittelstand firms (Pissarides, 1999).

Against this backdrop, Mittelstand firms face many challenges. In this thesis, I focus on four specific challenges facing contemporary Mittelstand firms: digitalization, globalization and related aspects such as increasing automation and the need to innovate. Digitalization as the multiple “sociotechnical phenomena and processes” of applying digital technologies “in broader individual, organizational and social contexts” (Legner et al., 2017, p. 301) has a fundamental impact on firms’ activities and business models (id est (i.e.), how firms create value) (Björkdahl, 2020; Rachinger et al., 2019; Strina et al., 2021). At the same time,

digitalization is placing firms under pressure to rethink their strategic business goals (Rachinger et al., 2019), which can change market environments and lead to new long-term corporate relationships with various stakeholders such as employees, suppliers and customers (Rachinger et al., 2019; Strina et al., 2021). According to Lerch et al. (2017) and Saam et al. (2016), the current level of digitalization in Mittelstand firms still has a lot of room for improvement and requires further development. Saam et al. (2016) found that only approximately 20% of the examined Mittelstand firms can be considered as “digital pioneers” in terms of their degree of digitalization (these firms had a business model based on digital services or products). By contrast, 50% are in the “midfield” in terms of the degree of digitalization since these firms are characterized by the use of basic digital applications such as networked information and communication systems (Saam et al., 2016). This seems surprising, as most of these firms are often considered to be “hidden champions”, with many global market leaders in certain niches (Ludwig et al., 2016; Simon, 1996).

Similarly, Mittelstand firms also face the challenge of increasing globalization and related individual aspects such as automation and innovation. Globalization, the increasing interdependence of markets and production for stakeholders in different countries (Knight, 2000; Smeral, 1998), may lead to turbulence in markets or increase international marketing opportunities, which can in turn affect the activities and performance of Mittelstand firms (Knight, 2000). Also, Mittelstand firms often lack resources and capabilities (Knight, 2000) and tend to have a solid regional and local focus, making it more difficult to compete in the globalized market characterized by low-cost suppliers from emerging countries such as Indonesia and India, where variable costs such as wages are much lower than those in Western developed countries such as the United States (U.S.) (Li et al., 2012). In this vein, to remain globally competitive, firms have to constantly improve their efficiency by taking advantage of the opportunities offered by business innovation such as automation (Wright & Schultz, 2018).

On this point, areas of tension such as the adaptability of cyber-physical production systems and introduction strategies, employee qualifications, human-machine collaboration and occupational health and safety (Ludwig et al., 2016) are increasingly coming to the fore. The benefits associated with business automation such as production efficiency, lower costs and reliable production (Parthasarthy & Sethi, 1992) are often weighted more heavily than the adverse effects of automation on employees such as lay-offs (Gasteiger & Prettner, 2017). As a result, employees may lose their long-term commitment to and trust in their employers due to automation, thus affecting long-term stakeholder relationships.

In this context, stakeholder theory encourages us to view firms as “vehicles through which stakeholders engage in a collaborative firm to create value for themselves” (Freeman et al., 2007, p. 6). Stakeholder theory conceptualizes a firm as a group of stakeholders (Aguilera & Jackson, 2003) with various relations to the firm (Schneider, 2002) and states that the firm must strategically manage these stakeholder relations by considering their interests and needs (Freeman et al., 2010; Philips, 2005) to achieve its goals. In line with Freeman (1984) and Freeman et al. (2007), stakeholders are individuals or groups who affect and are affected by a firm’s decisions, practices and actions to achieve its objectives. Therefore, stakeholders have a high interest in the long-term well-being of the firm.

Mittelstand firms, in particular, are often assumed to take great care to develop, establish and maintain long-term stakeholder relationships (e.g., Cennamo et al., 2012; Duh et al., 2010). Long-term stakeholder engagement can thus be seen as a cornerstone of Mittelstand firms’ success (Zellweger & Nason, 2008). In this line, Mittelstand firms often have to deal with a kaleidoscope of stakeholders, all of whom have different perspectives on innovation, growth strategies, the need for changes in the firm and the management capacities of top managers (Poza & Daugherty, 2014). The views and interests of these stakeholders influence the ability of Mittelstand firms to use their unique skills and resources (Poza & Daugherty, 2014). In

particular, stakeholders can drive the specific characteristics of Mittelstand firms (Vazquez, 2018), so that many Mittelstand firms can compensate for their weaknesses with resources such as social capital and trust, which, in turn, may positively impact the firm's stakeholder relationships (Pukall & Calabò, 2014). Consequently, successfully engaging with stakeholders can improve organizational performance (e.g., Berman et al., 1999).

However, these long-term stakeholder relationships are constrained by increasing digitalization and globalization and the related aspects of business automation and innovation. Consequently, it can be assumed that long-term stakeholder relationships are at risk, and tensions between the realization of efficiency gains through the automation and innovation of business processes and the management of long-term stakeholder relationships are to be expected; hence, the stability of these long-term stakeholder relationships may suffer. Jensen and Sandström (2011) referred to globalization as a "blind spot" in stakeholder theory that undermines stakeholder theory's explanatory power and usefulness for decision-makers in firms worldwide. Julius (1997) noted the possible increased risks for both the state and firms owing to globalization and pointed to the development of current skills and acquisition of new skills to deal with challenges such as new markets. Increasing globalization means long-term stakeholder interests are becoming more divergent due to the manifold stakeholder groups and loss of geographical cohesion, which previously unified these long-term stakeholder groups but is no longer present (Julius, 1997). Hence, Julius (1997) argued that globalization strengthens the claims of some stakeholders and undermines the claims of others. Few firms are prepared to deal with the complex stakeholder conflicts created by globalization and develop strategies that all stakeholder groups support in the long term (Julius, 1997). Hence, in this area of tension, continuous adjustments to future business situations must be made or are at least likely.

Despite the aforementioned dynamics, academic research that can inform – either conceptually or empirically – how Mittelstand firms can best manage long-term stakeholder relationships in

such a digitalized and globalized environment is scarce (e.g., Brunetti et al., 2020; Freeman et al., 2017; Jensen & Sandström, 2011). In this vein, the design of concepts associated with digitalization and globalization, such as the “Industry 4.0 Initiative” launched by the German federal government and the effects of global financial crises, threaten long-term stakeholder relationships with employees, customers and suppliers and in line with Knight (2000) could lead to turbulent environments.

In detail, Rachinger et al. (2019) indicated that digitalization pressures firms to rethink their strategic business goals, which can change their long-term stakeholder relationships. The automation enabled by digitalization and associated adverse impact on employees are often underestimated (Carbonero et al., 2020; Makridakis, 2017). Trusting and stable employee relationships in the long term and employee recognition are associated with higher employee performance (Barnard & Rodgers, 2000); hence, actions that diminish relationship stability such as automation can reduce employee performance (Cropanzano et al., 2017). In this line, Freeman et al. (2017) pointed out that rapid technological change has speeded up the rate of information sharing between the firm and its stakeholders; moreover, information is now more dynamic and accessible to a broader audience, making stakeholder demands more present for Mittelstand firms. Similarly, Brunetti et al. (2020) explored a strategy to address the challenges of digitalization, finding that a diversified set of strategic actions is needed, including leveraging the synergies of innovative technological solutions and, in particular, involving various stakeholders. Strina et al. (2021) indicated that studies of business model innovations have predominantly been conducted using large firms rather than Mittelstand firms. Hence, it is essential to conduct more research on strategic actions that can address the challenges of digitalization for Mittelstand firms.

To summarize, the management of Mittelstand firms’ long-term stakeholder relationships is becoming increasingly important in view of selected aspects of globalization (e.g., the dynamics

of and conflicts in stakeholder relations) and digitalization. However, research has thus far lacked a comprehensive analysis of the behavior of Mittelstand firms in view of these dynamics from the perspective of stakeholder theory. Based on the conceptual understanding developed so far, this dissertation addresses the following overall research question:

Dissertation Research Question. How can existing long-term, traditional stakeholder relationships be maintained in the face of increasing globalization and digitalization in Mittelstand firms?

The dissertation is divided into five separate papers, with each contributing to finding preliminary answers to the dissertation research question (see Table A-2).

A.2 Associated Research Papers and Research Questions

To analyze social scientific phenomena, the analyst must develop a specific prior understanding, which influences the interpretation (Mayring, 2002). Qualitative methods are usually more suitable than quantitative methods for understanding and ultimately preliminarily theorizing social phenomena for two reasons: qualitative methods usually reach the limits of a subject area and ultimately obtain the intended empirical information and deal with difficult empirical circumstances in the most efficient way (Glaser & Strauss, 2017). In this vein, this research adopts the cross-sectional field study method (Lillis & Mundy, 2005). This method comprises non-randomly selected case studies with limited discussion depth (Lillis & Mundy, 2005) based on the location, accessibility and willingness of firms to participate in the research (Seethamraju, 2014). The aim is to achieve a basic understanding of social phenomena based on participants' perceptions (Lillis & Mundy, 2005). Hence, interviews, especially problem-centered interviews, are the most suitable data collection mode and are recommended for theory-driven research (Mayring, 2002).

Following the process model of problem-centered interviews of Mayring (2002), the

preliminary understanding of the above dissertation research question was developed based on the literature and theory, the result of which was an interview guide (see Appendix Dissertation Table A 1). This interview guide, which contained the main research questions (Mayring, 2002), was adapted after the first conducted interview (as a pretest) and it then served as a basis for further interviews. In total, 22 semi-structured interviews were conducted in person with individuals from the top management in Mittelstand firms at the end of 2019 and the beginning of 2020 (see Table A-1 for more information). The Mittelstand firms belonged to different industries (e.g., industrials and consumer staples) and the interviews were recorded in the form of an audio transcript.

Interview	Number of employees	Annual sales (in Mio. EUR)	Interview partner	Industry (based on S&P sectors)	Date of Interview	Interview duration (hh:mm:ss)
1	< 250	< 50	Shareholder	Industrials	November 2019	01:08:04
2	501–1,000	101–300	CEO	Industrials	November 2019	00:55:31
3	< 250	< 50	CEO	Industrials	November 2019	01:34:47
4	250–500	50–100	CTO	Industrials	November 2019	00:46:19
5	< 250	< 50	CEO	Industrials	November 2019	01:04:17
6	250–500	101–300	CEO	Industrials	November 2019	01:05:11
7	501–1,000	101–300	CEO	Industrials	November 2019	01:07:36
8	> 1,000	> 300	CEO	Consumer Staples	December 2019	00:43:36
9	< 250	< 50	CEO	Industrials	December 2019	00:49:16
10	< 250	< 50	CEO	Industrials	December 2019	00:59:25
11	< 250	< 50	CTO	Industrials	December 2019	00:47:09
12	< 250	< 50	CEO	Industrials	December 2019	00:44:36
13	< 250	< 50	Leading engineer	Industrials	December 2019	00:52:13
14	< 250	50–100	CEO	Industrials	December 2019	00:52:01
15	n.a.	n.a.	Shareholder	Materials	December 2019	01:05:25
16	< 250	< 50	CEO	Industrials	January 2020	00:50:12
17	< 250	n.a.	CEO	Industrials	January 2020	01:11:12
18	250–500	50–100	CEO	Industrials	January 2020	00:58:59
19	< 250	< 50	CEO	Information technology	January 2020	00:39:15
20	501–1,000	101–300	CEO	Industrials	January 2020	00:59:05
21	< 250	< 50	CEO	Industrials	January 2020	00:54:09
22	< 250	< 50	CEO	Industrials	February 2020	00:37:02

Note. CEO = Chief Executive Officer; CTO = Chief Technology Officer; S&P = Standard & Poor's.

Table A-1. Additional information on the interview partners

The interview transcripts were then analyzed using the general inductive approach adopted primarily in health and social sciences, as suggested by Thomas (2006). This approach offers a

systematic set of procedures for analyzing qualitative data that leads to reliable results (Thomas, 2006). In this dissertation, the approach consisted of inductively inferring the patterns in the interview transcripts (Hiebl, 2012), including closely reading the textual data, identifying the individual text segments and component categories, categorizing overlapping coding, reducing redundant categories and creating a category system (Thomas, 2006) (see Appendix Dissertation Figure A 1 and Appendix Dissertation Figure A 2 for interview codings). The general inductive approach procedure was carried out in MAXQDA 2018 (VERBI Software, 2017) software. The developed codes helped create an initial understanding of the phenomenon in Mittelstand firm practice and formed the informational basis to develop the preliminary hypotheses, which were subsequently tested using quantitative methods. Empirical Papers 2 to 5 focus on testing these hypotheses. This transition from the development of the preliminary hypotheses to their empirical testing (Papers 2 to 5) was supported by a review paper (Paper 1) to understand the state of the art of the international literature in addition to the practices of Mittelstand firms.

A.2.1 Paper 1: Stakeholder Theory Applied to Family Businesses: A Literature Review and Integrated Framework

Paper 1 (see Table A-2) provides a systematic literature review on the current state of stakeholders in family firms through the lens of stakeholder theory. Paper 1 provides a literature-based foundation of knowledge in addition to the interview data, thereby capturing the literature related to the dissertation research question. In the international literature, however, the term “Mittelstand firms” is less established (e.g., De Massis et al., 2018). Mittelstand firms are strongly characterized as the family firm type (Berghoff, 1996), meaning they are usually owned or managed by a family (Block & Spiegel, 2011). Family firms comprise the majority of firms in international economies (e.g., Astrachan & Shanker, 2003). Thus, to survey the related and international literature status of research, the literature review focuses not specifically on Mittelstand firms, but on a similar type of firm; that is, family firms. Paper

1 examines how stakeholders influence family firm performance (both financial and non-financial aspects, see, e.g., Zellweger & Nason, 2008) in multiple ways. In detail, Paper 1 investigates the conditions under which Mittelstand firms' stakeholder relationships add value. In addition, Paper 1 presents an integrative framework that explains several dimensions of family firm performance and suggests fruitful avenues for further research.

Paper Number	Title	Authors	Methodology and Sample	Contributions	Status
Paper 1	Stakeholder Theory Applied to Family Businesses: A Literature Review and Integrated Framework	Pielsticker, David I., Hiebl, Martin R. W.	Systematic Literature Review: Review of 74 studies of stakeholders in family firms.	<p>(a) The paper overviews and synthesizes the existing literature on stakeholder theory in family firms, combining the knowledge from the sampled articles to discuss the research fields on stakeholder relationships in family firms. Overall, the review results show that stakeholders impact family business performance in multiple ways. In addition, they show that family firms' stakeholder relations only add value if the stakeholders are satisfied or if their interests are considered extensively based on excellent communication. Consequently, family firms need to engage in collaborative practices with all stakeholders.</p> <p>(b) Further, the paper present an integrative framework based on the reviewed literature, the three-circle model of the family business (Gersick et al., 1997) and recent insights from stakeholder theory. The framework is based on general stakeholder theory and explains the variance in several dimensions of family business performance.</p> <p>(c) Based on the developed framework and sampled literature, the paper shows several fruitful avenues for further research. These include studies of the antecedents of successful stakeholder engagement in family firms, the costs and benefits of stakeholder engagement in family firms and under which conditions family firm performance can be improved through such engagement, how stakeholder engagement interacts with family firm's behavior around corporate social responsibility and the role of the intermediate outcomes between stakeholder engagement and family firm outcomes.</p>	Submitted to the <i>Journal of Business Ethics</i> (VHB-JOURQUAL3: B): reject and resubmit
Paper 2	Digitalization and Entrepreneurial Firms' Resilience to Pandemic Crisis: Evidence from COVID-19 and the German Mittelstand	Bürgel, Tobias R., Hiebl, Martin R. W., Pielsticker, David I.	Quantitative: Surveying the CEOs of German Mittelstand firms in 2020. Receiving 156 partially or fully completed questionnaires, resulting in a final sample of 115 cases with full information on all the variables of interest in this study.	<p>(a) The paper provides empirical evidence that more globalized entrepreneurial firms and non-family entrepreneurial firms have been more resilient to the crisis in the short run if they had digitalized their business model before the crisis to a high degree. That is, the paper's findings qualify the Parasite Stress Theory of Values, which has thus far focused on the reduction of personal contact but overlooked digital technologies that may provide an alternative to such contact. The findings of the paper imply that the extent to which globalized and non-family entrepreneurial firms are affected by crises can be reduced by higher levels of digitalization.</p> <p>(b) The findings contribute to the literature on organizational resilience. The results confirm the context-dependency of organizational resilience (Linnenluecke, 2017) by showing that digitalization does not universally contribute to developing resilience to pandemic crises, particularly in non-family firms and firms more affected by globalization.</p>	Submitted to <i>Technological Forecasting & Social Change</i> (VHB-JOURQUAL3: B): revise and resubmit
Paper 3	Management Effectiveness and Organizational Ambidexterity: The Moderating Role of Multiple Dimensions of Environmental Dynamism	Pielsticker, David I., Hiebl, Martin R. W.	Quantitative: (a) Surveying the CEOs of German Mittelstand firms in 2020. Receiving 156 partially or fully completed questionnaires, resulting in a final sample of 139	<p>(a) The paper confirms the direct effect of management control effectiveness on organizational ambidexterity. Hence, it contributes to the nascent literature on management control effectiveness (Bedford et al., 2016) by delivering evidence from Germany and the U.S. suggesting that effective control systems help reach high levels of organizational ambidexterity.</p> <p>(b) The results show that dynamism in different stakeholder relations affects this relationship differently, indicating that unidimensional measures of environmental dynamism may not adequately account for its various dimensions. From Study 1, the findings of the paper show that effective control systems are the most beneficial in situations of low customer relational</p>	<p>(a) Presented at the PhD Research Seminar BWL 2021 at the University of Siegen</p> <p>(b) To be submitted to <i>European Accounting</i></p>

			cases with full information on all the variables of interest in this study.		dynamism and in cases of high employee dynamism. The latter moderating effect (employee-related dynamism) also finds support from Study 2.	<i>Review</i> (VHB-JOURQUAL3: A)
			(b) Validating the research results by conducting a second survey of finance and accounting personnel in the U.S. Final sample for Study 2 includes 99 cases.	(c)	Further, the paper contributes to the literature by showcasing the applicability of new tests for replicating evidence in the management accounting field.	
Paper 4	Automation and the Stability of Employee Relations: The Moderating Role of Organizational Ambidexterity	Hiebl, Martin R. W., Pielsticker, David I.	Quantitative: Surveying the CEOs of German Mittelstand firms in 2020. Receiving 156 partially or fully completed questionnaires, resulting in a final sample of 127 cases with full information on all the variables of interest in this study.	(a)	The findings imply that highly ambidextrous firms should examine the effects of increasing levels of automation on their employee relations extremely cautiously. By contrast, for limitedly ambidextrous firms, increasing levels of automation does not seem to be a significant concern.	Submitted to <i>The Journal of Technology Transfer</i> (VHB-JOURQUAL3: B): revise and resubmit
				(b)	The paper's results suggest that organizational ambidexterity can be viewed as a norm, which is violated when it is threatened by a greater reliance on automation; hence exploitation. This may explain why the paper's results show a negative impact of automation on employee relational stability in highly ambidextrous firms.	
				(c)	The results are among the first to confirm the empirical predictions of Wright and Schultz (2018) about the harmful effects of automation on stakeholder relationships. However, the results put this effect into perspective by showing that it can only be found for highly ambidextrous firms. This suggests that the theories of Wright and Schultz (2018), inspired by stakeholder theory, may not apply universally and are moderated by ambidexterity.	
Paper 5	The Impact of Transformational Leadership on Sustainable Supplier Relations: The Moderating Role of Automation and Globalization	Pielsticker, David I., Hiebl, Martin R. W.	Quantitative: Surveying the CEOs of German Mittelstand firms in 2020. Receiving 156 partially or fully completed questionnaires, resulting in a final sample of 121 cases with full information on all the variables of interest in this study.	(a)	The results confirm the positive relationship between transformational leadership and supplier relational stability for the German Mittelstand. On the one hand, the results confirm the existing findings in the literature, particularly the results of relationship commitment by Hult et al. (2000), Camarero Izquierdo et al. (2015) and Hult et al. (2007). On the other hand, they provide empirical evidence for replicating these existing results in a different cultural context, the German Mittelstand.	Submitted to <i>Business Strategy and the Environment</i> (VHB-JOURQUAL3: B)
				(b)	The findings also suggest that compared with Hult et al. (2000), the positive effect of transformational leadership is less evident under the current trends of increasing automation and globalization. In this environment, the personal bond between buyer and supplier no longer seems to be so intense, suggesting that the positive effect of transformational leadership is no longer as relevant for highly automated and global market-oriented business models. The findings indicate that transformational leadership is less advantageous for expanding already high levels of automation and globalization, especially since highly automated and globally operating firms are less dependent on personal contact and close communication with	

stakeholders – two strengths that are typically associated with transformational leaders (Burawat, 2019; Hult et al., 2000).

- (c) The results reject the view held in the literature that transformational leadership is the preferred leadership style in global firms (Ghasabeh et al., 2015). They imply that the effectiveness of transformational leadership in globalized markets, at least in terms of its effect on stakeholder relationships, is a context-specific strategy. That is, the positive effect of transformational leadership on stakeholder relations seems to be more effective when the focal firm is relatively unaffected by globalization.
- (d) The paper's findings supplement the study by Bass (2000) of the use of transformational leadership in the context of automation. Bass (2000) suggested that the introduction of new automated technologies should go hand in hand with learning and adaptation opportunities for the firm and its leaders as well as that transformational leadership, with its characteristics such as inspiration and intellectual stimulation, helps design and optimize automated technologies together with affected stakeholders. However, the paper's results suggest that these positive effects of transformational leadership have limits and may be less evident under today's trends (i.e., increasing automation) as well as that transformational leadership is less suited to expanding already high degrees of automation.

Table A-2. Detailed overview of the five research papers included in this dissertation

Finally, both the qualitative results of the interviews and Paper 1 show that primary stakeholders such as suppliers, customers and employees are particularly important for Mittelstand firms (e.g., Clarkson, 1995; Kull et al., 2016), which want to establish and maintain long-term stakeholder relationships (Cennamo et al., 2012). Stakeholders can be classified as primary if their involvement in the firm’s operations is essential to its continued existence (Clarkson, 1995) and long-term performance (Kull et al., 2016). As a result, primary stakeholders are involved in a firm’s economic exchanges; without them, a firm cannot continue its processes and activities (Clarkson, 1995).

Challenges	Stakeholders relationships of Mittelstand firms		
	Employees	Customers	Suppliers
Automation	Paper 4		Paper 5
Digitalization	Paper 2 ¹	Paper 2	Paper 2
Globalization	Paper 2	Paper 2	Paper 2, Paper 5
Innovation	Paper 3, Paper 4	Paper 3	Paper 3

Table A-3. Allocation of the papers to the challenges of Mittelstand firms’ stakeholder relationships

Building on the interviews with top managers in Mittelstand firms and theory-driven systematic literature review in Paper 1, this dissertation empirically examines four challenges (Papers 2 to 5; see Table A-3) for Mittelstand firms and how their stakeholder relationships (suppliers, customers and employees) can be maintained under increasing digitalization and globalization as well as selected aspects such as automation and innovation (see Table A-3).

A.2.2 Paper 2: Digitalization and Entrepreneurial Firms’ Resilience to Pandemic Crisis: Evidence from COVID-19 and the German Mittelstand

Paper 2 (see Table A-2), entitled “Digitalization and Entrepreneurial Firms’ Resilience to Pandemic Crisis: Evidence from COVID-19 and the German Mittelstand”, investigates the relationship between the COVID-19 pandemic crisis and Mittelstand firms’ resilience as well as increased levels of digitalization. The last two centuries have seen several crises due to diseases such as Spanish flu, AIDS, SARS and Coronavirus Disease 2019 (COVID-19) (Kraus

¹ Paper 2 addresses all three stakeholder groups. The construct based on Becker et al. (2016) pointed in particular to questions about the impact of the crisis on stakeholders such as customers and suppliers. Further, the construct has individual items on the current order situation, sales and the capital availability of the firm, which in turn are closely related to customers and suppliers, but also to employees.

et al., 2020). These diseases have affected multiple people and have had severe economic and individual short- and long-term consequences for various firms (Donthu & Gustaffson, 2020; García-Carbonell et al., 2021). Bennett and Nikolaev (2021) mentioned that one strategy for curtailing the spread of infectious diseases is to avoid interactions between people. This strategy was applied in the COVID-19 crisis under the term “social distancing” (see, e.g., Ferguson et al., 2020). Therefore, COVID-19 has affected firms’ stakeholder relations, triggering how the work of firms’ employees is organized (Collings et al., 2021) and how existing global supply chains could be further maintained (Shen et al., 2020). In this line, digitalization, in particular, may be seen as a game-changer (cf. Eller et al., 2020). Hence, higher levels of digitalization may have reduced the potentially damaging effects of social distancing on individual firms and their stakeholders during the COVID-19 crisis. In other words, firms with higher digitalization levels before the COVID-19 crisis may have shown a higher level of resilience against the crisis.

Since not all firms benefit from digitalization in the same way (e.g., Eller et al., 2020), Paper 2 additionally investigates whether this general relationship between digitalization and crisis resilience is moderated by the degree of globalization of the respective firm and family firm status (and examines further potential moderator variables such as firm size, industry affiliation, strategy and past performance). The stakeholder relationships with suppliers and customers of firms severely affected by globalization are often spread across countries (e.g., Laanti et al., 2007). The social distancing measures introduced by a pandemic prevent personal contact between firms and their international business partners due to travel restrictions (Nummela et al., 2020). Close personal connections between global business partners can be more challenging to maintain without using digital technologies. The systematic review in Paper 1 shows that communication and collaborative work between the firm and its stakeholders seem essential for them to create value together. Consequently, Paper 2 tests whether for firms

strongly affected by globalization, a higher degree of digitalization before a pandemic crisis is critical to have a higher level of resilience against the crisis.

Similarly, family firms usually strive for long-term corporate stability and therefore show higher risk aversion (De Massis et al., 2015; Hiebl, 2013). Such risk aversion is reflected in higher levels of equity or debt (González et al., 2013), which could lead to greater resilience to short-term crises. By contrast, such crisis resilience is generally less common in non-family firms (Amann & Jaussaud, 2012), which is why they tend to be more susceptible to crises. Hence, it can be expected that higher levels of digitalization are more significant for non-family firms to develop resilience against crises. Paper 2 also tests whether the family firm status moderates the relationship between higher levels of digitalization before a pandemic crisis and higher levels of crisis resilience. Overall, the following two research questions are addressed in Paper 2:

Research Question 1. Do higher levels of digitalization increase entrepreneurial firms' resilience to pandemic crises?²

Research Question 2. How do Mittelstand firms' characteristics (firms' level of globalization, family firm status, firm size, industry affiliation, strategy and past performance) impact the digitalization–crisis resilience relationship?

A.2.3 Paper 3: Management Control Effectiveness and Organizational Ambidexterity: The Moderating Role of Multiple Dimensions of Environmental Dynamism

According to De Massis et al. (2018), Mittelstand firms are often considered to have high innovativeness. However, one primary limitation of Mittelstand firms is their scarce financial resources (Audretsch & Elston, 1997; Beck & Demirguc-Kunt, 2006; Beck et al., 2005;

² The research questions (Research Question 1 to Research Question 8) can be found in the individual Papers 2 to 5. Unlike Papers 2 to 5, the stated research questions (Research Question 1 to Research Question 8) have been reworded to adapt them to the relevant scientific community.

Pissarides, 1999). Due to this limitation, Mittelstand firms often use management control systems less frequently than and differently to large firms (Lavia López & Hiebl, 2015). In line with Merchant and van der Stede (2017), if management control systems are effective, they are crucial in achieving organizational goals such as innovativeness. The research literature shows that management control systems can be essential for converting innovation into innovation performance (Grabner et al., 2018). Innovation can be viewed as the creation of new knowledge, use of existing knowledge and its translation into business outcomes (Hiebl, 2015). In this vein, organizational ambidexterity describes successfully balancing the exploration of new knowledge and exploitation of current knowledge (March, 1991; O'Reilly & Tushman, 2013). A firm's long-term viability is decisively determined by its ambidexterity (see, e.g., Lubatkin et al., 2006; Luger et al., 2018 for firm performance). McCarthy and Gordon (2011) stated that management control systems, in particular, could be crucial for developing and maintaining a balance between exploitation and exploration, hence in achieving ambidexterity.

However, according to Porter (1985), firm-level outcomes such as ambidexterity rely on several resources and environmental aspects such as competition and dynamism. Dynamism (and uncertainty)³ can be an environment in which the future development of markets or technologies is difficult to predict (MacCormack et al., 2001). Stakeholders such as employees, customers and suppliers also represent an aspect of environmental dynamism (see, e.g., Ezzamel, 1990; Grabner et al., 2018). The dynamism of these stakeholder groups is examined in more detail in Paper 3, particularly regarding the effect of management control systems on ambidexterity. Hence, Paper 3 (see Table A-2) entitled "Management Control Effectiveness and Organizational Ambidexterity: The Moderating Role of Multiple Dimensions of Environmental Dynamism" examines the potentially moderating effect of environmental dynamism based on

³ In many studies, this phenomenon is referred to as "dynamism" rather than "uncertainty". These two constructs are closely related or sometimes considered as indicators of each other (see e.g., the review by Kreiser & Marino, 2004; Miller & Friesen, 1983; Schilke, 2014). Consequently, for the sake of simplicity, the dissertation retains the wording "environmental dynamism".

three essential stakeholder groups (employees, customers and suppliers) on the relationship between management control effectiveness and organizational ambidexterity. Following management control theory (Merchant & van der Stede, 2017), Paper 3 extends empirical evidence on management control effectiveness and expects that such effectiveness will lead to a higher degree of organizational ambidexterity. Therefore, the following research question is formulated:

Research Question 3. Is Mittelstand firms' management control effectiveness positively related to organizational ambidexterity?

Although management control systems may play a decisive role in driving firm-level outcomes such as organizational ambidexterity, they, like any other firm-internal capability or resource, cannot be exclusively responsible for such firm-level outcomes such as organizational ambidexterity (Kraaijenbrink et al., 2010). In line with Porter (1985), firm-level outcomes depend on many internal resources as well as environmental aspects such as dynamism and competition. Therefore, the assumed positive effect of management control effectiveness on firm-level outcomes such as organizational ambidexterity is unlikely to apply universally to all organizational contexts. Paper 3 focuses on overall management control system effectiveness and environmental dynamism (as an aspect of a firm's environment). Henri and Wouters (2020) found that environmental dynamism moderates the relationships between individual control systems (providing information for decision-making) and organizational ambidexterity. Some of the recent studies adopt a unidimensional measure of environmental dynamism (e.g., Bisbe & Malagueño, 2012; Braumann et al., 2020; Demartini & Otley, 2020; Grabner et al., 2018), although there are several indications that a firm's environment is not necessarily homogeneous and therefore that different parts of the firm environment may exhibit different levels of dynamism (e.g., Brouthers et al., 2002), not least individual stakeholders and stakeholder groups. These groups may demonstrate quite different levels of relationship dynamism, mainly

through their interests and needs (Freeman et al., 2010; Phillips, 2005), which not least, may, in turn, be influenced by individual aspects of globalization (see Collings et al., 2021; Shen et al., 2020). Hence, a further research question is addressed in Paper 3:

Research Question 4. Is the relationship suggested in Research Question 3 affected by different stakeholder groups' (customers, supplier and employees) relational dynamism?

A.2.4 Paper 4: Automation and the Stability of Employee Relations: The Moderating Role of Organizational Ambidexterity

Paper 4 (see Table A-2), called “Automation and the Stability of Employee Relations: The Moderating Role of Organizational Ambidexterity”, analyzes the effects of increasing automation on Mittelstand firms’ relationships with their employees. For firms to remain competitive in an increasingly globalized market, they need to constantly improve their efficiency by taking advantage of the opportunities offered by business innovation concepts such as automation (Wright & Schultz, 2018). Automation can be understood as transferring the functions of the operational process from humans to artificial systems (Autor, 2015). In this regard, automation has increased significantly in recent years, leading to the gradual replacement of human operations (Arntz et al., 2017; Autor, 2015), based on its benefits such as lowers costs and higher production efficiency (Parthasarthy & Sethi, 1992).

Increasing automation also impacts many of the key stakeholders of firms, such as consumers and suppliers (Wright & Schultz, 2018). However, employees may be the most affected stakeholder group (Autor, 2015; Morrar & Arman, 2017; Wong & Ngin, 1997). Here, automation raises ethical, moral and systematic questions about how employees can keep their current jobs or move into new ones (e.g., Parschau & Hauge, 2020). According to Gasteiger and Prettnner (2017), automation can affect the trust between firms and employees because, from the stakeholder theory perspective, employees may perceive automation as a deliberate move

by firms and potentially destroy trusting and lasting relationships between firms and employees. Consequently, automation is expected to create tensions between generating efficiency gains through business process innovation and managing employee relationships. In general, a high level of employee relational stability helps keep employee turnover and the associated costs of adjustments (e.g., firing and hiring) low (Failla et al., 2017; Lallemand et al., 2005). Trusting and stable employee relations and employee recognition can also raise employee performance (Barnard & Rodgers, 2000); hence, measures that hinder with employee relational stability such as automation could lower employee performance (Cropanzano et al., 2017). Carbonero et al. (2020) and Makridakis (2017) found indications that firms underestimate the adverse effects of automation on employees. Therefore, the stability of employee relationships in Mittelstand firms could suffer from automation. Hence, the following research question is formulated:

Research Question 5. Does the increasing degree of automation in Mittelstand firms lead to a decrease in employee relational stability?

The research question may not be universally applicable to all Mittelstand firms. In particular, organizational ambidexterity may be an important moderator of the relationship between automation and the relational stability of employees. Firms that show a high degree of organizational ambidexterity both use existing skills and explore new skills, which leads to innovation and is essential for the firm's long-term survival (Chandrasekaran et al., 2012; Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2013). A high degree of organizational ambidexterity is only possible by balancing exploration and exploitation (e.g., Cao et al., 2009; Hiebl, 2015; Simsek, 2009). Employees are assumed to be an important driving force for achieving such a balance, as they may create such a balance themselves and carry out both exploitation and exploration activities (Chang, 2016; Gibson & Birkinshaw, 2004; Güttel & Konlechner, 2009).

However, the research literature shows that targeting organizational ambidexterity can also be

associated with specific tensions (e.g., Birkinshaw & Gupta, 2013; Luger et al., 2018; Montealegre et al., 2019; Rothaermel & Alexandre, 2009). An increased focus on ambidexterity could limit a firm's strategic options. If a firm features a high level of ambidexterity, employees will expect that the relationship between exploitation and exploration has to be balanced. This can be particularly relevant for innovating business processes such as automation. If a firm increasingly relies on automation, the balance between exploitation and exploration can be distorted (Montealegre et al., 2019); the stronger focus on automation can lead a firm more in the direction of exploitation, hence away from achieving ambidexterity. When a firm features a high level of ambidexterity, employees could become irritated as the firm moves away from the balance between exploration and exploitation, prompting employees to consider whether the firm has started to focus more strongly on automation. Thus, automation puts their jobs at risk and makes them feel less attached to their firm, which could be expressed in less stable relationships. As a result, firms with a high level of organizational ambidexterity should be more susceptible to automation as its adverse impact on employee relational stability is exacerbated, leading to less employee relational stability. Therefore, the following research question is formulated:

Research Question 6. Is the relationship described in Research Question 5 moderated by organizational ambidexterity?

A.2.5 Paper 5: The Impact of Transformational Leadership on Sustainable Supplier Relations: The Moderating Role of Automation and Globalization

In addition to the long-term relational stability of employees as essential stakeholders of a firm, supplier relationships and their stability are examined more closely in this dissertation. Paper 5 (see Table A-2), called "The Impact of Transformational Leadership on Sustainable Supplier Relations: The Moderating Role of Automation and Globalization", analyzes the effects of increasing automation and globalization on a firm's supply chain relationships. To remain

competitive in an increasingly globalized market, firms have to constantly improve their efficiency and take advantage of the new opportunities that business innovation concepts such as automation offer them (Wright & Schultz, 2018). In this vein, a firm's leadership style can be critical in creating awareness to stakeholders and help to drive business innovation transformations (e.g., Bass & Avolio, 1993; Men, 2014). Transformational leadership is particularly suitable for coping with business transformations (Rowold & Poethke, 2017). Transformational leadership can change stakeholders' attitudes toward the firm, making them think more often about the organization's goals (Rowold & Poethke, 2017). Transformational leaders drive change and growth by transcending the status quo and inspiring their followers with their visions and goals, thus motivating all stakeholders to reach their full potential (Bass & Avolio, 1993; Men, 2014). The existing literature indicates the potential impacts of transformational leadership on the supply chain relationships of firms (e.g., Burawat, 2019; Camarero Izquierdo et al., 2015; Hult et al., 2000, 2007). According to stakeholder theory, effective supply chain management seems essential due to the need for close communication and relationships with suppliers (Burawat, 2019; Hult et al., 2000). Birasnav (2013) found that transformational leaders implement a technological infrastructure that can lead to an increased exchange of information between the firm and its suppliers (Birasnav, 2013; Birasnav et al., 2015) and could build solid long-term relationships (Birasnav et al., 2015). Therefore, transformational leadership may positively influence the stability of supplier relationships. The following research question is formulated:

Research Question 7. Is Mittelstand firms' transformational leadership positively related to supplier relational stability?

Existing findings (e.g., Burawat, 2019; Camarero Izquierdo et al., 2015; Hult et al., 2000, 2007) on how transformational leadership may influence supply chain relationships are not universally proven and trends such as increasing automation and globalization provide a

changing subject of investigation for the effects of transformational leadership. The growing importance of automation can be found in many industries such as manufacturing and the service sector (Krzywdzinski, 2017). Technology industries have also become more globalized (Karagozoglu & Lindell, 1998). On the one hand, increasing process automation affects the stakeholders of firms and existing process structures (Wright & Schultz, 2018) and changes relationships by making them less personal. On the other hand, the increasing uncertainty of globalization can lead to threats such as global competition and the relocation of production activities (Parrilli et al., 2013), which means the risk that relationships could fail more quickly. Therefore, automation and globalization may influence the strength of the effect of transformational leadership on the stability of supplier relationships. A further research question thus reads as follows:

Research Question 8. Is the relationship between a Mittelstand firm's transformational leadership and supplier relational stability affected by the buyer firm's automation and globalization level?

A.3 Methodology and Structure

An online survey targeting German Mittelstand firms was conducted to address the dissertation's eight empirical research questions, as detailed in Section A.2 (see Appendix Dissertation Table A 2 for the total overview of the complete survey questionnaire). Because the response rates in business and management research have declined in recent years (Mellahi & Harris, 2016; Pielsticker & Hiebl, 2020), especially among Chief Executive Officers (CEOs) (Cycyota & Harrison, 2006), firms located close to the survey's authors were selected from the Amadeus database, as previous research has shown that geographical proximity between addressees and survey authors leads to higher response rates (Bartholomew & Smith, 2006). The geographical search field was limited to the regions of North Rhine-Westphalia, Rhineland-

Palatinate and Hesse. The Amadeus data included information such as the number of employees, industry affiliation and contact information of each firm. The survey's authors manually searched for the firm's top managers' e-mail addresses, specifically the e-mail addresses of CEOs and other members of the top management team. Finally, a sample of 1,118 Mittelstand firms in Germany (defined as firms with a maximum of 3,000 employees) was drawn (Becker et al., 2008). This dataset included only unlisted firms that were not part of the financial services industry. The 1,118 firms do not represent the entire population of firms in the three regions, but only those whose CEOs or top managers' e-mail addresses were known and consequently who were invited to participate in the survey. To increase the response rate, participants were also provided with an incentive to participate in the survey (see Edwards et al., 2002), including receiving a detailed research report and/or donating 10 EUR to charity. They could choose whether they wanted to receive both incentives or only one.

Survey invitations were emailed to the top managers in early July 2020. The timing of the survey was during the COVID-19 crisis. A total of 156 fully or partially completed questionnaires were received, resulting in a response rate of 14%, which is comparable to the response rates of similar recent studies (e.g., Bonner et al., 2021; Chithambo et al., 2021; Todaro et al., 2021). Different samples were used for Papers 2 to 5 owing to the different variables used. Concerning Paper 3, a second survey targeting finance and accounting employees was conducted in the U.S. in 2021 (size: 99 cases) to replicate the results from the survey of the German Mittelstand.

Both surveys adopted a single respondent approach widely used in management research (e.g., Avlonitis & Gounaris, 1997; Ogbonna & Harris, 2000). This approach has often been criticized for being susceptible to common method bias (Flynn et al., 2018). However, in times of decreasing response rates (Chidlow et al., 2015; Pielsticker & Hiebl, 2020), surveys of individual top managers offer a pragmatic approach to generate large sample sizes (Montabon

et al., 2018). Avlonitis and Gounaris (1997) also pointed out that only participants knowledgeable about the research topic should be selected. Following Podsakoff et al. (2003), specific measures were taken to contain and avoid the risk of common method bias. Respondents' anonymity was ensured, pretests were conducted and established items from the international research literature were mainly used to ask the questions in a concise, straightforward manner and precise; hence not confronting respondents with complicated syntax. Lastly, a lag between the independent and dependent variables was also introduced in the questionnaire's order. Finally, further statistical tests such as Harman's one-factor test were performed and a marker variable was used in the questionnaire. The test results (see Papers 2 to 5) indicated that the data were unlikely to suffer from common method bias.

The rest of this dissertation is organized as follows: after this introduction in Section A, Sections B, C, D, E and F present Papers 1 to 5. Finally, Section G follows with an overall discussion and conclusion of the results. Table A-2 provides detailed information on Papers 1 to 5 such as the title, authors, methodology and sample, scientific contributions, presentations and submission status to research journals.

B Stakeholder Theory Applied to Family Businesses: A Literature Review and Integrated Framework


Authors: David I. Pielsticker, Martin R. W. Hiebl

Paper's status: This paper has been submitted to the Journal of Business Ethics: Reject and resubmit.

We, the authors of the paper, hereby declare that this paper's first author, David I. Pielsticker, was responsible for reviewing the literature and writing most of the paper.



Martin R. W. Hiebl



David I. Pielsticker

B.1 Introduction

Stakeholder theory is prominent across several different research areas, including management, business ethics, accounting, and marketing (Parmar et alii (et al.), 2010) and is widely acknowledged as a valuable lens to analyze the intersections between society and businesses (Barney & Harrison, 2020). With a history of more than 30 years, the theory describes how firms work to reach optimal value creation (Freeman et al., 2007), conceptualizing the firm as a group of stakeholders (Aguilera & Jackson, 2003), each with different relationships to the firm (Schneider, 2002). Successful engagement of these stakeholders may, in turn, drive firm performance (exempli gratia (e.g.), Berman et al., 1999).

From the perspective of stakeholder relations, family firms are a specific type of firm, often viewed as putting great care into the establishment, development, and long-term retainment of stakeholder relations (e.g., Cennamo et al., 2012; Duh et al., 2010). Consequently, long-term stakeholder engagement is seen as one cornerstone of family firms' success (Zellweger & Nason, 2008). Family firms also engage with a particular kaleidoscope of different stakeholders, all of whom have various perspectives on topics such as succession planning, innovation, the need for change in the firm, growth strategy, the management capacity of top managers, and family unity. These stakeholder interests influence family firms' ability to leverage the unique skills and resources that family members bring to the business model (Poza & Daugherty, 2014). In line with such reasoning, individual stakeholders may be seen as the driving forces behind family firms' specific nature (Vazquez, 2018). Some authors further propose that family-specific resources such as trust and social capital have a positive impact on relationships within the family (e.g., faster decision-making processes and conflict management), and thus, family firms may compensate for some of their often found weaknesses including internationalization (Pukall & Calabrò, 2014). Despite these alleged idiosyncrasies of family firms in terms of stakeholder theory, the literature lacks a clear, synthesized picture

of how stakeholder theory has been and can potentially be further applied to the study of family firms.

Against this backdrop, we review the existing literature on stakeholder engagement in family firms, as well as recent developments in stakeholder theory more generally. We then establish an integrated framework of stakeholder theory in family firms to serve as a basis for future research.

Researchers have examined how stakeholders influence the performance of family businesses in various ways. As is typical for many family firms (e.g., Zellweger & Nason, 2008), performance outcomes encompass both financial and non-financial aspects, such as earnings, succession, and socioemotional wealth. Furthermore, our review shows that added value from family firms' stakeholder relations is more likely if stakeholders are satisfied or if their interests are considered extensively through excellent communication.

We then suggest several fruitful avenues for further research based on the integrated framework. Most importantly, future research must study factors that impact stakeholders' satisfaction and how their satisfaction, in turn, affects the performance of the family firm, as well as studying factors that determine stakeholders' engagement.

The next Section B.2 presents the core tenets of general stakeholder theory and the specific dynamics that can be theorized for stakeholder theory in family firms. We then describe our review methods (approach and sample construction) and the main characteristics of the reviewed articles. We next detail our review findings and develop an integrated framework based on the review and more general developments in stakeholder theory. The paper concludes with a discussion of avenues for further research applying stakeholder theory to family firms.

B.2 Stakeholder Theory and Family Firms

B.2.1 General Stakeholder Theory

Stakeholder theory offers a framework to understand firms' holistic environment. Used in

various disciplines, including management, business ethics, and marketing (Parmar et al., 2010), stakeholder theory conceptualizes the firm as groups of stakeholders (Aguilera & Jackson, 2003) with different relationships to the firm (Schneider, 2002). The theory suggests that meeting corporate goals requires the firm to manage these stakeholder relationships strategically, that is, to take into account stakeholders' interests and needs (Freeman et al., 2010; Phillips, 2005).

Following leading proponents of stakeholder theory, we define stakeholders as individuals or groups who affect and are affected by a firm's decisions, practices, and actions in achieving its objectives (Freeman, 1984; Freeman et al., 2007). These stakeholders can either be defined by their economic function such as supplying, investing or consuming, but can also have claims based on cultural, social and political affiliations that cannot easily be reconciled with a typical firm's economic interests (Crane & Ruebottom, 2011). All these stakeholders can apply different strategies to influence the firm (Frooman, 1999), which results in a mutual interaction or reciprocal influence between stakeholders and any specific firm (Berman et al., 1999).

One way to categorize stakeholders is to divide them into primary and secondary stakeholders (Buysse & Verbeke, 2003; Freeman et al., 2007; Mitchell et al., 1997). Many primary organizational stakeholders are internal to a firm, such as firm owners, managers, and employees, but others are external, such as suppliers or customers. Regardless of whether they are internal or external, stakeholders are primary if their involvement in a firm's operations is essential for the firm's continued existence (Clarkson, 1995) and long-term performance (Kull et al., 2016). Consequently, primary internal and external stakeholders are both engaged in a firm's economic exchanges; without them, a firm could not continue its activities and processes (Clarkson, 1995).

By contrast, while secondary stakeholders also affect or are affected by the firm, they are not essential for survival and are not involved in economic transactions (Clarkson, 1995). For

instance, secondary stakeholders include the government, media, competitors, consumer advocate groups, and special interest groups, such as environmental groups (Freeman et al., 2007; Garcia-Castro & Francoeur, 2016). In general, while secondary stakeholders have no formal contractual commitment to the firm, such as regulators have, these groups may exert pressure (e.g., civil suits, protests), for instance, in order to encourage firms to respond to requests from various stakeholders (Eesley & Lenox, 2006). Consequently, each of these secondary stakeholder groups affects the firm through one of the primary groups, whether internal or external (Freeman et al., 2007).

However, also to the economic function such as suppliers or customers, stakeholders may have claims based on cultural, social and political affiliations that are not easily reconciled with the economic interests of a typical firm; that is, stakeholders are defined both economically and socially (Crane & Ruebottom, 2011). Many stakeholders interact with firms based on shared social identities (e.g., gender, political, age-based); hence these social identities determine the actions and cohesion of stakeholders concerning firms (Crane & Ruebottom, 2011). For instance, among employees, various demographic stakeholders have different expectancies and needs of their employers (Crane & Ruebottom, 2011). That is why we apply a cross-mapping of economic stakeholder roles and social identities according to Crane and Ruebottom (2011); hence, identifying both social stakeholders and traditional (primary, secondary) stakeholders and their interests that could be recognized as critical or essential to the firm's goals (Crane & Ruebottom, 2011).

Stakeholders seem to directly influence and contribute to the firm's value creation process (Hillman & Keim, 2001). For this reason, several scholars (e.g., Berman et al., 1999; Choi & Wang, 2009; Garcia-Castro & Francoeur, 2016; Kassinis & Vafeas, 2006) have noted a positive empirical association between firm performance and their relations with stakeholders. Additionally, some authors have identified theoretical and conceptual arguments about how a

firm's engagement with its stakeholders can affect its performance (Jones et al., 2016). In particular, overall attention to stakeholders seems to be a decisive variable explaining variance in firm performance (Kacperczyk, 2009).

Many researchers interested in stakeholder theory have primarily discussed a dyadic interaction, that is, a reciprocal relationship between a stakeholder group and a firm (Rowley, 1997). Rowley (1997) criticized the limited and static consideration of individual stakeholder influence resulting from the theory of such a dyadic relationship, pointing out that relationships are diverse and interdependent. For instance, if firm I is connected to firm II only through firm III, firm III can control all movements of resources between the other two firms. Thus, some more recent literature has viewed firms as integrated into networks with different participants (Lawrence & Weber, 2017). In line with this latter view, we place the firm at the center of a network of stakeholders with diverse relationships (Donaldson & Preston, 1995; Rowley, 1997). While we acknowledge this network view of stakeholder relations, the below figures do not present such network relationships for reasons of visual clarity.

Synthesizing the above, based in particular on the research models and approaches of Berman et al. (1999), Harrison and St. John (1998), Rowley (1997), Freeman et al. (2010), Clarkson (1995), Buysse and Verbeke (2003), Crane and Ruebottom (2011) and Freeman et al. (2007), the current state of stakeholder theory is visualized in Figure B-1. We later refer to this view when discussing the results of our review of stakeholder theory as applied to research on family businesses. Following Whetten (1989), we understand a theory to be the mapping of an if-then-relationship, which should essentially contain elements like the what, if, how and why. In particular, we adapt the perspective of Harrison and St. John (1998): the firm includes all the stakeholders, processes, and resources that exist within the traditional corporate boundaries of the firm. That is, firms comprise interdependent relationships, especially between primary stakeholders (Clarkson, 1995; Freeman, 1984; Jawahar & Mclaughlin, 2001). Firms have a

particular responsibility and obligation to internal primary stakeholders, such as employees and shareholders (Galbreath, 2006). Thus, in Figure B-1, essential internal primary stakeholders, such as owners or the board of directors, managers, and employees, form the firm (Buysse & Verbeke, 2003; see also Murillo-Luna et al., 2008). External primary stakeholders include suppliers and customers—external secondary stakeholders include government, special interest groups, and media stakeholders. Stakeholder engagement is the process by which the firm involves primary (internal and external) and secondary stakeholders who may be affected by the firm’s choices and who actively influence the firm and its decisions (Greenwood, 2007). Following the above-noted literature and as visualized in Figure B-1, a firm’s performance benefits from effective stakeholder engagement (e.g., Jones et al., 2016). Note that, in line with the reviewed literature, “firm performance” encompasses not only financial performance but also various other dimensions of performance, such as innovation performance and environmental performance.

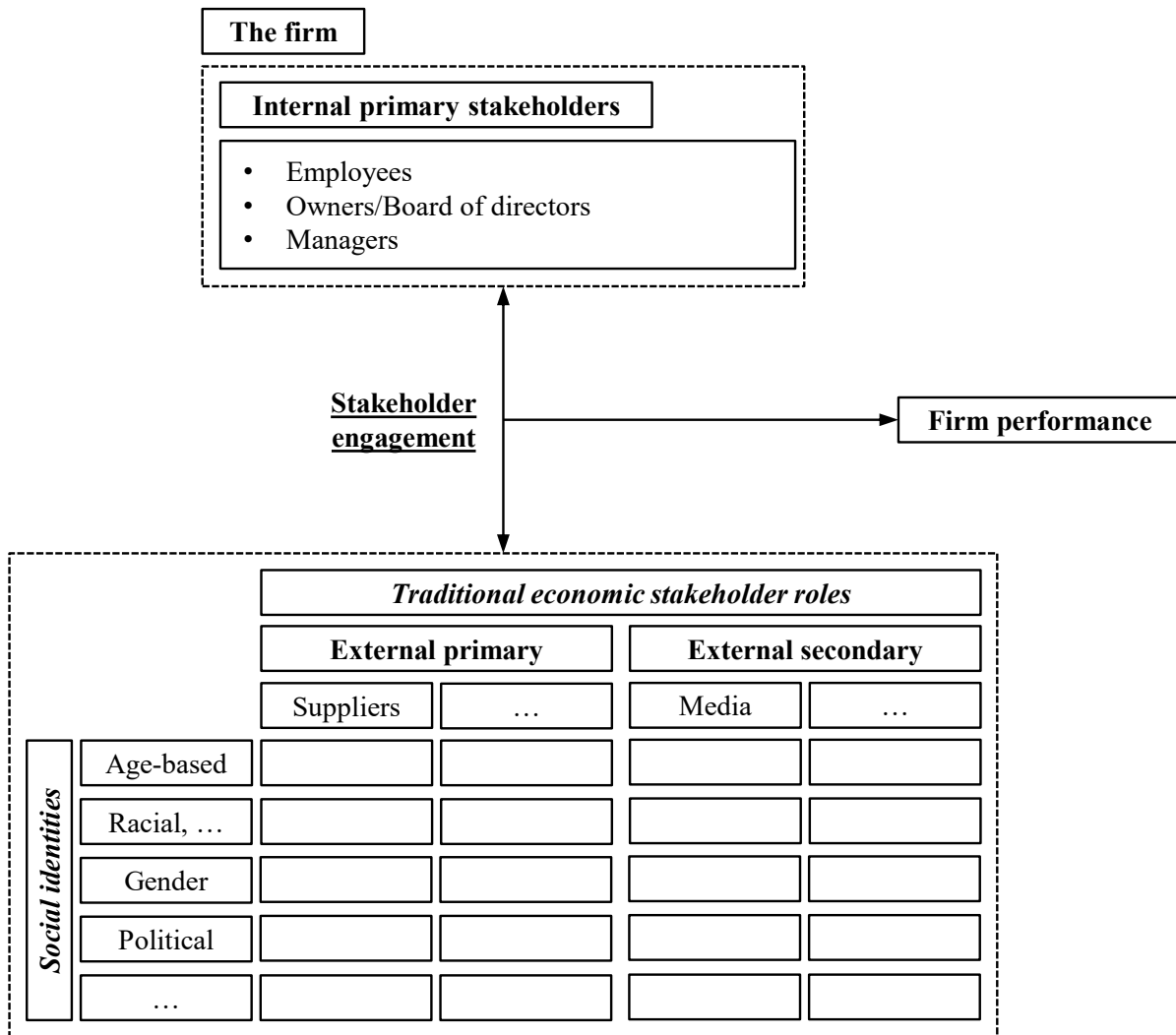


Figure B-1. The main relationships covered by stakeholder theory

B.2.2 Stakeholders in Family Firms

Research on family businesses is characterized by the lack of a generally accepted definition of family firms (Steiger et al., 2015). However, most of the definitions of family firms show some agreement that family firms are characterized by a high degree of family involvement (Chua et al., 1999; Sharma, 2004). From a stakeholder perspective, family firms represent a specific type of firm, which, following Cennamo et al. (2012), are often considered as firms that pay particular attention to the establishment, development and long-term maintenance of stakeholder relationships. Consequently, stakeholders' long-term involvement is seen as an essential cornerstone of family firms' success (Zellweger & Nason, 2008). In addition, family firms have a particular kaleidoscope of different stakeholders. These stakeholders may bring

different perspectives on innovation, growth, strategy, succession planning, top managers' management capacity, the need for change in the firm, and family unity. These different stakeholder interests may influence family firms' ability to leverage the resources and skills that family members bring to the business model (Poza & Daugherty, 2014).

To illustrate family firms' typically complex stakeholder relations, we draw on the three-circle model of family firms by Gersick et al. (1997). In this model, a family firm is a complex, dynamic social system in which integration can be achieved through mutual adjustments among three subsystems: the family, the business, and the owners. Poza and Daugherty (2014) suggest that family firms can be better understood by examining all three subsystems with their interactions and interdependencies as part of the family firm system. In line with this notion, Habbershon et al. (2003) suggest that the relationships between individual family members, the family unit, and the business unit, in particular, generate exceptional systematic circumstances.

B.3 Methods

B.3.1 Approach and Sample Composition

We applied systematic review methods (Kraus et al., 2020; Tranfield et al., 2003) to analyze the existing literature on stakeholder engagement in family firms. A three-stage selection method (Tranfield et al., 2003) has been increasingly used in recent research on family businesses (e.g., Mazzi, 2011) and allows us to transparently analyze and synthesize all relevant literature on this topic. Since research on family firms that is based on stakeholder theory is not an immature research field, as exemplified by the relatively large size of our review sample, we focus only on research published in academic journals (cf. Adams et al., 2017). To identify such research, we use a combination of two different search strategies: a database-oriented search and a journal-oriented search (see Table B-1). According to some recent methodological advice, such a combination of search approaches should allow for the most comprehensive identification of relevant research items (Hiebl, 2021).

First, we identified relevant articles on stakeholder engagement by family businesses by conducting a keyword search in the following electronic databases: Scopus, EBSCOhost, and Web of Science (WoS). To search for articles on stakeholder engagement in family firms, we used the following keyword phrase: (“Family compan*” OR “family firm*” OR “Family business*” OR “Family enterprise*” OR “family corporation*” OR “family-controlled*” OR “family-run” OR “family-owned” OR “family-led” OR “family-centered”) AND (“Stakeholder*”). Asterisks (“*”) captured all different keyword variations, and the search string was applied to the full text of items in the database. For inclusion in the sample, the articles had to investigate stakeholders in family firms, even if only a part of the overall research. We did not limit our search to research published in certain years nor to specific research methods, since no earlier review of stakeholder engagement in family firms has been conducted, and we wanted our review to be as comprehensive as possible. That is, we included in our sample all relevant empirical (quantitative and qualitative) and non-empirical articles published until 2021, when the literature search was last updated. This keyword search resulted in an initial list of 1,236 articles (see Table B-1).

We filtered duplicates from the results and kept only articles in our preliminary sample that were written in English. In line with other recent reviews of family business research (e.g., Sageder et al., 2018; Waldkirch, 2020), we then applied a quality threshold. That is, articles in our review sample had to be published in journals that were included in the 2018 version of the Chartered Association of Business Schools (CABS) Academic Journal Guide. Furthermore, we excluded all articles that did not fit the content of our research topic (see Tranfield et al., 2003). The vast majority of articles excluded were empirical studies that did not include information on stakeholder engagement in their empirical results but only mentioned stakeholders “in passing”. After these exclusions, 61 articles remained in our sample.

We then augmented this database search with a manual “snowball” search, as recommended by

Greenhalgh and Peacock (2005) and Hiebl (2021). In this regard, we scanned the references of the initially included articles for further relevant articles, with the aim of including those that fit our content-related and quality-related inclusion criteria as detailed above. In addition to this backward search, we also performed a forward snowball search (Greenhalgh & Peacock, 2005; Hiebl, 2021; Webster & Watson, 2002); with the help of Google Scholar, we wanted to identify articles that cited the initially included articles. However, from both snowballing exercises, no additional relevant articles could be identified.

In addition to this database-oriented keyword search, we also manually searched premier outlets of general management and family business research for additional relevant research items. That is, with the help of the keywords above, we searched the individual websites of the journals *Entrepreneurship Theory and Practice* (ETP), *Journal of Business Ethics* (JBE), *Journal of Business Venturing* (JBV), *Family Business Review* (FBR), *Journal of Small Business Management* (JSBM), *Academy of Management Journal* (AMJ), *Academy of Management Review* (AMR), *Administrative Science Quarterly* (ASQ), and *Journal of Management Studies* (JMS). This search of premier journals, however, identified no additional articles. An additional manual search in Google Scholar yielded one additional article for inclusion in our review sample.

In addition, we included 12 articles based on the recommendation of experts on stakeholder theory in family firms. These articles, too, correspond to our inclusion criteria as discussed above. In Table B-1, we provide a summary of our search and refer to the last 12 articles as “expert recommendations”.

Search strategies	Search tools	Keyword search hits	Hits after removal of duplicates	Articles published in journals included in the 2018 CABS Academic Journal Guide	Articles in the sample
1. Basic database search	<i>Database</i>				
	Scopus	381	213	78	22
	WoS	393	168	62	28
	EBSCOhost	462	284	43	11
	<i>Subtotals</i>	1236	665	183	61
2. Search for additional relevant articles	<i>“Snowballing”</i>				
	Reference tracking				0
	Citation tracking				0
	<i>Specialized journals</i>				
	ETP/JBE/JBV/FBR/JSBM				0
	AMJ/AMR/ASQ/JMS				0
	<i>Google Scholar search</i>				1
<i>Expert recommendations</i>				12	
	<i>Subtotals</i>				13
	Total				74

Table B-1. Search and selection process

The overall search and selection process for identifying the relevant literature, including the step-by-step filtering process, is presented in Table B-1. Further details can be found in Appendix Section B Figure A 1. In the end, 74 journal articles published between 1997 and 2021 were included in our review sample. In addition to articles whose theoretical basis was stakeholder theory, we also included studies whose models were based on other theories but which at least in part examine stakeholder engagement in family firms and thus are relevant to our review.

B.3.2 Article Characteristics

The 74 sampled articles were published between 1997 and 2021 in 38 academic journals (see Appendix Section B Table A 1). According to the journals' primary research field according to the 2018 CABS Academic Journal Guide, approximately a quarter (24%) of the reviewed articles came from the research area of *general management, ethics, gender, and social responsibility*. Another large proportion (30%) is attributable to the research area of *entrepreneurship and small business management*. Journals from the *international business and area studies* cover another 9%, and the remaining 31% are distributed over journals in other topics and 6% is grey literature. Among all journals covered here, the *Journal of Business Ethics* has the highest single research output (ten articles), followed by *Family Business Review* (six articles) and *Entrepreneurship Theory and Practice* (six articles).

The annual research output after 2009 increased from an average of one to an average of more than three publications per year (excluding years 2010 and 2014). Accordingly, 91% of the research articles covered in our review were published between 2009 and 2021. This fact is somewhat surprising since stakeholder theory has been used in research since the 1990s. One possible reason for this observation could be that general interest in family business research has increased significantly since the early 2000s (Bird et al., 2002), which may also apply to interest in stakeholder engagement in family firms.

The sampled articles explored stakeholder engagement in family firms in various contexts. For instance, we found 37 quantitative (e.g., Bingham et al., 2011; Cabrera-Suárez et al., 2015) and 19 qualitative (e.g., Blombäck & Brunninge, 2016; Peters et al., 2018) articles relevant to our review focus. The most frequently studied region in empirical research was Europe, where data has been primarily collected in Spain, the United States (U.S.) and Germany. These are also among the countries with vast general research output on family businesses (Benavides-Velasco et al., 2013). In particular, manufacturing (e.g., Déniz-Déniz et al., 2018b) is among the leading sector covered in the empirical part of our review sample. Concerning the type of data collection, 18 articles were based only on surveys (e.g., Neubaum et al., 2012), 27 were based only on databases (e.g., Bingham et al., 2011), four used a combination of surveys and databases (e.g., Cabrera-Suárez et al., 2015), and 19 used case studies and interviews (e.g., Bozer et al., 2017). Non-empirical articles included in our review sample involved conceptual elaborations and prior reviews on specific aspects of family firms (e.g., Cennamo et al., 2012; Zellweger & Nason, 2008).

Regarding the sampled articles' theoretical backgrounds, 19 (26%) were based on stakeholder theory (e.g., Zellweger & Nason, 2008). The remaining articles were based, for instance, on social network theory (e.g., Acquaah, 2011), social capital theory (e.g., Cabrera-Suárez et al., 2015), or no specific theoretical background (e.g., Hutt, 2015; Morley, 1998). Appendix Section B Table A 2 and Appendix Section B Table A 3 present more detailed information on the individual articles included in the review sample.

B.4 Review Results

B.4.1 Cluster Analysis and Emergent Findings

Following Tranfield et al. (2003), we identified, selected, and analyzed our sample to synthesize the extracted data and main issues of every article concerning stakeholder relationships in family firms. As shown in Table B-2, we organized our results by a thematic classification of

the findings (for similar procedures, see Parris & Peachey, 2013; Searcy, 2012). The clustering is based on a content analysis of the studies included in the sample. We searched for similarity structures in the studies and termed the resulting clusters in line with their main research focuses. We tried to form hierarchically as large clusters as possible to avoid too narrow thematic clusters. A total of five clusters emerged, each assigned a letter from A to E and based on the identification of mutual thematic overlaps among the respective reviewed articles. We detail these clusters in the following sections, building our integrative framework of stakeholder theory in family firms on that basis (see the Discussion Section B.5 and Figure B-2).

Cluster	Cluster contents	Supporting studies		
		Empirical	Conceptual	Review
A	Family firms' stakeholder engagement and mutual communication help to reach corporate goals.	Aragón-Amonarriz et al. (2019); Blombäck and Brunninge (2016); Déniz-Déniz et al. (2018a); Neubaum et al. (2012); Uhlaner et al. (2004); Duh et al. (2010); Cabrera-Suárez et al. (2015); Laffranchini et al. (2020); Sakawa and Watanabel (2019); Debicki et al. (2017); McGuire et al. (2012); Badru and Oasem, (2021); von Bieberstein et al. (2020); Iaia et al. (2019); Le Breton-Miller and Miller (2020)	Braun et al. (2016); Hutt (2015); Morley (1998); Cennamo et al. (2012); Kellermanns et al. (2012); Mitchell et al. (2011); Hauswald and Hack (2013); Berrone et al. (2014); Baron and Lachenauer (2021)	Ring et al. (2017); Chaudhary et al. (2021)
B	Internal primary stakeholders influence the succession process in family firms.	Bjuggren and Sund (2014); Bozer et al. (2017); Pyromalis and Vozikis (2009); Sharma et al. (2003); Poza et al. (1997); Byrne et al. (2021); Kandade et al. (2021); Li et al. (2020)	Mitchell et al. (2013)	Daspit et al. (2016)
C	Non-family internal primary stakeholders (e.g., employees) are less often involved in the strategic decision-making process of family firms in contrast to non-family firms.	Peters et al. (2018); Stavrou et al. (2007)	Campbell (1997)	
D	Stakeholders affect the family firm's social and environmental sustainability.	Huang et al. (2009); Cuadrado-Ballesteros et al. (2015); Bendell (2021); Nadeem et al. (2020); Ng and Hamilton (2021); Noor et al. (2020); Pantano et al. (2020); Shipilov et al. (2019)		
E	Family firms' engagement with stakeholders is significantly related to family firm performance.	Acquaah (2011); Bachiller et al. (2015); Déniz-Déniz et al. (2018b); van Essen et al. (2015); Miller et al. (2009); Pérez-Cabañero et al. (2012); Bingham et al. (2011); Labelle et al. (2018); Neubaum et al. (2012); Cruz et al. (2014); Khan et al. (2015); Schlierer et al. (2012); Rose (2018); Amato et al. (2021); Cano-Rubio et al. (2021); Gamble et al. (2021); Heino et al. (2020); Martínez-Alonso et al. (2020); García-Sánchez et al. (2021); Kang and Kim (2020); Schellong et al. (2019); Weimann et al. (2021)	Cabrera-Suárez et al. (2011); Zellweger and Nason (2008); Zientara (2017); Fang et al. (2013); Miller and Le Breton-Miller (2021)	Claessens and Yurtoglu (2013)

Table B-2. Clusters of existing research on stakeholder engagement in family firms

(A) - Family firms' stakeholder engagement and mutual communication help to reach corporate goals

As shown in Table B-2, the first of the five clusters identified engagement and mutual communication practices as antecedents to family firms' corporate goals (e.g., Aragón-Amonarriz et al., 2019; Duh et al., 2010; Hutt, 2015). The reviewed articles suggest that family members make especially large personal contributions to the achievement of corporate goals. Based on a case study with 49 managers, Duh et al. (2010) found that, because family firms are often more personal, stakeholders feel like part of the family and act accordingly; thus, family firm management is often characterized by teamwork. Similarly, the findings of Neubaum et al. (2012) and Uhlaner et al. (2004) suggest that if the family business character of a firm comes into play, the felt distance between a firm and its stakeholders can be reduced, and selected stakeholders can be integrated into the kinship culture. Also, multiple studies (Aragón-Amonarriz et al., 2019; Cabrera-Suárez et al., 2015; Déniz-Déniz et al., 2018a; Duh et al., 2010) have suggested that, in family firms, social engagement determines the achievement of corporate goals. Such engagement takes the form of stakeholder maintenance over generations, personal care, and social capital (e.g., trust, shared values), and this finding seems to apply primarily to engagement with primary (internal and external) stakeholders; the reviewed papers primarily touch upon such primary stakeholders as employees and communities (e.g., Déniz-Déniz et al., 2018a; Duh et al., 2010; Le Breton-Miller & Miller, 2020), which may reflect their greater dependence upon local stakeholders (McGuire et al., 2012). Consequently, several lines of evidence (Braun et al., 2016; Déniz-Déniz et al., 2018a) suggest that decisions about the goals of family firms should be oriented to the needs and interests of primary stakeholders—with cooperative behavior between a family firm and its primary stakeholders—and not only driven by market demands.

Close stakeholder engagement may, however, benefit not only the family firm but also its

stakeholders. For instance, based on a survey of Spanish firms, Déniz-Déniz et al. (2018a) reported that the adoption of corporate goals concerning stakeholders' interests is positively related to the affective engagement of family managers. Furthermore, according to these findings, family managers' engagement in their firm gives intrinsic value to stakeholders' interests, whether they are employees or part of the local community. In addition, external stakeholders seem to be more honest when interacting with a family manager (von Bieberstein et al., 2020). Moreover, concerning dividend payments, fulfilling stakeholders' interests seems to open the way to satisfying shareholders' demands (Badru & Oasem, 2021).

One plausible way to understand the interests and needs of different stakeholders is excellent mutual communication. Hutt (2015) and Morley (1998) recommended setting up a program for corporate positioning, communication and online communication to reach a family firm's stakeholders who, in turn, can influence corporate goals, such as firm growth, plans for profitability, heritage communication, as well as create successful and long-range relations (Blombäck & Brunninge, 2016; Hutt, 2015; Iaia et al., 2019; Morley, 1998). Last but not least, reputation and trust are of significant importance for developing relations with stakeholders and achieving both economic and non-economic goals (Chaudhary et al., 2021). For instance, Blombäck and Brunninge (2016) highlighted the need to consider a large number of different stakeholders when planning communication about heritage. Also, Hutt (2015) noted that implementing a strategic approach to corporate communication makes sense as the number of different stakeholders and firm size increases. In this line, Sakawa and Watanabel (2019) found that foreign shareholders interact with family control to increase the firm's profitability. However, Baron and Lachenauer (2021) suggest that family firms' owners should always consider carefully what information should be shared with their stakeholders and effectively communicate why they want to keep some information secret or not.

One important goal that can be reached via stakeholder engagement is the preservation of

socioemotional wealth (Berrone et al., 2012; Deephouse & Jaskiewicz, 2013). In general, the reviewed articles suggest that family firms seem more inclined than non-family firms to actively invest in stakeholder engagement activities, as they maintain and promote their socioemotional wealth (Berrone et al., 2014; Cennamo et al., 2012). Achieving the families' socioemotional wealth goal may not be entirely at odds with the firm's economic goals (Ring et al., 2017). Hence, results by Debicki et al. (2017) suggest that socioemotional wealth goals that prioritize the importance of family goals represent strategic alignment between different stakeholder units in family firms, which may, in turn, lead to positive performance outcomes. In line with this notion, in their conceptual article, Hauswald and Hack (2013) propose that a firm which more greatly prioritizes socioemotional wealth goals is more likely to be benevolent towards stakeholders, which in turn impacts stakeholders' views of the firm's benevolence. As Hauswald and Hack (2013) explained, increasing control by and influence of the family over the firm leads to an increasing tendency to aim for preservation of socioemotional wealth (also see Gómez-Mejía et al., 2007). Laffranchini et al. (2020) confirmed these considerations, finding that family firms seem to formulate their decisions in a way that preserves the support of stakeholders who have helped the owning family secure their socioemotional wealth in turnaround situations.

Additionally, Mitchell et al. (2011) established that family firms' socioemotional wealth promotes a sense of urgency to respond to stakeholders' demands (e.g., family members), arguing that the urgency of increasing socioemotional wealth impacts views on family stakeholders' legitimacy and power, as well as their capacity to impact the firm's behavior. By contrast, in a conceptual article, Kellermanns et al. (2012) suggested that, under certain conditions, there could be a negative correlation between stakeholder engagement and socioemotional wealth. If family firms' norms violate generally accepted norms of conduct, socioemotional wealth should be negatively related to stakeholder engagement. In this respect,

Kellermanns et al. (2012) argued that strong ties often produce such organizational norms that conflict with generally accepted norms of behavior and that, as a result, family members feel pressure to follow those organizational norms. When generally accepted norms are consistent with the family firm's socioemotional wealth, Kellermanns et al. (2012) suggested that family ownership will support stakeholder engagement, but where there is a conflict between organizational and generally accepted norms of behavior, acting in concert with organizational norms will increase the family's socioemotional wealth at the expense of various other stakeholders.

(B) – Internal primary stakeholders influence the succession process in family firms

The second cluster refers to the succession process in family firms. Several studies indicated that internal, primary stakeholders' opinions, views and know-how, such as family members and co-owners, as well as family support and non-family stakeholders, play an essential role in succession planning (Bjuggren & Sund, 2014; Bozer et al., 2017; Daspit et al., 2016; Poza et al., 1997). In detail, Bjuggren and Sund (2014) found that such stakeholders impact the succession process through their family ties and friendships. Similarly, a case study by Bozer et al. (2017) found that higher perceived support from such family and family-adjacent stakeholders make it more likely for a candidate to enter the succession process. Challenges of intergenerational understanding can primarily be resolved through increased communication with one another to build trust (Li et al., 2020). According to Poza et al. (1997), this result also applies to the succession of a Chief Executive Officer (CEO), since family stakeholders such as "CEO parents" determine how and whether ownership of the firm is transferred between generations. In line with this notion, Kandade et al. (2021) conclude that the next family firm's generation should be given opportunities as early as possible to make contacts and build relationships with all stakeholders in the firm, hence developing mutual respect, obligations and

trust. By contrast, stakeholders without family ties, such as suppliers and creditors, do not have an enforceable impact on the succession process; instead, an intergenerational succession process of contractual relationships follows (Bjuggren & Sund, 2014). However, to acquire knowledge, the successor may need to build a repertoire of exchanges with non-family stakeholders to meet relational and transactional needs (Daspit et al., 2016). According to Byrne et al. (2021), it is necessary to exercise entrepreneurial, paternalistic and authoritarian masculinity to gain legitimacy with stakeholders as a new successor CEO.

Sharma et al. (2003) and Pyromalis and Vozikis (2009) examined the satisfaction of several primary internal stakeholders with family firm succession processes. On the one hand, Pyromalis and Vozikis (2009) suggested that stakeholders' perceived satisfaction with the succession process is strictly related to the effectiveness of that process. Successor stakeholders seem more satisfied if affected primary stakeholders accept their family-fixed roles (Sharma et al., 2003). On the other hand, Pyromalis and Vozikis (2009) proposed that a successor who is not well-prepared and self-confident will foment dissatisfaction among the concerned family stakeholders, with the effects occurring after a specific time delay, long after the succession process; the effects cannot be identified directly during the transition. Pyromalis and Vozikis (2009) argued that successors must have specialized knowledge of the family firm and various business skills; otherwise, family stakeholders may be dissatisfied. To counteract this trend, Mitchell et al. (2013) suggested that a stakeholder analysis to assess the different expectations of the various stakeholders could help formulate sustainable succession plans that would be supported by the stakeholders in the case of succession planning.

(C) – Non-family internal primary stakeholders (e.g., employees) are less often involved in the strategic decision-making process of family firms in contrast to non-family firms

The articles clustered in (C) investigate the decision-making process in family firms regarding

the involvement of various stakeholders, indicating that non-family primary internal stakeholders, such as employees, are often not included in decision-making processes (Peters et al., 2018; Stavrou et al., 2007). The family's demands often take precedence over those of other firm's stakeholders (Campbell, 1997). For instance, in a case study, Peters et al. (2018) showed that decisions in family firms are made by a small group of managers, or even by the owner, without the advice of other stakeholders, even though it would be advisable to involve in the decision-making process internal stakeholders, such as employees, who are in close contact with other primary stakeholders (e.g., customers).

(D) - Stakeholders affect the family firm's social and environmental sustainability

Based on a survey of 235 Taiwanese family firms, Huang et al. (2009) found that some stakeholder pressure fosters family firms' ambitions regarding the management of the natural environment. External stakeholders, such as regulators and the government, significantly impact the decision of a family firm to introduce and invest in environmentally friendly technical and organizational innovations through an increase in perceived pressure (Bendell, 2021; Huang et al., 2009; Ng & Hamilton, 2021); however, firms are more likely to avoid these investments if they negatively affect their reputation among industry (Bendell, 2021). In particular, family firms' innovation management operating at the local and regional levels may benefit from greater stakeholder engagement (Pantano et al., 2020). Similarly, the media stakeholders, whose impact of media coverage both praise and criticism, could lead to changes in corporate management and governance practices (Shipilov et al., 2019). Compared to non-family firms, Huang et al. (2009) explained, in family firms, the perceived pressure from regulators and market actors for the adoption of green innovations is smaller, on the one hand, but the perceived pressure from stakeholders such as shareholders, managers, and employees is higher. In this respect, family and non-family firms have different preferences in evaluating the

perceived pressure from various stakeholders; Huang et al. (2009) identify a specific decision-making mechanism of family firms within the framework of environmental management.

In a similar vein, Cuadrado-Ballesteros et al. (2015) focused on the relationship between stakeholders and family firms' corporate social responsibility, finding a positive relationship between the proportion of independent directors and published information on corporate social responsibility. However, Cuadrado-Ballesteros et al. (2015) also showed that the independence of board directors can disappear, mainly through the influence of family owners and through personal or family ties, reducing this positive relationship with the disclosure of information. The study by Noor et al. (2020) points out that building a good reputation and relationship with stakeholders takes time, so family firms that invest in their corporate social responsibility activities over a more extended period benefit in particular. In contrast, Nadeem et al. (2020) show a link between board gender diversity and stakeholder value creation. Specifically, board gender diversity on the supervisory board appears to increase social and environmental value creation, here exclusively environmental value creation (Nadeem et al., 2020). Hence, the study results ultimately indicate that female board members in family firms primarily consider the interests of environmental stakeholders (Nadeem et al., 2020).

(E) - Family firms' engagement with stakeholders is significantly related to family firm performance

As presented in Table B-2, the findings in cluster (E) concern the relationship between stakeholder engagement and family firm performance. A number of studies (Acquaah, 2011; Bachiller et al., 2015; Déniz-Déniz et al., 2018b; Miller et al., 2009; van Essen et al., 2015) described a significant impact between the engagement of various stakeholders and family firms' financial performance. Such studies usually assessed family firm performance through accounting performance measures, such as return on assets (RoA; e.g., Acquaah, 2011) or return

on equity (RoE; e.g., Bachiller et al., 2015). It seems that many owner-managers have a clear, pragmatic view of the value creation process for stakeholders and intuitively apply stakeholder engagement principles as an ethical concept and as a strategic concept that is crucial to the firm's survival (Schlierer et al., 2012). For instance, based on a survey of Ghanaian firms, Acquah (2011) found that the network relationship with primary (internal and external) stakeholders is essential for family firms and has a positive impact on their performance. Furthermore, network relationships with secondary stakeholders, such as politicians, do not influence family firm performance (Acquah, 2011). Still, relationships with stakeholders such as the community in which the family firm is located and the associated local ties appear to help explore business opportunities, especially in international markets (Cano-Rubio et al., 2021). In this regard, Miller and Le Breton-Miller (2021) posit that stakeholder relations impact the strategic outcomes of family firms, and both effects, in turn, are related to financial performance and business growth. Hence, it should be considered that there may be different outcomes between stakeholder relations and family firm performance. Earlier, however, Miller et al. (2009) examined the differences between social behavior and the performance of family and non-family firms in emerging markets, finding contradictory results to Acquah (2011). Specifically, based on a survey of high-technology firms in emerging markets, Miller et al. (2009) found that relationships with secondary stakeholders had a more positive impact on the performance of a family firm compared to a non-family firm.

Bachiller et al. (2015) focused on how the board of directors (an internal primary stakeholder) can influence the financial performance of family firms. On the one hand, Bachiller et al. (2015) found that Return on Assets (RoA) declined in family firms as board size increased; on the other hand, they identified a positive correlation between the number of executives on the board of directors and RoE. Bachiller et al. (2015) further showed that the number of generations on the board of directors influences financial performance; more generations on the board of

directors leads to higher RoA and RoE. In addition to these findings by Bachiller et al. (2015), Déniz-Déniz et al. (2018b) examined the relationship of the top management team to family firm financial performance, finding that a high degree of familial identification with the firm influences how the family firm orients towards non-family stakeholders when defining corporate goals. Moreover, a high degree of familial identification has a significant and positive association with the firm's economic performance, and this identification is even stronger when the top management team mostly family members. Thus, according to Déniz-Déniz et al. (2018b), familial character (e.g., family member presence in management) moderates the association between family identification with the firm and the firm's orientation toward stakeholders, which also implies the importance of the relationship between this orientation and economic performance. Weimann et al. (2021) add that for the members of a controlling family, it can be beneficial to make non-family stakeholders (such as employees) feel like part of the family. This finding is illustrated, for instance, by Khan et al. (2015), whose results show that family firms with family CEOs tend to pay significantly lower audit fees compared to firms with non-family CEOs and seem less inclined to hire high-caliber audit firms. Complementing these findings, van Essen et al. (2015) investigated the relationship between listed family firms and outcomes for primary internal stakeholders (e.g., financiers and employees) before and during the global financial crisis. During the financial crisis, their results suggest, stricter financier protection laws and reliable employee protection significantly improved family firms' financial performance. Family firms, in particular, often seem to treat employees as essential stakeholders under challenging times due to their social proximity (e.g., sense of belonging) to the business environment (Amato et al., 2021). In addition, according to the study by Kang and Kim (2020), due to the family firm's reputation of their firm and family, which is very important to family firm owners, it is more likely that the family firm owners may prioritize their investment in employee relations primarily to avoid potential conflicts. Hence, on the one side

from an economic viewpoint, van Essen et al. (2015) suggest that it can make sense for family firms in a time of financial crisis to actively engage with corporate stakeholders in a targeted manner. On the other side, García-Sánchez et al. (2021) suggest that family firms should mainly take care of internal stakeholders in difficult economic situations, as they create human capital in addition to the financial aspect and make critical strategic decisions to satisfy external stakeholders.

Several lines of evidence indicate that stakeholder satisfaction significantly and positively impacts family firm performance (Cabrera-Suárez et al., 2011; Pérez-Cabañero et al., 2012; Zellweger & Nason, 2008). For example, Cabrera-Suárez et al. (2011) pointed out that matching between the firm's business and the interests of involved stakeholders is a determining factor of family firm performance that contributes to these firms' long-term survival. Similarly, Pérez-Cabañero et al. (2012) found that customer satisfaction positively impacts family firm performance, as high customer retention leads to increased sales. The stronger the communication of the brand's family firm status, the greater the satisfaction of consumers may be (Schellong et al., 2019). In this line, the study results by Rose (2018) indicate that cooperative intentions of the family firm as a seller have a positive influence on the trust and satisfaction of the buyer relationship so that a mutual economic benefit can be derived, since the interaction experience leads to higher perceived relationship quality and at the same time reduces the risk of conflict. Building on these findings, Gamble et al. (2021) show that family firms can gain more knowledge with their stakeholders, such as suppliers, hence collaborating to create more personalized experiences for other stakeholders such as consumers. Besides, their results indicate that employee satisfaction positively influences family firm performance, as it increases the employees' motivation. The study also confirms family firms' product differentiation capacity positively impacts stakeholder satisfaction. Thus, investing resources in product policy (marketing capabilities) leads to a differentiation of offers and increases

stakeholder engagement, which in turn increases family firm performance (Pérez-Cabañero et al., 2012). In addition, promoting and cooperating with qualified employees seems to favor the family firm's technological innovation efficiency and growth (Martínez-Alonso et al., 2020). Finally, Zellweger and Nason (2008) theoretically explored stakeholder satisfaction through causal (one performance result causes other performance results) and overlapping (one performance result satisfies various stakeholders) performance relationships. According to Zellweger and Nason (2008), understanding these performance relationships can help to increase a family firm's ability to satisfy multiple stakeholders. They suggest that using causal and overlapping relationships which satisfy several stakeholders increases firm performance.

Some studies have linked family firm performance with the social practices of family firms towards their stakeholders (Bingham et al., 2011; Cruz et al., 2014; Fang et al., 2013; Labelle et al., 2018; Neubaum et al., 2012). Based on a survey of U.S. firms, Bingham et al. (2011) found that family firms focus more on social initiatives and objectives for stakeholders, such as communities and employees, compared to non-family firms. Furthermore, Labelle et al. (2018) showed that this trend is particularly evident for family firms operating in stakeholder-oriented countries and that family firms tend to adapt to a country's institutional environment in their relations with stakeholders. Also, Bingham et al. (2011) reported that family involvement is a further restrictive factor; thus, the more a family is involved in the business, the more stakeholders are included in making decisions that impact the firm's performance.

Reviewing recent research on corporate governance, Claessens and Yurtoglu (2013) showed that a high level of corporate responsibility enables good relationships with a firm's stakeholders and strengthens family firm performance. Viewed from a different direction, Zientara (2017) suggested that unfair behavior towards stakeholders leads to a long-term decline in competitiveness and performance, threatening a firm's survival. A conceptual study by Fang et al. (2013) used a stakeholder salience model based on Mitchell et al. (1997). The

concept of stakeholder salience describes situations in which stakeholders are given legitimacy based on their characteristics which are valued by the families' coalition decision-makers and not on their legitimate claim to fixed resources (Fang et al., 2013). Fang et al. (2013) discuss how limited stakeholder salience creates long-term relationships between the family firm and its stakeholders, arguing that satisfying non-economic objectives through relationships with stakeholders can influence family firm performance.

Further research highlights an inverse connection between social practices towards stakeholders and their impact on firm performance. For instance, Cruz et al. (2014) found that, unlike non-family firms, family firms reduce social objectives in the face of decreasing performance. Thus, corporate social responsibility policy decreases alongside declining firm performance, though this outcome is significant only for customers, not for employees, governance, or the community (Cruz et al., 2014).

Finally, the study results by Heino et al. (2020) of listed family firms show that to achieve sustainable competitive advantage and organizational effectiveness, the firm's focus should be on those stakeholders that are of immediate power, urgency, legitimacy and relevance to the firm, rather than exclusively engaging all internal and external stakeholders as suggested by stakeholder theory.

B.4.2 From Synthesis to an Integrated Framework

Figure B-2 represents an adapted, synthesized framework of stakeholder theory for family firms based on our literature review as reported above. Based on our literature from the systematic search, we have expanded and adapted Figure B-1 to include our results. To represent the complex nature of family firms in Figure B-2, we use the three-circles model of family businesses of Gersick et al. (1997). Based on our above review findings, Table B-3 details the relationships between several stakeholder groups, as represented by the arrows in Figure B-2. If a sampled article referred to a specific group of internal stakeholders, we note this accordingly

(see Figure B-2, numbers [1] to [12]). For the classification and development of the central topics [13] to [20], we chose an inductive approach. The hyphen should be understood to mean that the codes of actor groups concerned engage with each other (see Table B-3). We concentrated primarily on comparisons between the findings in our review sample and thus found similar topics. In order to find connections to the existing literature in the research field of family businesses, we then oriented ourselves on the work of Debicki et al. (2009) and Chrisman et al. (2003). Some of the topics were in agreement. The remaining thematic fields were adopted, according to Debicki et al. (2009) and Chrisman et al. (2003). Note that some actors situated in the three-circles model have no official business position in the family firm, such as spouses of family firm managers. In Figure B-1, we nevertheless treat such actors as internal stakeholders because, following the three-circles model, they may still be regarded as part of the overall family business system (Gersick et al., 1997). Furthermore, while the arrows in Figure B-2 suggest dyadic stakeholder relations, we do not mean to exclude the network stakeholder relations discussed above. That is, the two-headed arrows in Figure B-2 are included for visual simplicity and should not be understood to exclude network relationships. Moreover, as exemplified in the results of our review, there may be stakeholder relationships among primary internal stakeholders. Again, for visual clarity, we do not include separate arrows among internal stakeholder groups, this does not imply that relationships among internal stakeholders are non-existent or could not decisively impact various dimensions of family firm performance.

Various performance outcomes of stakeholder engagement in family firms include corporate goals, socioemotional wealth, succession processes, decision-making processes, corporate social responsibility, natural environment management, financial performance, and overall firm performance. These performance outcomes are marked in Figure B-2 by the numbers (13) to (20). Table B-3 highlights that interactions between family firm stakeholders, for instance,

between internal stakeholders positioned within the three circles in Figure B-2 and external stakeholders as represented by the numbers (11) and (12), affect various dimensions of family firm performance. This finding supports the general notion from stakeholder theory that stakeholder engagement leads to superior performance (Kull et al., 2016), applied specifically to family firms.

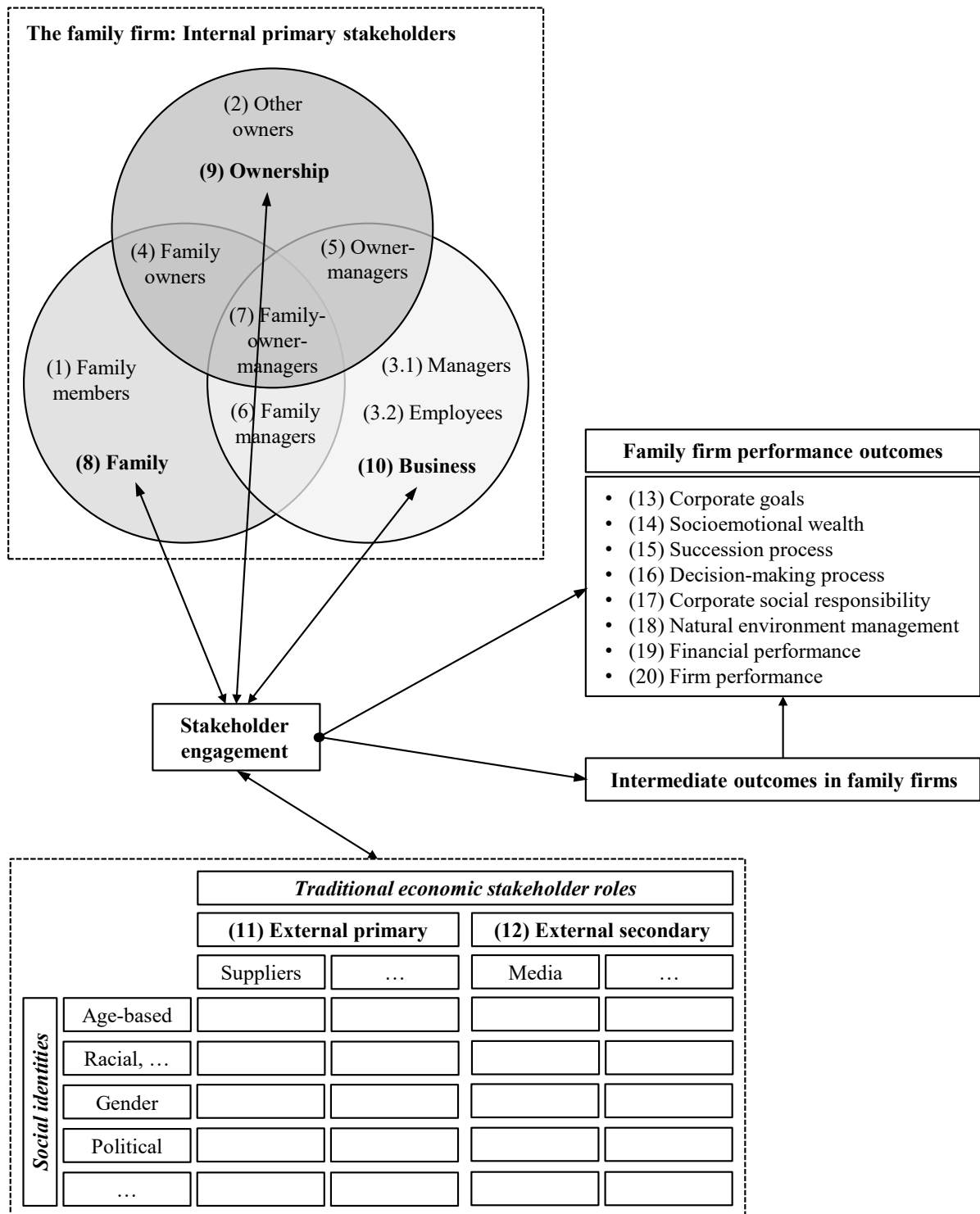


Figure B-2. A synthesized, integrated framework of stakeholder engagement in family firms and roadmap for further research

Engagement (codes of actor groups displayed in Figure B-2)			Performance outcomes (codes displayed in Figure B-2)	Supporting studies
Internal primary stakeholders	External primary stakeholders	External secondary stakeholders		
8 – 9 – 10	11	12	13	Aragón-Amonarriz et al. (2019); Blombäck and Brunninge (2016); Déniz-Déniz et al. (2018a); Neubaum et al. (2012); Uhlener et al. (2004); Duh et al. (2010); Cabrera-Suárez et al. (2015); Braun et al. (2016); Hutt (2015); Morley (1998); McGuire et al. (2012); Baron and Lachenauer (2021); Iaia et al. (2019); Chaudhary et al. (2021); Le Breton-Miller and Miller (2020)
1	11		13	Weimann et al. (2021)
6	11		13	Déniz-Déniz et al. (2018a); Sakawa and Watanabel (2019)
6	11	12	13	von Bieberstein et al. (2020).
8 – 9 – 10	11	12	14	Laffranchini et al. (2020); Cennamo et al. (2012); Kellermanns et al. (2012); Mitchell et al. (2011); Hauswald and Hack (2013); Berrone et al. (2014); Ring et al. (2017)
8 – 9 – 10	11	12	15	Bjuggren and Sund (2014); Bozer et al. (2017); Pyromalis and Vozikis (2009); Sharma et al. (2003); Daspit et al. (2016); Mitchell et al. (2013); Byrne et al. (2021); Kandade et al. (2021); Li et al. (2020)
7	11		15	Poza et al. (1997)
8	11		15	Bjuggren and Sund (2014); Bozer et al. (2017)
9	11		15	Bjuggren and Sund (2014); Bozer et al. (2017)
1	11		15	Bjuggren and Sund (2014); Bozer et al. (2017)
9	11		16	Peters et al. (2018)
10	11		16	Peters et al. (2018)
8 – 9 – 10	11		16	Peters et al. (2018); Stavrou et al. (2007)
8	11	12	16	Campbell (1997)
8 – 9 – 10	11		17	Cuadrado-Ballesteros et al. (2015)
8 – 9 – 10	11	12	17	Noor et al. (2020)
8 – 9 – 10	11	12	18	Huang et al. (2009); Nadeem et al. (2020); Ng and Hamilton (2021); Pantano et al. (2020)
8 – 9 – 10		12	18	Bendell (2021); Shipilov et al. (2019)
8 – 9 – 10	11		19	Acquaah (2011); Bachiller et al. (2015); Déniz-Déniz et al. (2018b); van Essen et al. (2015); Badru and Oasem (2021)
8 – 9 – 10		12	19	Miller et al. (2009); Khan et al. (2015)
8 – 9 – 10	11	12	19	Miller and Le Breton-Miller (2021)
5 – 7	11		20	Schlierer et al. (2012)
8 – 9 – 10	11	12	20	Labelle et al. (2018); Neubaum et al. (2012); Claessens and Yurtoglu (2013); Zientara (2017); Pérez-Cabañero et al. (2012); Cabrera-Suárez et al. (2011); Zellweger and Nason (2008); Fang et al. (2013); Cruz et al. (2014); Debicki et al. (2017); Heino et al. (2020); García-Sánchez et al. (2021); Kang and Kim (2020); Amato et al. (2021); Miller and Le Breton-Miller (2021)
8 – 9 – 10		12	20	Cano-Rubio et al. (2021)
8 – 9 – 10	11		20	Rose (2018); Gamble et al. (2021); Martínez-Alonso et al. (2020); Schellong et al. (2019)
8	11		20	Bingham et al. (2011)

Table B-3. Studies underpinning the relationships shown in Figure B-2

B.5 Discussion and Directions for Future Research

This systematic review of the existing literature on stakeholder engagement in family firms presents a basis for further research and provides a sample of outcomes obtained by the discussed articles. The integrative framework above shows an overall view of the stakeholder engagement efforts by family businesses as investigated in the literature. Various findings emerge from this analysis, as summarized in Table B-2, Table B-3 and Table B-4 (and Appendix Section B Table A 4). While the literature already highlights several specific aspects of family firms in terms of stakeholder theory, we propose that stakeholder theory is well-suited to guide still further research on family firms. Such research seems promising at least because the reviewed literature suggests that stakeholder engagement drives various beneficial outcomes for family firms. Therefore, we suggest four important avenues for future research, as summarized in Table B-4. Future research could take many additional directions, of course; we offer those that we view as most pressing and relevant.

Research avenue	Future research suggestions	Relevant existing studies
I	Exploring family culture as a factor influencing various antecedents (determining factors) of stakeholder engagement in family firms.	Aragón-Amonarriz et al. (2019); Cabrera-Suárez et al. (2015); Déniz-Déniz et al. (2018a); Duh et al. (2010); Blombäck and Brunninge (2016); Herremans et al. (2016); Olander and Landin (2008); Yang et al. (2011); Sharma (2002)
II	Exploring the mutual performance linkages between the family firm and stakeholder engagement.	Cabrera-Suárez et al. (2015); Berman et al. (1999); Choi and Wang (2009); Garcia-Castro and Francoeur (2016); Greenley and Foxall (1998); Jones et al. (2016); Kacperczyk (2009); Kassinis and Vafeas (2006); Li et al. (2018); Sloan (2009); Lussier and Sonfield (2006); Lee (2006); Daspit et al. (2016)
III	Exploring stakeholders' social engagement expectations of family firms.	Uhlaner et al. (2004); Huang et al. (2009); Berrone et al. (2010); Neubaum et al. (2012); Cennamo et al. (2012); Barnett (2007); McWilliams and Siegel (2001); Helmig et al. (2016); Surroca et al. (2013); Acquaah (2011); Blombäck and Brunninge (2016); Ring et al. (2017); Berrone et al. (2014); Mitchell et al. (2013); Crane and Ruebottom (2011)
IV	Exploring the role of intermediate outcomes between stakeholder engagement and family firm outcomes	Freeman (2008); Jensen (2008); Carney et al. (2011); Aguilera and Jackson (2003); Roloff (2008); Kochan and Rubinstein (2000); Sorenson (1999); Kellermanns and Eddleston (2007); Frank et al. (2011)

Table B-4. Future avenues for research applying stakeholder theory to family firms

(I) – Exploring family culture as a factor influencing various antecedents (determining factors) of stakeholder engagement in family firms

First, as shown in findings cluster A (see Table B-2 and Figure B-2), stakeholder engagement is a determining factor for adding value to the whole family firm and business environment. However, only a few of the reviewed studies (e.g., Déniz-Déniz et al., 2018a, 2018b) address the antecedents of stakeholder engagement. A further central research question would therefore be which factors determine stakeholder engagement in family firms (cf. Cabrera-Suárez et al., 2015). One important factor could be family culture, defined as the family's perspectives, assumptions, values, and attitudes, whether collaborative, conflictive, or patriarchal (Dyer, 1988; Vallejo, 2008). As Zellweger et al. (2010) and Chua et al. (1999) suggested, a family firm's family culture can be a key resource. We, therefore, propose that family culture could also be an important resource for realizing effective stakeholder engagement.

The stakeholder literature (e.g., Herremans et al., 2016; Olander & Landin, 2008; Yang et al., 2011) and our sample literature (e.g., Cabrera-Suárez et al., 2015; Déniz-Déniz et al., 2018a; Duh et al., 2010) present various factors that influence stakeholder engagement: communication skills (e.g., stakeholder needs and interests), personal care and social capital (e.g., trust, shared values), and common goals. Uhlaner et al. (2004) showed that family character could reduce the distance between a firm and its stakeholders and integrate selected stakeholders into the family or kinship culture. Thus, the following further research questions arise:

- How does family culture lead to investment in stakeholder engagement? How does family culture influence stakeholder engagement in family firms?
- Under what circumstances does family culture actually influence stakeholder engagement, and what group of people makes decisions? Are the antecedents of stakeholder engagement different in family firms, and how do these antecedents impact

stakeholder trust? Does gender play a role in differentiation? How can they be aligned and managed to improve family firm performance, and how do family firms adapt their system of stakeholder engagement?

- Conversely, among the various antecedents of stakeholder engagement in family firms, what are the main drivers for using and investing in stakeholder engagement? Which drivers have the most significant impact (e.g., on stakeholder satisfaction)? How can these drivers be aligned and managed to improve family firm performance?

(II) – Exploring the mutual performance linkages between the family firm and stakeholder engagement

Second, cluster *E* (see Table B-2) concerns stakeholder engagement and its connection to family firm performance. A number of studies from the general literature on stakeholder theory have postulated a positive association between stakeholder relationships and firm performance (e.g., Berman et al., 1999; Choi & Wang, 2009; Garcia-Castro & Francoeur, 2016; Kacperczyk, 2009; Kassinis & Vafeas, 2006). While such research stresses the benefits of stakeholder engagement, little is known about its costs. Thus, obtaining a better differentiated view of stakeholder engagement in family firms and its effect on performance requires closer investigation of the costs of stakeholder engagement. Our review identified factors influencing stakeholder engagement, such as communication skills and personal care, but building and maintaining these relationships probably takes time and other resources and thus has associated social and financial costs (see Sloan, 2009). As our review indicated, the controlling family, in particular, usually invests a great deal in stakeholder relationships. To better understand the balance between the costs of stakeholder engagement and its outcomes, we suggest pursuing the following research questions:

- How can the costs (e.g., social and financial) and benefits of stakeholder engagement in family firms be assessed? How can these benefits be achieved, and in what respects does the family personally help to secure and achieve these benefits? How can controlling families know when their incurred costs provide sufficient return (i.e., sufficient return on investments in stakeholders)?
- What barriers do family firms experience when investing in stakeholder engagement, and how can these barriers be overcome? How do these barriers impact performance?
- What happens when newly hired, non-family managers enter family firms and try to engage with stakeholders? Does an engagement of non-family stakeholders and their valuable knowledge facilitate the family firm's succession process?

Additional research is also necessary to illuminate under which circumstances (e.g., firm size, industry type, country of origin, regional context) family firms benefit from stakeholder engagement. Cabrera-Suárez et al. (2015) showed that external factors, such as an initial public offering (IPO), may also affect the family's influence and relationships with relevant stakeholders outside the family. Based on a survey of family firms in the U.S. and France, Lussier and Sonfield (2006) found that family firms change with increasing size and that growth patterns differ by country. For instance, larger family firms in both countries have significantly more non-family members within their top management teams and make greater use of external consultants compared to smaller family firms (Lussier & Sonfield, 2006). Thus, larger family firms have increased diversity and more stakeholder groups. Furthermore, we know from Lee (2006) that a family firm's behavior is greatly affected by its industry affiliation (e.g., manufacturing and services) and size.

Since our review sample shows many direct effects between stakeholder engagement and family firm performance, we propose to examine the above-mentioned contextual factors (e.g., firm size, industry type, country affiliation, regional context) as moderators of this relationship

to determine under which circumstances and contexts family firms (most) benefit from stakeholder engagement. Related research questions could include the following:

- Under what circumstances and in which contexts (e.g., firm size, industry type, country of origin, regional context) can family firms (most) benefit from stakeholder engagement?
- How does behavior concerning stakeholder engagement differ by family firm size? Is there a gradient in stakeholder engagement performance between small and large family firms?

(III) – Exploring stakeholders’ social engagement expectations of family firms

Our finding clusters in Table B-2 show that primary (internal and external) stakeholders seem to affect family firms’ corporate social responsibility. In line with this notion, Barnett (2007) suggested accounting for firm–stakeholder relationships in terms of corporate social responsibility. According to McWilliams and Siegel (2001) and Helmig et al. (2016), stakeholder pressure can often be observed that could lead to increased resources allocated to corporate social responsibility. In this vein, Huang et al. (2009) demanded better understanding of how family firms assess perceived stakeholder pressure. Especially perceived stakeholder pressure from social identity-based stakeholders and thus stakeholder claims based on cultural or social affiliations that are not easily reconciled with economic interests (Crane & Ruebottom, 2011). It may be that stakeholder pressure is created because firms often fail to meet stakeholders’ expectations (Surroca et al., 2013). Especially if family firms are perceived as “more benevolent” from the perspective of stakeholders (see Cennamo et al., 2012), a higher level of demands and expectations may accordingly develop. Disappointing stakeholders relative to expectations may correspondingly affect family firms more negatively since expectations are higher compared to non-family firms (see Berrone et al., 2010; Neubaum et

al., 2012). As Uhlaner et al. (2004) highlighted, further research is needed to investigate whether family firms are more likely to favor corporate social responsibility toward particular stakeholders. Important questions for future research include the following:

- What are stakeholders' typical expectations of corporate social responsibility (e.g., mix of demands) for family firms, and how can family firms measure and respond to such stakeholder pressure?
- Which expectations and needs of the traditional (such as primary and secondary) and social stakeholders can be consistently complementary to the family?
- On what basis do family firms or the family itself make decisions to invest in corporate social responsibility initiatives in specific stakeholders?
- Why are some family firms more willing to meet stakeholders' demands than others (e.g., other family firms or non-family firms)?
- How do increasing firm growth and the increasing involvement of non-family managers affect family firms' social activities related to various stakeholders?
- How do family firms quickly recognize the social engagement expectations of different stakeholders so that contradictory engagement expectations do not arise and, conversely, synergies can be efficiently generated in the form of overlapping stakeholders' social engagement expectations?
- What effects do the different stakeholders' social engagement expectations have concerning the varying degrees the individual stakeholders identify with the family business?
- What are the effects on the social health of meeting or not meeting the social engagement expectations of various stakeholders?

(IV) – Exploring the role of intermediate outcomes between stakeholder engagement and family firm outcomes

We know that a family business is a complex, dynamic social system in which integration can be achieved through mutual adjustments between three subsystems: the family, the firm and property (Gersick et al., 1997). Conflicts are not specific to family firms, but especially in family firms, conflicts can escalate much more quickly due to family relationships, so that conflicts are a central problem in family firms (Frank et al., 2011). In line with this idea, various authors of general stakeholder theory research propose investigating the emergence of conflicts of interest (e.g., social conflicts, conflicts of values, governance) between different stakeholders in the firm and, in particular, to identify possible conflict resolution strategies for stakeholders (Aguilera & Jackson, 2003; Carney et al., 2011; Freeman, 2008; Jensen, 2008). In particular, conflicts and conflict resolution strategies between stakeholders such as family members have been researched (see Kellermanns & Eddleston, 2007 and Sorenson, 1999), but the investigation of many other stakeholders such as suppliers remains unresolved or results do not refer to the specific type of family firms (see, e.g., Kochan & Rubinstein, 2000; Roloff, 2008). Thus, further research is needed to investigate how conflicts of interest between different stakeholders in the family firms arise and, in particular, how these conflicts can be identified and resolved. Important questions for future research include the following:

- What kind of conflicts (e.g., resource conflicts, conflicts of values, governance) arise between different stakeholders?
- How exactly can conflicts of interest be identified and managed in family firms?
- How do stakeholder engagement strategies function as conflict resolution strategies (e.g., meeting expectations and needs)?
- Which conflict resolution strategies are significant and have a positive influence on the family firm's performance?

B.6 Limitations

We acknowledge several limitations of the present systematic literature review. First, our review only considered family firms; the results are not transferable to other types of business. Although we believe that our method of article selection was comprehensive, other searches might have found a slightly varied list of studies. Also, as is usual in systematic literature reviews, we only included articles from international journals that were available in electronic databases as a first step. According to expert recommendations, we search for other sources, such as books or articles published in non-academic journals; hence these provided interesting results. Overall, while our sample size of 74 articles may appear small, other reviews of similarly emerging topics within research on family firms and business ethics have relied on similar or even smaller samples (e.g., De Massis et al., 2013; Parris & Peachey, 2013) yet have proven highly influential after their publication. For instance, the review by De Massis et al. (2013) on technological innovation in family firms “only” covered 18 articles. After its publication, research interest in this field has greatly increased; at the time of this writing (end of 2021), De Massis et al. (2013) has already attracted more than 400 citations according to Google Scholar. Besides, our study is internationally oriented and written in English, and thus the sample is also available in English. We know that many countries outside the United Kingdom and the U.S. with their dominant shareholder paradigm are very advanced in the real application of stakeholder engagement, such as the Scandinavian countries or the Netherlands, where social capital, which is very close to stakeholder management, was applied early in practice. The exclusion of these publications does not mean that we consider them to be non-existent. However, we propose to do translation work here in a separate study. Consequently, we are confident that, despite its relatively small review sample, our paper will spark more research on stakeholder engagement in family firms.

B.7 Conclusion

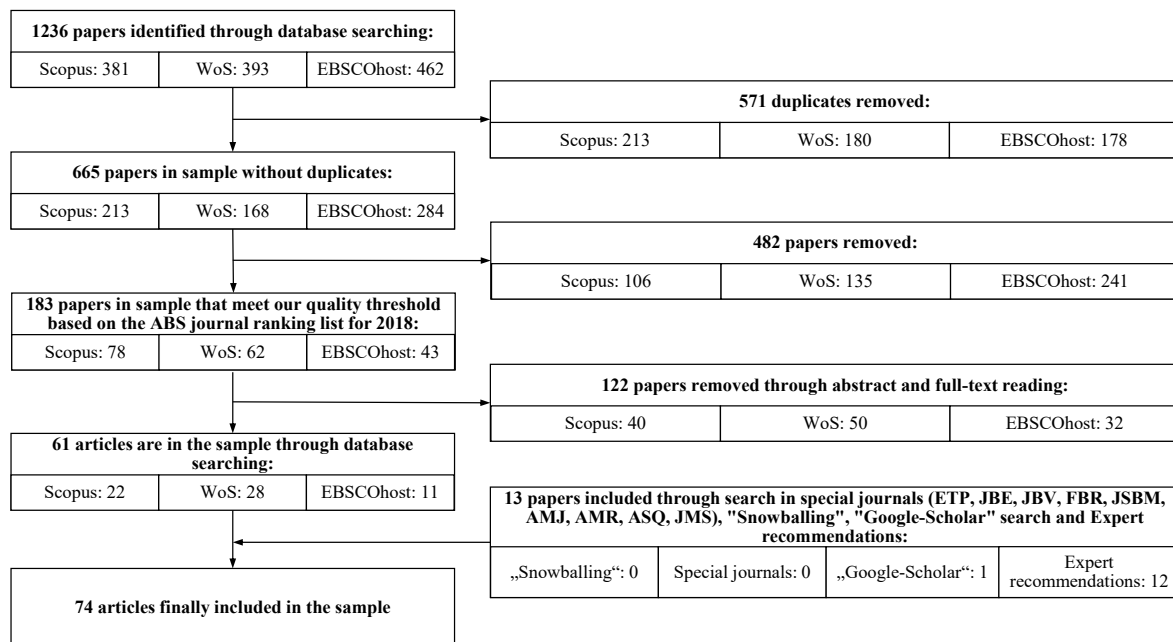
This paper contributes to the literature on stakeholder theory and family business in three primary ways. First, it overviews and synthesizes the existing literature on stakeholder theory in family firms, combining existing knowledge from sampled articles to facilitate an intensified discussion among various research fields concerning stakeholder relationships in family firms. Overall, the review showed that (i) researchers have examined how stakeholders impact family business performance in multiple ways. As is typical for many family firms (e.g., Zellweger & Nason, 2008), performance outcomes encompass both financial and non-financial aspects, such as earnings, succession, and socioemotional wealth. Further, as main managerial implication, our review results show that (ii) family firms' stakeholder relations only add value if the stakeholders are satisfied or if their interests are considered extensively based on excellent communication. Consequently, family firms need to engage in collaborative practices with all stakeholders.

Second, in addition to our review, we developed an integrative framework (see Figure B-2) based on our literature review, the three-circle model of the family business of Gersick et al. (1997), and recent insights from stakeholder theory. The framework is based on the general stakeholder theory and explains variance in several dimensions of family business performance. We present a classification that has not been taken up in research to date but which we hope can serve as a basis for further research on family firms inspired by stakeholder theory.

Third, based on this framework, we suggest a number of fruitful avenues for further research based on our reading of the literature. These include studies of (i) the antecedents of successful stakeholder engagement in family firms, (ii) the costs and benefits of stakeholder engagement in family firms and under which conditions family firm performance can be improved through such engagement, (iii) how stakeholder engagement interacts with family firm's behavior around corporate social responsibility, and (iv) the role of intermediate outcomes between

stakeholder engagement and family firm outcomes. We are confident that research in these areas will deliver not only interesting contributions to family business research but also important implications for family business practice.

Appendix Section B



Appendix Section B Figure A 1. Step by step filtering process for the selection of relevant literature

Journals' primary research field as in the CABS 2018 journal quality guide	Journal title and abbreviation	CABS 2018 journal ranking	1997	1998	2003	2004	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
<i>General management, ethics, gender and social responsibility (8)</i>	Business Ethics Quarterly (BEQ)	4									1											1
	Business Ethics: A European Review (BEER)	2																1				1
	Corporate Social Responsibility and Environmental Management (CSREM)	1																		1		1
	Harvard Business Review	3																			1	1
	Journal of Business Ethics (JBE)	3					1			1	1	1					2	2		1	1	10
	Journal of Management, Spirituality and Religion (JMSR)	1											2									2
	Journal of Sustainable Finance and Investment (JSFI)	1																				1
	Management Science (MS)	4*																			1	1
<i>Finance (2)</i>	Emerging Markets Review (ENEMAR)	2											1									1
	The British Accounting Review (BAR)	3													1							1
<i>Entrepreneurship and small business management (7)</i>	Entrepreneurship: Theory and Practice (ETP)	4										2		1					1	1	1	6
	International Entrepreneurship and Management Journal (IEMJ)	1							1												1	2
	Journal of Business Venturing (JBV)	4			1																	1
	Family Business Review (FBR)	3	1						1				1		1	1					1	6
	Journal of Family Business Strategy (JFBS)	2									1	1									1	4
	Journal of Small Business and Enterprise Development (JSBED)	2				1												1				2
	Journal of Small Business and Entrepreneurship (JSBE)	1																				1
<i>International business and area studies (7)</i>	European Journal of International Management (EJIM)	1																1				1
	European Management Journal (EMJ)	2									1											1
	International Business Review (IBR)	3													1							1
	Journal of International Business Studies (JIBS)	4*							1													1
	International Journal of Disclosure and Governance (JDG)	2														1						1
	Corporate Governance: An International Review (CGIR)	3														1						1
	Journal of Communication Management (JCM)	1		1																		
<i>Economics, econometrics and statistics (1)</i>	European Journal of Law and Economics (EJLE)	1												1								1
<i>Organizational studies (4)</i>	International Studies of Management and Organization (ISMO)	2														1						1
	Journal of Management and Organization (JMO)	2							1													1
	Journal of Business Research (JBR)	3										1								1	2	4
	Organization Studies (OS)	4																				1
<i>Marketing (1)</i>	Marketing Intelligence and Planning (MIP)	1										1										1
<i>Strategy (5)</i>	Journal of Business Strategy (JBS)	1													1	1						2
	Business Strategy Review (BSR)	1	1																			1
	Strategic Management Journal (SMJ)	4*																	1			1
	Business Strategy and the Environment (BSE)	2																		1	3	4
	European Journal of Innovation Management (EJIM)	1																			1	1
<i>Regional studies, planning and environment (1)</i>	British Food Journal (BFJ)	1																	1			1
<i>Operations research and management science (1)</i>	Management Decision (MD)	2																	1			1
<i>Human resource management and employment studies (1)</i>	Advances in Developing Human Resources (ADHR)	2																			1	1
Subtotal (38)			2	1	1	1	1	1	3	1	4	6	4	2	6	3	3	4	4	10	13	70
<i>Grey literature</i>														1			2	1				4
Total			2	1	1	1	1	1	3	1	4	6	4	3	6	3	5	5	4	10	13	74

Appendix Section B Table A 1. Article distribution over time based on the journals' primary research field and bibliographical source

Author(s) (Year of publication)	Geographic location		Industry type ⁴
	Country	Region	
Acquaah (2011)	Ghana	Western Africa	M/S
Amato et al. (2021)	Spain	Southern Europe	FO/CH/ELEC/TR/C/U/M/O
Aragón-Amonarriz et al. (2019)	Mexico	Central America	S/T/R
Bachiller et al. (2015)	Italy	Southern Europe	CO/E/INF/M/U/TR
Badru and Oasem (2021)	Malaysia	Southeast Asia	T/S/M/C/CO/O
Baron and Lachenauer (2021)			
Bendell (2021)	U.S.	Northern America	S
Berrone et al. (2014)			
Bingham et al. (2011)	U.S.	Northern America	C/M/TECH/HE/O
Bjuggren and Sund (2014)	Sweden	Northern Europe	n.a.
Blombäck and Brunninge (2016)	Sweden/Germany	Northern Europe/Western Europe	S/M/R
Bozer et al. (2017)	Australia	Australia and New Zealand	n.a.
Braun et al. (2016)			
Byrne et al. (2021)	France	Western Europe	CO/FO/M/O
Cabrera-Suárez et al. (2015)	Spain	Southern Europe	P/CO/M/WH/R/HE/O
Cabrera-Suárez et al. (2011)			
Campbell (1997)			
Cano-Rubio et al. (2021)	Spain	Southern Europe	FO
Cennamo et al. (2012)			
Chaudhary et al. (2021)			
Claessens and Yurtoglu (2013)			
Cruz et al. (2014)	n.a.	Europe	n.a.
Cuadrado-Ballesteros et al. (2015)	International ⁵	International ⁶	EN/INF/M/U/HE/C
Daspit et al. (2016)			
Debicki et al. (2017)	Poland	Eastern Europe	M/S/R
Déniz-Déniz et al. (2018a)	Spain	Southern Europe	P/CO/M/WH/R/HE/O
Déniz-Déniz et al. (2018b)	Spain	Southern Europe	P/CO/M/WH/R/HE/O
Duh et al. (2010)	Slovenia	Southern Europe	M/CO/WH/R/FIN/HO/FO/O
Fang et al. (2013)			
Gamble et al. (2021)	n.a.	n.a.	TR/O
García-Sánchez et al. (2021)	International ⁷	International ⁸	S/M/FIN/HE/C/FO/ELEC/TECH/INF/U/R/EN/R/O
Hauswald and Hack (2013)			
Heino et al. (2020)	Finland	Northern Europe	M/FO/TR/CO/S/O
Huang et al. (2009)	Taiwan	Eastern Asia	CH/M/ELEC/INF
Hutt (2015)	U.S.	Northern America	
Iaia et al. (2019)	Italy	Southern Europe	FO
Kandade et al. (2021)	India	Southern Asia	M/S/T/HE/FIN/R/TECH/TR/O
Kang and Kim (2020)	U.S.	Northern America	S/M/WH/TR/INF/CO/T/R/P/O
Khan et al. (2015)	Bangladesh	Southern Asia	CH/INF/FO/M/S/O
Kellermanns et al. (2012)			
Labelle et al. (2018)	International ⁹	International ¹⁰	C/EN/FIN/HE/M/INF
Laffranchini et al. (2020)	U.S.	Northern America	n.a.
Le Breton-Miller and Miller (2020)	n.a.	n.a.	n.a.
Li et al. (2020)	China	Eastern Asia	CH/M/HE/EN/S
Martínez-Alonso et al. (2020)	Spain	Southern Europe	M/CH/FO/P/ELEC/TR/CO/O
McGuire et al. (2012)	n.a.	n.a.	n.a.
Miller et al. (2009)	South Korea	Eastern Asia	ELEC/INF/M
Miller and Le Breton-Miller (2021)			
Mitchell et al. (2011)			
Mitchell et al. (2013)			
Morley (1998)			
Nadeem et al. (2020)	UK	Northern Europe	n.a.
Neubaum et al. (2012)	U.S.	North America	FO
Ng and Hamilton (2021)	United Arab Emirates	Western Asia	T/S/CO/C/M/FIN/R/TR/O
Noor et al. (2020)	International ¹¹	International ¹²	P/M/CH/CO/HE/S/C/O
Pantano et al. (2020)	Italy	Southern Europe	C
Pérez-Cabañero et al. (2012)	Spain	Southern Europe	M
Peters et al. (2018)	Austria	Western Europe	S
Poza et al. (1997)	n.a.	n.a.	n.a.
Pyromalis and Vozikis (2009)	Greece	Southern Europe	n.a.
Ring et al. (2017)			

⁴ M (manufacturing, industry, materials, industrials, machinery), S (services), T (trade), R (retail, retailing), CO (construction), E (entertainment), INF (information and communication, information technology, information, telecommunication services, telecommunication), U (public utility, utilities), TR (transport and storage), C (consumer), TECH (high tech), HE (health, hospitality, health care), O (other), P (primary), WH (wholesale), EN (energy), FIN (financial intermediation, financials), HO (hotels), FO (restaurants, food processing), CH (chemical), ELEC (electrical, computers, electronics).

⁵ Belgium/Canada/Denmark/Finland/France/Germany/Italy/The Netherlands/Spain/Sweden/Switzerland/United Kingdom/ U.S.

⁶ Northern Europe/Southern Europe/Northern America/Western Europe.

⁷ Australia, Belgium, Bermuda, Canada, China, Denmark, Finland, France, Germany, Hong Kong, Ireland, Italy, Japan, Jersey, Luxembourg, Macau, Mexico, Netherlands, New Zealand, Norway, Papua New Guinea, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom, U.S.

⁸ Australia and New Zealand, Western Europe, Northern America, Eastern Asia, Northern Europe, Southern Europe, Central America, Melanesia, Eastern Europe, Southeastern Asia, Southern Africa.

⁹ Australia/Austria/Belgium/China/Denmark/Finland/France/Germany/Greece/Hong Kong/Ireland/Italy/Japan/Luxembourg/The Netherlands/New Zealand/Norway/Portugal/Singapore/South Korea/ Spain/Sweden/Switzerland/Taiwan/United Kingdom.

¹⁰ Australia and New Zealand/Southeastern Asia/Eastern Asia/Western Europe/Southern Europe/Northern Europe.

¹¹ Brazil, Russia, India, China.

¹² South America, Eastern Europe, Eastern Asia, Southern Asia.

Rose (2018)	Germany	Western Europe	T/CO/CH/TR/FO/O/M/
Sakawa and Watanabel (2019)	Japan	Eastern Asia	M/O
Schellong et al. (2019)	Germany	Western Europe	O
Schlierer et al. (2012)	International ¹³	International ¹⁴	M/S/T
Sharma et al. (2003)	Canada	Northern America	n.a.
Shipilov et al. (2019)	Canada	Northern America	n.a.
Stavrou et al. (2007)	U.S.	Northern America	n.a.
Uhlener et al. (2004)	The Netherlands	Western Europe	R/S/M/CO
van Essen et al. (2015)	International ¹⁵	International ¹⁶	n.a.
von Bieberstein et al. (2020)	Germany/Austria	Western Europe	n.a.
Weimann et al. (2021)	Germany	Western Europe	M/TR/S/P/CO/T/INF/O
Zellweger and Nason (2008)			
Zientara (2017)			
Total (74)			

Appendix Section B Table A 2. Description of the sample included in this literature review, Panel A

¹³ Belgium/Italy/Norway/France/United Kingdom/Spain

¹⁴ Western Europe/Southern Europe/Northern Europe

¹⁵ Austria/Belgium/Croatia/Czech Republic/Denmark/Finland/France/Germany/Greece/Hungary/Ireland/Italy/Lithuania/Luxembourg/Malta/The Netherlands/Norway/Poland/Portugal/Romania/Russia/Serbia/Spain/Sweden/Switzerland/Turkey/United Kingdom.

¹⁶ Western Europe/Southern Europe/Northern Europe/Eastern Europe/Western Asia.

Author(s) (Year of publication)	Useful sample size	Type of article		Conceptual	Review	Data collection			Time frame Year(s)	Stakeholder theory-based
		Qualitative	Quantitative			Survey	Database	Case study/Interview		
Acquaah (2011)	206		✓			✓			2002/2005	
Amato et al. (2021)	3063		✓				✓		2002/2015	
Aragón-Amonarriz et al. (2019)	3	✓						✓	2014	
Bachiller et al. (2015)	31		✓				✓		2007/2009	✓
Badru and Oasem (2021)	263		✓				✓		2008/2013	
Baron and Lachenauer (2021)				✓						
Bendell (2021)	121	✓	✓			✓		✓	n.a.	
Berrone et al. (2014)				✓						
Bingham et al. (2011)	706		✓				✓		1991/2005	✓
Bjuggren and Sund (2014)	143		✓			✓			1979/2009	
Blombäck and Brunninge (2016)	55	✓						✓	n.a.	✓
Bozer et al. (2017)	57	✓						✓	n.a.	
Braun et al. (2016)				✓						
Byrne et al. (2021)	7	✓						✓	n.a.	
Cabrera-Suárez et al. (2015)	173		✓			✓	✓		2011	
Cabrera-Suárez et al. (2011)				✓						✓
Campbell (1997)				✓						
Cano-Rubio et al. (2021)	10	✓						✓	2017/2018	
Cennamo et al. (2012)				✓						✓
Chaudhary et al. (2021)					✓					
Claessens and Yurtoglu (2013)					✓					
Cruz et al. (2014)	598		✓				✓		2001/2010	✓
Cuadrado-Ballesteros et al. (2015)	575		✓				✓		2003/2009	
Daspit et al. (2016)					✓					
Debicki et al. (2017)	133		✓			✓			n.a.	✓
Déniz-Déniz et al. (2018a)	129		✓			✓	✓		2011	✓
Déniz-Déniz et al. (2018b)	173		✓			✓	✓		2011	✓
Duh et al. (2010)	17	✓						✓	n.a.	
Fang et al. (2013)				✓						✓
Gamble et al. (2021)	4	✓					✓	✓	2018	
García-Sánchez et al. (2021)	956		✓				✓		2006/2014	
Hauswald and Hack (2013)				✓						
Heino et al. (2020)	16	✓						✓	n.a.	
Huang et al. (2009)	235		✓			✓			2005	
Hutt (2015)				✓			✓		2007	
Iaia et al. (2019)	22	✓					✓	✓	2017	✓
Kandade et al. (2021)	23	✓						✓	2017	
Kang and Kim (2020)	1563		✓				✓		1996/2010	
Khan et al. (2015)	155		✓				✓		2005/2013	
Kellermanns et al. (2012)				✓						
Labelle et al. (2018)	275		✓				✓		2008	
Laffranchini et al. (2020)	n.a.		✓				✓		2000/2012	✓
Le Breton-Miller and Miller (2020)	5	✓						✓	n.a.	
Li et al. (2020)	5	✓						✓	n.a.	
Martínez-Alonso et al. (2020)	152		✓				✓		2012	
McGuire et al. (2012)	118		✓				✓		2000	
Miller et al. (2009)	170	✓	✓			✓		✓	2003	
Miller and Le Breton-Miller (2021)				✓						
Mitchell et al. (2011)				✓						
Mitchell et al. (2013)				✓						✓
Morley (1998)				✓						
Nadeem et al. (2020)	399						✓		2007/2017	✓
Neubaum et al. (2012)	359		✓			✓			n.a.	✓
Ng and Hamilton (2021)	14	✓					✓	✓	n.a.	

Author(s) (Year of publication)	Useful sample size	Type of article		Conceptual	Review	Data collection			Time frame Year(s)	Stakeholder theory-based
		Qualitative	Quantitative			Survey	Database	Case study/Interview		
Noor et al. (2020)	600		✓				✓		2010/2017	✓
Pantano et al. (2020)	4	✓						✓	2016	
Pérez-Cabañero et al. (2012)	391		✓			✓			2007/2008	
Peters et al. (2018)	15	✓						✓	2017	
Poza et al. (1997)	229		✓			✓			n.a.	
Pyromalis and Vozikis (2009)	194		✓			✓	✓		n.a.	
Ring et al. (2017)					✓					✓
Rose (2018)	352		✓			✓			n.a.	✓
Sakawa and Watanabel (2019)	n.a.		✓				✓		2007/2016	
Schellong et al. (2019)	166		✓			✓			2015	
Schlierer et al. (2012)	123	✓						✓		
Sharma et al. (2003)	177		✓			✓			n.a.	
Shipilov et al. (2019)	n.a.		✓				✓		2004/2010	
Stavrou et al. (2007)	90		✓				✓		2000/2002	
Uhlaner et al. (2004)	42	✓	✓					✓	1999/2000	
van Essen et al. (2015)	2949		✓				✓		2004/2009	
von Bieberstein et al. (2020)	n.a.		✓			✓			n.a.	
Weimann et al. (2021)	181		✓			✓			2017/2018	
Zellweger and Nason (2008)					✓					✓
Zientara (2017)					✓					
Total (74)	16447	19	37	16	4	18	27	19		19

Appendix Section B Table A 3. Description of the sample included in this literature review, Panel B

	Author(s)/Journal	Year	Research topic of the article	Main findings specific to our research topic
1	Acquaah/EMJ	2011	Acquaah (2011) examined management's use of networking relationships with external stakeholders (e.g., social and political organizations such as politicians, bureaucratic government officials, and community leaders) to create social capital in family and non-family firms. The aim was to observe the impact of the social cognitive value derived from the network relationships on firm performance, differentiated between family and non-family firms.	The descriptive results showed that networking relationships with community leaders and bureaucratic officials are significant to family firms. Thus, there is a difference between family and non-family firms in terms of their utilization of networking relationships. Furthermore, family firms seem to use networking relationships with communities more than do non-family firms. A regression analysis showed that external stakeholders, such as communities and bureaucratic officials, have a positive influence on family firm performance, but there is no significant impact of networking relationships with politicians on family firm performance. Family firms are also experiencing declining returns from the extensive use of network relationships with these external stakeholders (communities and bureaucratic officials).
2	Amato et al./JBE	2021	Amato et al. (2021) investigated the downsizing tendency of firms, taking into account their territorial embedding, both in times of financial crisis and economic stability.	Findings showed that family firms often seem to treat their employees as essential stakeholders under challenging times due to their social closeness (e.g., a sense of belonging) to the corporate environment.
3	Aragón-Amonarriz et al./JBE	2017	Aragón-Amonarriz et al. (2019) investigated families' long-term commitment to family firm stakeholders (responsible family ownership), how responsible family ownership can be transmitted across generations, and what role family social capital plays in securing this transfer.	The results of three case studies show that reputation is based on the care the family devotes to stakeholders over generations. Furthermore, this care is increasingly based more on family honor than on commercial interests. Thus, the firm's social approach influences relationships with external stakeholders.
4	Bachiller et al./JDG	2015	Bachiller et al. (2015) researched how the board of directors can influence financial and social performance in family and non-family firms.	The results demonstrated a negative and significant relationship between board size and return on assets (ROA) in family firms, which means larger board sizes lead to lower ROA. Furthermore, a significant positive relationship was identified between the number of executives on the board of family firms and ROA, which means more executives on the board leads to higher ROA. There also seems to be a significant positive relationship between board size and accountability score (social score), as well as a significant negative relationship between the number of executives on the board and the social score. Thus, family firms with fewer executives on a larger board will be more aware of social performance. Additionally, regarding the studied family firms, the number of generations on the board seems to impact financial performance; a greater number of generations on the board is associated with higher ROA and higher return on equity (ROE). This variable also influences social performance; a greater number of generations on the board is associated with higher social performance.
5	Badru and Oasem/JSFI	2021	The study by Badru and Oasem (2021) examined the impact of corporate social responsibility on dividend payments in Malaysian firms.	The results indicated that meeting stakeholders' interests in dividend payments seem to lead to meeting shareholders' demands.
6	Baron and Lachenauer/HBR	2021	Baron and Lachenauer (2021) investigated five aspects of ownership, such as the type of ownership and the governance structure that determine whether a family firm goes down or developed favorably.	The study implied that family firms' owners should always carefully consider what information should be shared with their stakeholders and communicate effectively why they want to keep particular information secret or not.
7	Bendell/BSE	2021	Bendell (2021) investigated how environmental innovation and pressure from external stakeholders are rated in both family and non-family firms.	The findings showed that external stakeholders influence a family firm's decision to innovate; however, avoid these investments if they negatively impact their reputation in the industry.
8	Berrone et al./grey literature	2014	Berrone et al. (2014) investigated stakeholder management in family firms concerning socio-emotional wealth.	Findings suggested that family firms seem more inclined than non-family firms to actively invest in stakeholder engagement activities, as they maintain and promote their socioemotional wealth.
9	Bingham et al./JBE	2011	Bingham et al. (2011) examined differences in corporate social performance (CSP) activities between family and non-family firms, arguing that CSP activities can be explained by the firm's identity orientation towards its stakeholders.	The results indicated that family firms have significantly more positive corporate social performance (CSP) and thus social initiatives toward stakeholders. Furthermore, the results demonstrated that family firms have more social initiatives for stakeholders, such as communities and employees. The results of the statistical regression also confirmed that greater family involvement in the firm is associated with a higher number of social initiatives for the community. Thus, greater family involvement in the business leads the firm to take stakeholders more into account when making decisions that have implications for corporate social performance.
10	Bjuggren and Sund/EJLE	2014	Bjuggren and Sund (2014) analyzed family firms' succession process from a contractual view.	According to the results, the opinions of stakeholders, such as family members and co-owners, play an important role for majority shareholders in the succession planning process of family firms. More precisely, such stakeholder groups have or may have an impact on the succession process through their family ties and friendships. Members without family ties and who are not co-owners have no enforceable influence. Regarding less-close stakeholders, such as suppliers and creditors, the intergenerational succession process is primarily focused on contractual relations.
11	Blombäck and Brunninge/ISMO	2016	Blombäck and Brunninge (2016) investigated heritage communication in 55 German and Swedish family firms. The aims of heritage communication were classified for different stakeholders.	This article identified different aims related to heritage communication planning in family firms, investigating particularly how stakeholders are targeted by heritage. Thus, primary stakeholders, who have a decision-making mandate, should get in touch with heritage communication and confirm the strategic orientation of the family firm.
12	Bozer et al./JSBED	2017	Bozer et al. (2017) focused on the key factors associated with effective succession in family firms across stakeholders, such as incumbents, family members, non-family members, and successors.	The results indicated that incumbents' perception of family support plays an important role in the succession process, with greater perceived support offering a greater head start in the process. Furthermore, an accepting and transparent communication structure with the incumbent is highly important to successors. These

				structures differ significantly, however, with the result that successors consider these features to be potential obstacles to successful succession.
13	Braun et al./JBS	2016	Braun et al. (2016) designed a strategic mapping tool for family firms to address potential misalignments arising from family influence on a firm. The tool is meant to align internal stakeholders in their pursuit of family business activities.	This framework should help stakeholders to work cooperatively to identify challenges that may hinder the effective design and implementation of a family firm's strategy. In this way, decisions about goals should be bound to internal stakeholders' needs and not only driven by market demands. Besides paying attention to the personal needs of internal stakeholders, investigating their risk profiles is essential as stakeholders may have different risk appetites, partly due to non-financial targets and generational succession. A lack of consensus on the amount of risk stakeholders are willing to take may stall decisions and lead to stagnation for the firm.
14	Byrne et al./OS	2021	Byrne (2021) examined how CEOs are gender-specific concerning succession and how successor's legitimacy is impacted.	The findings showed that it is necessary to exercise entrepreneurial, paternalistic and authoritarian masculinity to gain legitimacy among the stakeholders as the new CEO successor.
15	Cabrera-Suárez et al./FBR	2015	Cabrera-Suárez et al. (2015) investigated how structural family social capital impacts the establishment of corporate goals for non-family stakeholders in family firms.	The results showed that structural family social capital directly affects, as a determining factor, the establishment of corporate goals related to non-family stakeholders (e.g., employees and society).
16	Cabrera-Suárez et al./JFBS	2011	Cabrera-Suárez et al. (2011) investigated the concept of market orientation from the standpoint of stakeholder theory and a resource-based view in family firms.	Relationships with internal stakeholders (e.g., employees and shareholders) and external stakeholders, such as competitors and customers, who are market orientated were found to be positively related to firm performance in the areas of customer and employee satisfaction, financial performance, marketing performance. Furthermore, the results indicated that matching among the firm's business, the interests of the involved stakeholders, and the influence of a firm's market orientation determines financial results and long-term survival.
17	Campbell/BSR	1997	Campbell (1997) argues, on the one hand, that if stakeholding is valid, then the family should be counted among the stakeholders and, on the other hand, how then the family's stake in the firm should be distinguished from that of the firm.	The family's demands often take precedence over other firm's stakeholders.
18	Cano-Rubio et al./BSE	2021	Cano-Rubio et al. (2021) researched the influence of the family and the firm on the internationalization strategies of family firms, in particular the stakeholder engagement in developing business strategies.	The findings indicated that relationships with stakeholders, such as the community in which the firm is located and the local ties that appear seem helpful in exploring business opportunities, particularly in international markets.
19	Cennamo et al./ETP	2012	Cennamo et al. (2012) analyzed the influence of the dimensions of socioemotional wealth on proactive stakeholder engagement, identifying different logics that explain the adoption of these practices.	Family firms are more inclined to engage in proactive, stakeholder engagement activities because they maintain and enhance their socio-emotional wealth.
20	Chaudhary et al./JBR	2021	Chaudhary et al. (2021) investigated the existing research concerning trust and reputation in family firms.	The findings indicated that trust and reputation are of great importance for developing connections with stakeholders and achieving non-economic and economic goals.
21	Claessens and Yurtoglu/EMEMAR	2013	Claessens and Yurtoglu (2013) overviewed research in the field of corporate governance.	Reviewed literature suggests that a better corporate framework better the treatment of all stakeholders. In detail, stakeholder-responsive behavior can benefit the firm's shareholders and other financial stakeholders, as a firm with good relationships with its employees will likely find it easier to attract external finance. Internal stakeholders can influence the firm's financial policy. Overall, a high degree of corporate responsibility seems to ensure good relationships with the firm's stakeholders and strengthens the firm's overall performance.
22	Cruz et al./ETP	2014	Cruz et al. (2014) investigated whether family firms are more socially responsible than non-family firms, finding that family firms positively influence the social concerns of external stakeholders because of their socio-emotional wealth.	In the face of declining performance, this study found that family firms reduce their social practices regarding the environment and customer dimensions. Consequently, the social activities of family firms react more sensitively to declining organizational performance.
23	Cuadrado-Ballesteros et al./IBR	2015	Cuadrado-Ballesteros et al. (2015) offered empirical evidence for the relationship between stakeholder interaction and corporate social responsibility.	The results indicated that interaction between independent directors of the board and family firms positively influenced published corporate social responsibility information. Thus, a higher proportion of independent directors on the family firm's board was associated with a higher level of published corporate social responsibility information.
24	Daspit et al./FBR	2016	Daspit et al. (2016) conducted a family firm succession review.	The results indicated, to acquire knowledge, the successor may need to build a repertoire of exchanges with non-family stakeholders to meet relational and transactional needs.
25	Debicki et al./grey literature	2017	Debicki et al. (2017) investigated particular dimensions of socio-emotional wealth and its impacts on family firm performance.	The findings suggested that socioemotional wealth goals that prioritize family importance represent strategic alignment between different stakeholder units in family firms and lead to positive performance outcomes.
26	Déniz-Déniz et al./JBE	2018	Déniz-Déniz et al. (2018b) analyzed the relationship between the construct of aligning family firms with key non-family stakeholders and achieving higher economic performance.	The results showed that the relationship between family identification with the family firm and orientation towards key non-family stakeholders is stronger when the top management team is comprised primarily of family members. Conversely, family identification with the family firm weakens in terms of empowering stakeholders when a minority of the top management team comprises family members. The results also showed that a high level of family identification with a firm affects the firm's orientation to non-family stakeholders in setting corporate goals, which leads to higher economic performance if that goal setting builds on family identification with the firm.

27	Déniz-Déniz et al./BEER	2018	Déniz-Déniz et al. (2018a) explored the diverse ways family firms normatively consider their non-family interests.	The results showed that the affective engagement of family managers with their firm positively affects the adoption of corporate goals that take into account the interests of internal non-family stakeholders, such as employees, and external non-family stakeholders, such as communities and customers. Thus, family engagement with the firm seems to help give intrinsic value to stakeholders' interests, whether related to employment or to the local community or market.
28	Duh et al./JBE	2010	Duh et al. (2010) discussed differences between family firms and non-family firms in terms of ethical values and culture.	Findings suggested that key stakeholders link their positive attitude toward ethical values with the success of the firm. Family firms are more personal; stakeholders, such as employees, feel like part of the family and act accordingly. Management is distinguished by teamwork and participation, and employees display a high level of reciprocal trust and commitment to the firm.
29	Fang et al./JMSR	2013	Fang et al. (2013) discussed literature on how bounded stakeholder salience can strengthen the relationship between family firms and their stakeholders over time and, based on religiosity, may have positive effects on firm performance.	Bounded stakeholder salience based on religiosity is positively associated with a family firm's economic and non-economic performance.
30	Gamble et al./JBR	2021	Gamble et al. (2021) investigated how family firms and their external stakeholders together can create value for consumers.	The study showed that family firms have more knowledge about their stakeholders, such as suppliers, and thus can work together to deliver more personalized experiences for stakeholders such as consumers.
31	García-Sánchez et al./BSE	2021	García-Sánchez et al. (2021) investigated whether family firms care more about stakeholders when operating in an antagonistic business environment.	The findings suggested that family firms should primarily take care of internal stakeholders in difficult economic situations, as they create human capital in addition to the financial aspect and make critical strategic decisions to satisfy external stakeholders.
32	Hauswald and Hack/FBR	2013	Hauswald and Hack (2013) examined how family control or influence impacts stakeholder perceptions in the individual-to-organization relationship between a primary, non-family stakeholder and a family firm.	The study concluded, after reviewing the literature, that a firm that places higher priority on preserving socio-emotional wealth is more likely to act benevolently towards stakeholders, which positively influences stakeholders' perception of benevolence.
33	Heino et al./JFBS	2020	Heino et al. (2020) investigated which family-related factors impact stakeholder relationships in listed family firms.	The results showed that to achieve sustainable competitive advantage and organizational effectiveness, the firm should focus on stakeholders of direct power, urgency, legitimacy, and relevance to the firm, instead of exclusively involving all internal and external stakeholders.
34	Huang et al./JMO	2009	Huang et al. (2009) investigated whether family firms respond differently to stakeholder pressures when making decisions about natural environment management.	The findings indicated that stakeholders (internal, market, regulatory) significantly impact a family firm's decision to adopt green technical innovations; thus, the level of perceived pressure by stakeholders (internal, market, regulatory) increases the likelihood that a family firm will adopt such innovations. Furthermore, stakeholders' pressure significantly and positively influences the adoption of green administrative innovation.
35	Hutt/JBS	2015	Hutt (2015) identified different implications for the ability of corporate communications to reach stakeholders.	Stakeholders expect that firms should think and act like a firm. Consumers want firms that offer a broad and comprehensive range of products, as well as efficient delivery, billing, and customer care. Firms should also involve and manage their stakeholders. With increasing firm size, the number and variety of stakeholders increases, so the implementation of a strategic approach to corporate communication makes sense.
36	Iaia et al./BFJ	2019	Iaia et al. (2019) examined elements of corporate social responsibility in communicating in the Italian wine industry in family firms.	The results indicated that online communication could create successful and long-range relations with family firm's stakeholders.
37	Kandade et al./JFBS	2021	Kandade et al. (2021) investigated how relations between stakeholders and next-generation leaders expand and how stakeholders impact leadership progress.	The findings indicated that the next generation of the family firm should be given the opportunity as early as possible to socialize and develop relationships with all stakeholders in the firm to expand mutual respect obligations and trust.
38	Kang and Kim/MS	2020	Kang and Kim (2020) examined the difference between family and non-family firms investing in employee relationships.	The results showed that family firm owners are more likely to prioritize their investments in employee relationships because of their business and family reputation, which is very important to family firm owners to avoid potential conflict.
39	Khan et al./BAR	2015	Khan et al. (2015) investigated the impact of family control on audit prices and auditor choice empirically.	The findings showed that family firms with CEOs from the family tend to pay significantly lower audit fees than firms with employed CEOs and seem less inclined to hire audit firms of the highest quality.
40	Kellermanns et al./ETP	2012	Kellermanns et al. (2012) theorized aspects of socio-emotional wealth, suggesting that socio-emotional wealth could have a detrimental impact on family firm stakeholders.	Findings showed that when family firm norms violate generally accepted norms of conduct, socio-emotional wealth seems negatively related to proactive stakeholder engagement. If dimensions of socio-emotional wealth have negative valence, family firms seem to use less proactive objectives for stakeholder engagement.
41	Labelle et al./JBE	2018	Labelle et al. (2018) examined the engagement of family firms in corporate social responsibility and corporate social performance.	The results suggested that stakeholder orientation is significantly and positively associated with corporate social performance, which means that family firms that operate in stakeholder-oriented countries are more likely to invest in corporate social responsibility initiatives than are family firms operating in shareholder-oriented countries. Family firms tend to adopt their country's institutional environment in their relationships with stakeholders.
42	Laffranchini et al./ETP	2020	Laffranchini et al. (2020) examined how socio-emotional wealth affects the strategies of family firms that counteract decline.	Examining a sample of turnaround situations revealed that family firms seem to formulate their decisions in a way that preserves the support of the key stakeholders who have helped the owner family preserve their socio-emotional wealth. Family firms that valued socio-emotional wealth pursued decline-stemming strategies that protect the long-term interests of the family and key stakeholders.

43	Le Breton-Miller and Miller/JBE	2020	Le Breton-Miller and Miller (2020) developed an ideal-based accountability model in family firms.	The results suggest that relationships with external stakeholders are essential to manifest ideal-based behavior in family firms, especially trust-based, local and permanent relationships instead of transactions.
44	Li et al./ADHR	2020	Li et al. (2020) investigated the motivations, challenges and opportunities of second-generation women entrepreneurs in Chinese family firms.	The findings suggested that challenges in terms of intergenerational understanding can primarily be resolved through increased communication with one another to build trust.
45	Martínez-Alonso et al./EJIM	2020	Martínez-Alonso et al. (2020) explored the influence of technological innovation efficiency on business development and the moderating role of family engagement.	The results showed that collaboration and promotions with qualified employees seem to favor technological innovation efficiency and firm growth.
46	McGuire et al./JBR	2012	McGuire et al. (2012) examined the social performance of publicity family firms.	The results showed that primary stakeholders, as employees and communities, may contribute to the family's reputation and build more significant relations with local stakeholders.
47	Miller et al./JIBS	2009	Miller et al. (2009) examined the differences between social behavior and the performance of family firms and non-family firms in emerging markets.	The findings provided tentative support that relationships and connections with external stakeholders have a more positive impact on performance for a family firm than they do for a non-family firm in the technology sector in emerging markets.
48	Miller and Le Breton-Miller/ETP	2021	Miller and Le Breton-Miller (2021) investigated family firms' tendency to behave unusually towards stakeholders and their planned capabilities.	The study showed that relationships with stakeholders affect the strategic results and that both effects are, in turn, related to financial performance and firm growth.
49	Mitchell et al./BEQ	2011	Mitchell et al. (2011) explored how institutional logics in family firms extend the target audience and create a cascade effect that changes the nature of urgency, power and legitimacy in these organizations.	The article suggested that family firms' non-economic goals and socio-emotional wealth promote a sense of urgency in responding to claims of stakeholders, such as family members. Normative power is more typical in stakeholder salience in a family business.
50	Mitchell et al./JMSR	2013	Mitchell et al. (2013) investigated family members' spiritual identity and their impact on stakeholders as decision makers.	The results suggested that a stakeholder analysis to assess the different expectations of the various stakeholders could help formulate sustainable succession plans that would be supported by the stakeholders in the case of succession planning.
51	Morley/JCM	1998	Morley (1998) examined communication and collaboration among stakeholders involved in the family firm.	In the field of regulation, family firms have a reputation for being pioneers in social experimentation for the benefit of their stakeholders, including employees, communities, and the environment. Furthermore, good communication with family firms' stakeholders, such as suppliers, can help ensure that they are ready to play their key role in the firm's plans for growth and profitability. It seems to be beneficial for family firms to work with all stakeholders to develop a positioning and communication program that highlights the benefits of being a family-owned firm.
52	Nadeem et al./BSE	2020	Nadeem et al. (2020) explored the connection between gender-specific diversity on supervisory boards and value creation for stakeholders.	The findings showed that gender diversity on the supervisory board seems to increase social and environmental value creation, here exclusively environmental value creation. Hence the results indicated that female board members primarily consider the interests of environmental stakeholders.
53	Neubaum et al./JFBS	2012	Neubaum et al. (2012) examined how attention to key stakeholders is associated with financial performance in family and non-family firms.	The findings showed a positive influence on family firm growth from a firm's deep concern for environmental stakeholders and for employees. For family firms, these findings suggest that firms that pay special attention to the concerns of their employees are well-rewarded. Caring for employees can help reduce the gap between employees and family, enabling successful integration of employees into a kinship culture. Family firms that pay particular attention to the concerns of stakeholders (e.g., employees) regarding the environment tend to have higher performance.
54	Ng and Hamilton/JSBE	2021	Ng and Hamilton (2021) investigated the relationship between a family firm's socioemotional wealth and innovativeness.	The results showed that innovation in the sampled firms is primarily based on individual suggestions from stakeholders such as suppliers and customers.
55	Noor et al./CSREM	2020	Noor et al. (2020) explored the effects of the persistence of corporate social responsibility activities on firm value.	The findings suggested that it takes time to build a good reputation and relationships with stakeholders; hence firms that invest in their corporate social responsibility activities over a more extended period will particularly benefit.
56	Pantano et al./JBR	2020	Pantano et al. (2020) explored stakeholder engagement in the connection between innovation outcomes and innovation ability.	The results indicated that the innovation management of firms that operate at a local and regional level may benefit from greater stakeholder engagement.
57	Pérez-Cabañero et al./MIP	2012	Pérez-Cabañero et al. (2012) examined the knowledge of how different marketing skills affect different measures of organizational performance in family firms.	The results indicated that stakeholders' satisfaction significantly and positively influences financial performance. Customer satisfaction logically has a positive impact on the firm's financial performance, as high customer loyalty results in increased sales. Employee satisfaction can also improve the firm's financial results by raising motivation and personal productivity. The results further confirmed that product differentiation capabilities positively influence stakeholders' satisfaction. Thus, investing resources in product policy seems to increase stakeholder engagement, which in turn increases the firm's financial performance.
58	Peters et al./EJIM	2018	Peters et al. (2018) investigated the decision-making process in family firms regarding the involvement of different internal and external stakeholder groups.	Examining stakeholders' roles in strategic decision-making, findings showed that in small and medium-sized family firms, decisions seem to be made by a small group of managers (an internal stakeholder) or by the owner himself. Internal stakeholders, such as employees, are often not involved in the decision-making process, yet it seems advisable to include employees in decision-making when they have close contact with customers. Regarding internal stakeholders, such as family members, decisions are often made in the inner circle of the family, excluding other stakeholders' advice.

59	Poza et al./FBR	1997	Poza et al. (1997) explored family and business culture and practices concerning CEOs.	The results showed regarding the CEO succession process that since family stakeholders such as “CEO-parents” determine how and whether ownership of the firm is transferred between generations.
60	Pyromalis and Vozikis/IEMJ	2009	Pyromalis and Vozikis (2009) explored the implications for the succession process of perceptions by a family firms’ stakeholders.	The findings showed that family firm stakeholders’ perceived satisfaction with the succession process is closely related to that process’s effectiveness. Furthermore, a successor who is not well-prepared and self-confident will cause dissatisfaction among internal stakeholders (e.g., family stakeholders).
61	Ring et al./grey literature	2017	Ring et al. (2017) reviewed stakeholder relations in family firms.	The results indicated that achieving the families’ socioemotional wealth goal may not be entirely at odds with the firm’s economic goals.
62	Rose/grey literature	2018	Rose (2018) investigated supplier interaction in family firms.	The results indicated that cooperative intentions of the family firm as a seller have a positive influence on the trust and satisfaction of the buyer relationship so that a mutual economic benefit can be derived, since the interaction experience leads to higher perceived relationship quality and at the same time reduces the risk of conflict.
63	Sakawa and Watanabel/MD	2019	Sakawa and Watanabel (2019) examined whether family control leads to conflicts in stakeholder-oriented firms.	The results showed that foreign shareholders interact with family control to enhance the profitability of the firm.
64	Schellong et al./ETP	2019	Schellong et al. (2019) investigated the connection between family firm brands and their effect on consumers.	The results suggested that the more the brand’s status as a family firm is communicated, the greater consumer satisfaction may be.
65	Schlierer et al./JBE	2012	Schlierer et al. (2012) investigated stakeholder management in relation to small-medium-sized firms.	The results indicated that owner-managers have a clear, pragmatic view of the value creation process for stakeholders and intuitively apply stakeholder engagement principles as an ethical concept and as a strategic concept that is crucial to the firm’s survival.
66	Sharma et al./JBV	2003	Sharma et al. (2003) examined the satisfaction of different stakeholders (e.g., incumbent and successor) with the succession process in family firms.	A significant and positive relationship was found between internal stakeholders’, such as family members, acceptance of their roles in the family firm and the satisfaction of incumbents and successors.
67	Shipilov et al./SMJ	2019	Shipilov et al. (2019) examined the impact of direct media coverage of firm’s activities.	The findings showed that media stakeholders whose impact on media coverage both praise and criticism could lead to changes in corporate governance and practices.
68	Stavrou et al./JBE	2007	Stavrou et al. (2007) explored the relationship between family ownership and downsizing at Fortune 500 firms.	This study found that family firms differ in their use of stakeholder practices for employees compared to non-family firms. In particular, family firms are more likely to provide benefits to employees, provide fewer retirement benefits, and involve employees less often in decisions.
69	Uhlener et al./JSBED	2004	Uhlener et al. (2004) examined the social responsibility of family firms in terms of a variety of stakeholders.	This study suggested that family firms are more likely to have a special relationship with stakeholders, such as employees and customers, because of their family ownership. Family character seems to affect relationships with these stakeholders (employees and customers). Furthermore, it could be argued that the family owner views good relationships with stakeholders, such as employees, customers, and suppliers, as being beneficial to their business.
70	van Essen et al./CGIR	2015	Van Essen et al. (2015) explained the relationship between listed family firms and the results for stakeholders, such as investors and employees, before and during the global financial crisis.	The results during the financial crisis indicated that stricter investor protection laws and strong employee protection significantly improved financial performance for the entire firm population.
71	von Bieberstein et al./FBR	2020	Von Bieberstein et al. (2020) explored the impact of manager’s religious and owner family affiliation on stakeholders’ honesty.	The findings suggested that external stakeholders appear to be more honest when interacting with a family manager.
72	Weimann et al./IEMJ	2021	Weimann et al. (2021) examined the family involvement and social ties in entrepreneurship in family firms.	The findings showed that it could be beneficial if a family member makes non-family stakeholders feel part of the family.
73	Zellweger and Nason/FBR	2008	Zellweger and Nason (2008) examined financial and non-financial performance results in family firms across multiple categories of stakeholders.	The study described a typology of four performance relationships: causal, synergistic, overlapping, and substitution. The use of causal and overlapping relationships that can satisfy multiple stakeholders through a performance result increases the organizational effectiveness of family firms.
74	Zientara/JBE	2017	Zientara (2017) discussed the relationship between socio-emotional wealth and family firm stakeholders.	This study indicated that family firms engage in socially responsible practices towards external stakeholders and, simultaneously, engage in irresponsible practices towards internal stakeholders due to concerns about socio-emotional wealth. Because of the need to protect their socio-emotional wealth, family owners are particularly interested in the firm’s image and reputation, which they see as an extension of their family. This makes them more likely to address the needs of external rather than internal stakeholders, yet a family firm’s image and reputation today can be tarnished by irresponsible behavior towards internal stakeholders; furthermore, unprofessional human resource practices or unfair behavior towards internal stakeholders, such as employees, seem to reduce competitiveness and long-run performance, jeopardizing the family firm’s survival.

Appendix Section B Table A 4. Articles included in the literature review, research topic and main findings

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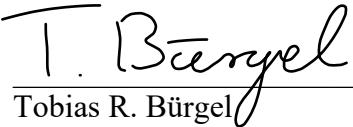
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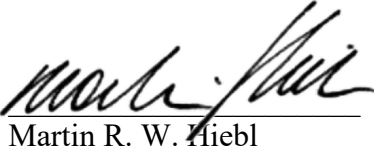
**C Digitalization and Entrepreneurial Firms’ Resilience to Pandemic Crisis:
Evidence from COVID-19 and the German Mittelstand**

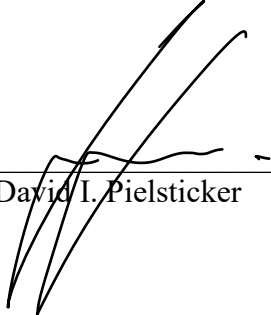
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We, the authors of the paper, hereby declare that this paper’s first author, Tobias R. Bürgel, and third author, David I. Pielsticker, were each equally responsible for collecting and analyzing most of the data, developing the multiple regression models, and writing most of the paper.


Tobias R. Bürgel


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C.1 Introduction

The 20th century and early 21st century have seen an increasing number of crises due to diseases such as Spanish flu, AIDS, SARS, Avian flu, and – most recently – the coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Kraus et alii (et al.), 2020). These diseases have impacted thousands or even millions of individuals, and have had serious short- and long-term consequences for the economy as a whole and for individual businesses (Donthu & Gustaffson, 2020; García-Carbonell et al., 2021). Since it cannot be ruled out that additional pandemic crises will further affect businesses, it seems relevant to investigate what makes businesses more resilient against such crises.

While research on organizational resilience has grown significantly in recent years (Duchek, 2020; Hillmann, 2021; Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017), this literature still features some important gaps. For instance, Linnenluecke (2017, page (p.) 15) concludes that existing resilience research is highly context-dependent and she further mentions that “a prominent approach for assessing resilience has been case-based research on organizational responses in the context of accidents and disasters”. While these insights can be relevant to other accidents and disasters, they may not generalize to external shocks (Linnenluecke, 2017) such as pandemic crises. Interestingly, in the review papers on organizational resilience by Hillmann and Guenther (2021), Linnenluecke (2017) and Williams et al. (2017), the context of pandemic crises, or healthcare crises more generally, is not mentioned. Hence, we lack a thorough understanding of what makes firms resilient to pandemic crises, which have increased in frequency over the past century (Kraus et al., 2020). Recently, studies have analyzed resilience to pandemic crises in the case of COVID-19, some of which point to digitalization as a driver of such resilience (*exempli gratia* (e.g.), Beninger & Francis, 2021; Fath et al., 2021). However, these works also rely on qualitative data (Fath et al., 2021) or remain at the conceptual level (Beninger & Francis, 2021). Thus, what makes larger

populations of firms resilient to pandemic crises remains an open question.

A theory to address this gap and which we draw on in this study is the Parasite Stress Theory of Values (e.g., Thornhill & Fincher, 2014). Generally, this theory assumes that the physiological and psychological immune systems can be mobilized to fight infectious diseases. Earlier research on business and human behavior (e.g., Bennett & Nikolaev, 2021; Faulkner et al., 2004; Navarrette & Fessler, 2006; Nørfelt et al., 2020; Park et al., 2007) has mainly added to our understanding of the psychological immune system and our paper follows this tradition. For instance, by drawing on the psychological immune system of the Parasite Stress Theory of Values and focusing on the effects of the Spanish flu, Bennett and Nikolaev (2021) recently found that countries with high historical exposure to pandemic diseases show lower innovativeness today. The Parasite Stress Theory of Values suggests that this observation is due to the phenomenon that in regions with a high disease prevalence, people tend to activate the psychological immune system and thus minimize the risk of contracting diseases by avoiding interactions with other people. In turn, this avoidance of social contact results in less “mutually beneficial economic and social interactions, thus hindering the division of labor, specialization, and gains from trade possible in broader markets” (Bennett & Nikolaev, 2021, p. 2) and in turns limits innovativeness. Adding to this line of thought by investigating the effects of Spanish flu, Rao and Greve (2018) found that pandemic crises lead to less organization building. Likewise, Nørfelt et al. (2020) argue that an openness to foreigners has historically created opportunities for social exchange and gains in technology, shelter and food resources – all of which are endangered in times of pandemic crises when the psychological immune system is activated. While these dynamics have been at play in historical pandemic crises such as the Spanish flu in the early 20th century, recent business trends may now provide a different environment for entrepreneurs. In particular, digitalization – the “manifold sociotechnical phenomena and processes of adopting and using” digital technologies “in broader individual, organizational,

and societal contexts” (Legner et al., 2017, p. 301) – may be seen as a game changer (confer (cf.) Eller et al., 2020). As indicated by Bennett and Nikolaev (2021), one strategy for curtailing the spread of contagious diseases is avoiding interactions among people. This strategy has been adopted in the COVID-19 crisis under the label of “social distancing”: according to Ferguson et al. (2020), isolation at home, voluntary quarantine, social distancing by at-risk groups, general social distancing, and lockdown including of governmental and entrepreneurial facilities are the five most important non-pharmaceutical interventions to fight the spread of the SARS-CoV-2 virus.

While these social distancing measures hampered business activity during the Spanish flu pandemic (Bennett & Nikolaev, 2021), higher levels of digitalization may have reduced this harmful effect of social distancing on individual businesses during the COVID-19 crisis. Put differently, we could expect that entrepreneurial firms that had a higher level of digitalization before the COVID-19 crisis show a higher level of resilience to the crisis. As not all firms may benefit from digitalization in the same way (e.g., Eller et al., 2020) and organizational resilience is generally found to be context-bound (Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017), we additionally examine whether this general digitalization–crisis resilience relationship is moderated by the respective firms’ level of globalization, family firm status, firm size, industry affiliation, strategy, and past performance (see Figure C-1 for a summary of these expectations). To recap, in this paper, we want to answer the following two research questions that have so far remained unanswered:

- 1) Do higher levels of digitalization increase entrepreneurial firms’ resilience to pandemic crises?
- 2) How do context characteristics (firms’ level of globalization, family firm status, firm size, industry affiliation, strategy, and past performance) impact the digitalization–crisis resilience relationship?

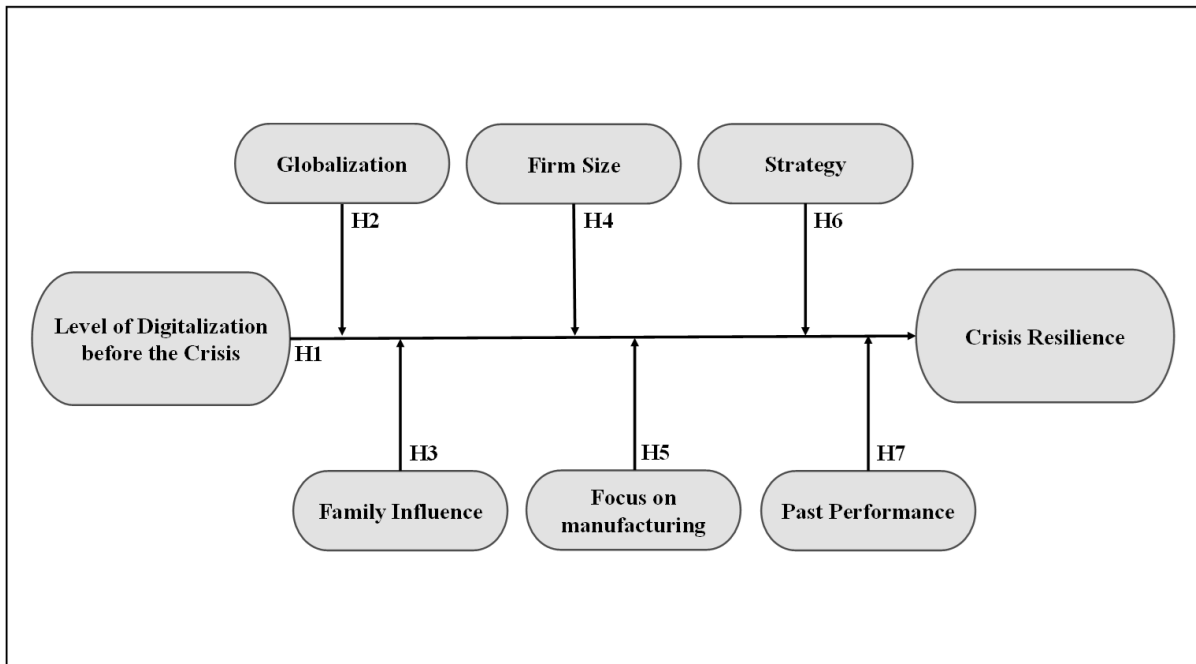


Figure C-1. Research model

By addressing these questions, we contribute to the organizational resilience literature (Hillmann, 2021; Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017) by being among the first to identify the conditions under which digitalization can make firms resilient to pandemic crises. Moreover, our study adds to the development of the Parasite Stress Theory of Values (Bennett & Nikolaev, 2021; Thornhill & Fincher, 2014) by introducing the notion that measures that can maintain business contacts despite social distancing in times of pandemic crisis (e.g., digital technologies) can help mitigate the detrimental economic impact of such crises, at least in certain contexts (e.g., high levels of globalization and non-family ownership).

The remainder of this paper is organized as follows. The next section positions our research in the existing literature and develops seven hypotheses. Section C.3 then describes our methods, the main characteristics of the sampled firms and respondents, and the procedures used to ensure valid data. Section C.4 presents our results. Section C.5 concludes with a discussion of our findings, their implications, and their main limitations.

C.2 Literature Review, Theory, and Hypotheses

C.2.1 Organizational Resilience

Much of the research on organizational resilience has focused on how well firms can respond to external threats or even shocks such as natural disasters, terrorist attacks, and financial crises (Hillmann, 2021; Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017). While lacking a generally agreed-upon definition of organizational resilience (Linnenluecke, 2017; Williams et al., 2017), there is some agreement in the literature that such resilience needs to be defined in light of the specific context being analyzed (Hillmann & Guenther, 2021; Parker & Ameen, 2018; Shin & Park, 2021). The context we examine, namely, a pandemic crisis or, more broadly, a healthcare crisis, has so far been overlooked in the organizational resilience literature, as reflected in three recent and well-cited reviews of the topic (Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017). Nevertheless, pandemic crises can be regarded as “inconceivable, unscheduled, and unexpected” (Williams et al., 2017, p. 735) and thus fit the definition of Williams et al. (2017) as a crisis triggered by a specific event. In our empirical setting, this event is the outbreak and worldwide spread of COVID-19. As argued by Hillmann and Guenther (2021, p. 24), in such an event-triggered crisis, organizational resilience is mainly geared toward stability and can be defined as an organization’s ability to “endure or bear the impacts of change or a disruptive event” and to “keep the organization functioning”. We thus start from this conceptual definition of organizational resilience in the context of an event-triggered crisis.

Like other exogenous shocks, pandemic crises can come with enormous economic and social costs such as lower productivity, firm closures, and unemployment (Bertschek et al., 2019; Frick, 2019; Landini et al., 2020; Rapaccini et al., 2020; Hammerschmidt et al., 2021). These effects are not only short-term but may instead have long-term consequences. As indicated above and motivated by the Parasite Stress Theory of Values, Bennett and Nikolaev (2021)

showed that countries with high personal and economic exposure to the Spanish flu in the early 20th century are less innovative today. Given this theory's focus on developing resilience against infectious diseases (Thornhill & Fincher, 2014), it fits our pandemic crisis-context well and we detail the theory's main tenets next.

C.2.2 Parasite Stress Theory of Values

According to the Parasite Stress Theory of Values, two main strategies can be deployed to overcome times of infectious diseases and thus develop resilience: (1) adapting the physiological immune system and (2) adapting the psychological (e.g., behavioral) immune system (Schaller, 2011). In this paper, as in other business-related research on this theory (e.g., Bennett & Nikolaev, 2021; Mortensen et al., 2010), we draw on the second strategy – adapting the psychological immune system, which can be described as “a complex suite of cognitive, affective, and behavioral mechanisms that ultimately help prevent pathogen transmission in the face of recurrent infectious disease threats” (Ackerman et al., 2018, p. 2).

The theory predicts that if the parasite stress increases, social groups will adopt their psychological immune system and will become more resilient towards infectious diseases (Thornhill & Fincher, 2014). For instance, the psychological immune system can lead to higher conformity to cultural norms and more social conservatism (Ackerman et al., 2018; Fincher et al., 2008; Faulkner et al., 2004). Also, the psychological immune system can be reflected in stereotyping, such as aversion toward outgroup members, especially those associated with the pandemic disease, and lead to phenomena such as xenophobia, neophobia, philopatry, and ethnocentrism (Nørfelt et al., 2020; Thornhill & Fincher, 2014). A series of experimental studies has generally confirmed this mechanism of the psychological immune system as predicted by the Parasite Stress Theory of Values (e.g., Faulkner et al., 2004; Navarrette & Fessler, 2006; Park et al., 2007).

As part of the psychological immune system, the theory suggests that in regions with a high

disease prevalence, people tend to minimize the risk of contracting by avoiding interactions with other people. Consequently, people in a closed group, who are confronted with the risk of infection by a disease, tend to be less open to new experiences as well as to economic and social interactions with people in other groups; hence, they are more introverted (Mortensen et al., 2010). This lowered level of interactions with other social groups jeopardizes several benefits of cross-cultural interaction such as sharing knowledge, technology or warfare strategies (Nørfelt et al., 2020).

In line with the latter notion, Bennett and Nikolaev (2021) have investigated the long-term effects of the Spanish flu and found that lower degrees of interaction have historically hindered the division of labor and trade more generally, which in turn may have resulted in lower innovativeness. By contrast, in regions less severely hit by the Spanish flu, Bennett and Nikolaev (2021) found higher levels of innovativeness today. The Parasite Stress Theory of Values suggests that this finding can be explained by the fact that people in less-hit regions can continue to be more open to interact with other people and engage in economic collaboration. Such less hit regions can thus continue to benefit from learning from other and foreign people (Nørfelt et al., 2020). Rao and Greve (2018) add to the detrimental effect on collaborative business activity found by Bennett and Nikolaev (2021) by showing that this effect is more pronounced for disasters that can be attributed to human behavior such as pandemic crises than natural disasters (e.g., caused by weather shocks). Rao and Greve (2018) theorize that this stronger detrimental economic effect of human-made crises such as pandemics is due to the less pronounced feeling of shared fate and need for cooperation than in situations of natural disasters.

C.2.3 Digitalization and Resilience against Pandemic Crises

As just discussed, for the Spanish flu, the predictions of the Parasite Stress Theory of Values, especially those of the adaptations of the psychological immune system, seem to hold. Existing

work on this theory assumes that physical distancing automatically leads to fewer interactions and detrimental long-term economic effects (e.g., Bennett & Nikolaev, 2021; Thornhill & Fincher, 2014). However, recent economic and technological trends may have created an environment that has spawned different dynamics than those in the early 20th century when the Spanish flu crisis occurred. In particular, the growing digitalization of and interactions among businesses may now provide a vehicle to maintain business contacts virtually despite physical social distancing measures. At the same time, when a pandemic crisis unfolds, digital alternatives to personal communication and business transactions may not immediately be available. That is, like with other kinds of infrastructures, digital infrastructures also need time to build, test, and implement (Bullini Orlandi et al., 2021; Urbinati et al., 2020). Consequently, we expect that businesses that had already built digital infrastructures to a higher degree before a pandemic crisis are better equipped to cope with that crisis. In short, such firms are more resilient (Linnenluecke, 2017). Hence, firms with higher levels of digitalization before a pandemic crisis may be more resilient in the face of such a crisis (Pedersen et al., 2020; Rappaccini et al., 2020; Belhadi et al., 2021). Consequently, we hypothesize:

Hypothesis 1 (H1). Entrepreneurial firms that had become more digitalized before a pandemic crisis are more resilient to the effects of that crisis.

C.2.4 Moderating Effects

As indicated above and addressed in our second research question, the existing literature on organizational resilience (Hillmann, 2021; Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017) has highlighted that responses to crisis events and thus the development of organizational resilience seems highly context-dependent. Thus, we now turn to the important aspects of context that can be assumed to impact the general digitalization–resilience relationship proposed in *H1*.

Among these context factors is globalization. In particular, we expect the relationship between

digitalization and resilience to pandemic crises to be more pronounced for globalized firms. Globalization can be understood as the increasing interdependence of national economies including suppliers, governments, and consumers in various countries (Knight, 2000). Entrepreneurial firms that are strongly affected by globalization usually have a supplier and customer base spread across several countries or even continents (e.g., Laanti et al., 2007). If social distancing measures are introduced in response to a pandemic crisis, then personal contacts between entrepreneurs and their international partners would be hit hard due to travel restrictions and outright travel bans (Nummela et al., 2020). That is, close personal contacts between global parties may be more difficult to maintain without the extensive use of digital technologies. Consequently, for entrepreneurial firms with a global orientation, higher levels of digitalization before a pandemic crisis seem to be particularly relevant to provide higher resilience to the crisis. By contrast, less globalized entrepreneurial firms, which are mainly active at the local or regional level, may find it easier to maintain personal contacts without increased levels of digitalization. Their business contacts may be predominantly found in the same region or country and thus less affected by travel bans and closed borders. Hence, we hypothesize:

Hypothesis 2 (H2). The relationship described in H1 is more pronounced if the respective firm is more affected by globalization.

Also, the relationship between digitalization and resilience to pandemic crises as proposed in *H1* can be expected to be more pronounced for non-family firms than for family firms. According to the literature, family businesses are characterized by a built-in focus on resilience against crises, which helps them to survive crises and quickly regain their performance afterwards (Amann & Jaussaud, 2012; Calabrò et al., 2021). A prime reason for such resilience can be found in family businesses' usual long-term orientation. That is, many family firms tend to strive for long-term business stability and, therefore, show higher levels of risk aversion (De

Massis et al., 2015; Hiebl, 2013). For instance, such risk aversion is reflected in lower levels of debt and higher levels of equity (e.g., González et al., 2013), which makes them more resilient towards short-term crises. In non-family firms, such built-in long-term orientation and crisis resilience usually cannot be found (Amann & Jaussaud, 2012). This is why they tend to be more vulnerable to crises. It can thus be expected that higher levels of digitalization are more important for non-family firms to develop resilience against pandemic crises. Hence, we hypothesize:

Hypothesis 3 (H3). The relationship described in H1 is more pronounced for non-family businesses than for family businesses.

Besides, the relationship between digitalization and resilience to pandemic crises can be expected to be more pronounced for smaller entrepreneurial firms than for their larger counterparts. Compared with smaller firms, larger ones usually enjoy more and better access to resources (Spithoven et al., 2013) such as access to finance (Cowling et al., 2015). Due to this higher level of resources, larger entrepreneurial firms usually have a more stable basis when entering crises, which makes them more likely to be resilient to such crises. In contrast, for smaller entrepreneurial firms, crises such as pandemics can be expected to threaten their existence, as they usually do not have the resources to weather extended periods with fewer sales, lower earnings, and associated liquidity problems (Eggers, 2020). Consequently, we expect that for smaller firms, higher levels of digitalization before the crises are even more important to develop resilience against a pandemic crisis than for larger firms. Hence, we hypothesize:

Hypothesis 4 (H4). The relationship described in H1 is more pronounced for smaller entrepreneurial firms than for larger entrepreneurial firms.

In addition, for firms that are mainly active in the manufacturing industry, it can be expected

that the relationship between digitalization and resilience to pandemic crises is less pronounced. For other industries such as retail, lockdowns during the COVID-19 pandemic have made in-person retail business difficult or non-existent in many countries worldwide (Pantano et al., 2020). That is, for such non-manufacturing industries, higher levels of digitalization before a crisis – such as e-commerce in the case of retail firms – can be expected to be a more important driver of the resilience against pandemic crises as compared with manufacturing firms. In contrast, for manufacturing firms, even higher levels of digitalization might not significantly affect their resilience against pandemic crises. Due to social-distancing measures during pandemic crises and the current inability to apply remote work to shopfloor levels, such manufacturing firms tend to be either shut down completely or have their operations upheld thanks to protective measures (Cai & Luo, 2020). On both options, the level of digitalization can be expected to have little impact on their resilience against pandemic crises. Hence:

Hypothesis 5 (H5). The relationship described in H1 is less pronounced if the respective firm is primarily focused on manufacturing activities.

Also, it can be expected that the relationship between digitalization and resilience to pandemic crises is more pronounced for prospector firms and less pronounced for defender firms. The latter firms primarily occupy niches in markets where relatively stable ranges of products or services are offered. Such defender firms are usually not at the forefront of market developments related to new products or services and tend to ignore changes that have no immediate impact on current activity areas (Miles & Snow, 1978). In contrast, prospector firms usually make changes to products or services frequently, are generally more open to radical innovation, and are thus more used to translating such innovation into their operations than defender firms (e.g., Laforet, 2008). Given their higher familiarity in dealing with innovation such as digitalization, we expect that prospector firms are able to “make more out of higher levels of digitalization” in terms of developing resilience to pandemic crises in the short term.

Hence:

Hypothesis 6 (H6). The relationship described in H1 is more pronounced for prospector firms and less pronounced for defender firms.

Finally, past performance can be expected to moderate the relationship proposed in *H1*. That is, we expect the relationship between digitalization and resilience to pandemic crises to be more pronounced for firms with high levels of past performance. Such high-performing firms are likely to have retained some of their high recent earnings and thus created reserve funds that can be drawn upon in times of pandemic crisis. While we have theorized above that high levels of digitalization are per se a driver of such resilience (see *H1*), we assume that the impact of this driver can even be enhanced by quick and bold measures to draw on and extend digitalization endeavors already started before the crisis (Rappaccini et al., 2020). Such measures are likely to require the short-term availability of financial resources. Such resources are more likely to be found in firms with recent outperformance and sufficient reserve funds than in firms which show recent underperformance (Pal et al., 2014). That is, we expect high-performing firms to be able to use their reserve funds to develop more quickly and effectively high levels of digitalization before a crisis into crises resilience than low-performing firms.

Hence, we assume:

Hypothesis 7 (H7). The relationship described in H1 is more pronounced for firms with high levels of past performance than for firms with low levels of past performance.

C.3 Methods

C.3.1 Sampling, Data, and Tests for Potential Biases

C.3.1.1 Sampling Procedures

To test our hypotheses, we conducted an online survey targeting German Mittelstand firms

since they have been depicted as usually showing high levels of entrepreneurship (De Massis et al., 2018; Heider et al., 2021), which makes these firms a useful sample to study entrepreneurial firms. In line with De Massis et al. (2018), we follow the German Mittelstand definition of Becker et al. (2008) and define Mittelstand firms as those with a maximum of 3,000 employees.

Most of the survey questions were based on established constructs from the English-language literature. We translated these questions into German – the language of our questionnaire. Our questionnaire was then retranslated into English by a fellow researcher who was not involved in the rest of the research process. This retranslated version allowed us to check potential translation errors by comparing the original English-language survey items with those in the retranslated version (cf. Brislin, 1970; Maneesriwongul & Dixon, 2004). In addition, we invited 10 pretesters (five academics, five practitioners) to provide feedback on the comprehensibility and flow of the questionnaire (cf. Hunt et al., 1982). Based on our language comparisons and the pretest feedback, we slightly amended the German-language questionnaire.

From the Amadeus database, we extracted a sample of 1,118 Mittelstand firms, which had a maximum of 3,000 employees and were situated close to our university since past research has shown that geographic proximity between survey authors and addressees results in higher response rates (Bartholomew & Smith, 2006). This data set exclusively comprised non-listed firms that were not part of the financial services industry. The Amadeus data included the firms' industry affiliation, their numbers of employees, and the contact information of each firm. We then manually searched for the firms' top managers' e-mail addresses. We specifically targeted Chief Executive Officers and other members of the top management team, since these top managers usually have an excellent and wide-ranging overview of their firms' activities (Zahra, 1991).

The survey invitations that clearly indicated the university sponsorship of our survey (cf.

Mellahi & Harris, 2016) were sent out to these top managers by e-mail in early July 2020 and reminders were sent through the middle of August 2020. The timeframe of the survey was in the midst of the COVID-19 crisis, which enabled us to capture the perceived impact of the crisis on the surveyed firms at that time without involving potential issues of recall bias, which could have materialized if we conducted our survey several months or years later. To facilitate responses, we assured participants of their anonymity (cf. Mellahi & Harris, 2016). In addition, since past research has found that incentives usually lead to higher response rates (Singer & Ye, 2013), we offered our survey addressees two kinds of incentives upon the completion of the survey: (1) an executive research report and (2) a donation of EUR 10 to a charity of their choice. Survey respondents could choose between receiving none, one, or both incentives.

In total, 156 complete or partially complete questionnaires were obtained. This resulted in a response rate of 14%. In general, response rates in management and entrepreneurship research have been declining in recent decades (e.g., Chidlow et al., 2015; Pielsticker & Hiebl, 2020), especially those targeting top executives (Cycyota & Harrison, 2006). However, our achieved response rate seems satisfactory, as it is in line with those of comparable recent and well-published survey studies (e.g., Rodil et al., 2016; Förster, 2015; Popa et al., 2017). Of the 156 cases, 41 had to be removed due to missing information on the variables of interest in this study. We thus used the remaining 115 cases with full information on the measures discussed below.

C.3.1.2 Potential Biases

In times of decreasing response rates (Chidlow et al., 2015; Pielsticker & Hiebl, 2020), surveys addressing individual top managers offer a pragmatic approach to realizing sufficiently large sample sizes (Montabon et al., 2018) and drawing on respondents' knowledge about their firms. At the same time, the results of such surveys may be susceptible to common method bias (Montabon et al., 2018; Podsakoff et al., 2003). Consequently, and in line with prior research (e.g., Podsakoff et al., 2003), we took several established measures to avoid common method

bias from arising. First, as indicated above, we ensured our respondents full anonymity. Second, we implemented a lag between the independent and dependent variables in the flow of our questionnaire to avoid respondents building their own mental models, which may bias our results. Third, we drew on pretested questions from the research literature and conducted extensive pretests. This way, we wanted to ensure that our questions were, for instance, simple, concise, specific, and did not feature complicated syntax (Podsakoff et al., 2003). Fourth, we integrated a marker variable in our questionnaire. As suggested by Lindell and Whitney (2001), we used a highly reliable multi-item construct that is theoretically unrelated to our variables – *Executive Job Demands* (see below for measurement). We computed correlations between this variable and all other variables in our study (see Table C-4) (Calic & Ghasemaghaei, 2021; Lindell & Whitney, 2001). These correlations provide no signals of a common method bias as the maximum significant correlation value was rather low (id est (i.e.), -.221; see Cohen, 1988 on correlation effect sizes). Finally, we conducted a Harman’s one-factor test. The basic assumption of this test is that common method variance is present when a single factor explains much of the covariance between the variables (Podsakoff et al., 2003; Podsakoff & Organ, 1986). Our exploratory factor analysis on all the variables included in this study shows that no single factor explains most of the covariance between the variables (the largest factor accounts for only 22.68% of the covariance). Therefore, our data seem unlikely to suffer from common method variance.

Another bias potentially affecting survey studies is non-response bias (van Loon, 2003), which arises if the percentage of non-respondents is high (Frohlich, 2002). A common type of non-response analysis is a comparison of late and early respondents since non-respondents are viewed as similar to late respondents (e.g., van der Stede et al., 2005). In line with the approach suggested by Armstrong and Overton (1977), Table C-1 compares the mean values between early (25th quantile) and late respondents (75th quantile) for all the variables involved in our

study. To use the correct tests for analyzing the differences between early and late respondents, we tested all the variables in our sample using a Kolmogorov–Smirnov test and Shapiro–Wilk test, finding that none of the variables were normally distributed, excluding *Past Performance*. Consequently, we used the non-parametric Mann–Whitney U test to check for significant differences between early and late respondents for non-normally distributed variables except the dichotomous variables *Industry*, *Family Business*, *Firm Size*, and *Strategy*. For these latter variables, we used the chi-square test to check for significant differences, and we used the T-test for the normally distributed variable *Past Performance*. We found no significant difference between early and late respondents and thus no signals of non-response bias.

Variable	Early Respondents	Late Respondents	p-value
	Mean	Mean	
Crisis Resilience	3.59	4.10	.249
Family Business	.55	.62	.594
Firm Size 250-499	.24	.14	.315
Manufacturing	.59	.69	.412
Strategy	.28	.41	.269
Past Performance	4.60	4.58	.921
Level of Digitalization before the Crisis	43.90	34.72	.136
Globalization	4.03	3.86	.674

Table C-1. Comparison of the variables involved in this study for late respondents and early respondents

C.3.2 Measures

C.3.2.1 Independent Variable

As suggested by prior literature (Bergkvist & Rossiter, 2007; Niemand et al., 2021), the *Level of Digitalization before the Crisis* was measured by a single item indicating the firm’s level of digitalization. In line with Niemand et al. (2021), respondents were asked to indicate the digitalization of their firm’s business model before the COVID-19 crisis from 0% to 100%.

C.3.2.2 Dependent Variable

Crisis Resilience was measured using a reverse-coded scale adapted from Becker et al. (2016). Becker et al. (2016) established a construct to measure the impact of the global financial crisis in 2008. We slightly adapted the questions for our specific empirical setting and the COVID-

19 crisis. Respondents were asked to indicate the extent to which their firm was impacted by the COVID-19 crisis along six dimensions on a seven-point Likert scale (from “not at all” to “very strongly”).

C.3.2.3 Moderator Variables

Globalization. Based on the scale presented by Knight (2000), we asked respondents to indicate their agreement on six dimensions (see Table C-2) of the globalization of their firm on a seven-point Likert scale (from “completely disagree” to “completely agree”). *Family Business.* Family business research has not agreed on a generally accepted definition of family firms, but many empirical studies rely on survey respondents’ self-assessment of their firms as family or non-family firms (Steiger et al., 2015). We followed this approach and coded this variable as “1” (yes) if the respondent considered his or her firm as a family firm and “0” if otherwise.

Firm Size. We operationalized *Firm Size* based on the number of employees (e.g., Speckbacher & Wentges, 2012; Tocher & Rutherford, 2009) and created two size classes: *Firm Size 250–499* is coded as “1” if the firm has more than 249 and fewer than 500 employees, and coded as “0” if otherwise.

Manufacturing. This dichotomous variable is coded as “1” if the firm primarily belongs to the manufacturing industry in the respondents’ view, and “0” if otherwise.

Strategy. We operationalized this variable using two of Miles and Snow’s (1978) strategic archetypes: prospectors and defenders. After reading a short description of two types of firms, one reflecting a prospector strategy and the other a defender strategy, respondents had to rate which of the two descriptions fits their firms best. The resulting *Strategy* variable was coded “1” for prospectors and “0” for defenders.

Past Performance. We measure *Past Performance* based on the subjective performance measurement suggested by Eddleston and Kellermanns (2007) consisting of eight items. For all items, our survey respondents were asked to indicate on a seven-point Likert scale whether they

performed better or worse than their competitors in the three years before our survey.

C.3.2.4 Marker Variable

The multi-item construct *Executive Job Demands* is based on the job demands measurement suggested by Janssen (2000). For all eight items by Janssen (2000), we asked our survey participants to indicate on a seven-point Likert scale how often the statements applied to their current organizational role (from 1 = “never” to 7 = “always”).

C.3.3 Reliability and Validity of Multi-item Constructs

For the multi-item constructs used in our study, we conducted confirmatory factor analyses (CFA) to establish construct validity (see Table C-2). As proposed by the literature, we suppressed factor loadings smaller than .40 (Field, 2018; Hair et al., 2019) and conducted empirical tests to establish content and construct validity (Nunnally, 1978). According to Hair et al. (2019), composite reliability (CR) values should be at least .7 and average variance extracted (AVE) values should be at least .5 for all multi-item constructs. After having confirmed that several items belonged to one factor, we averaged the responses across the items of the respective constructs to arrive at the final scores for our variables.

Crisis Resilience		
CR = .89	AVE = .67	Factor loadings (CFA)
To what extent is your firm impacted by the current COVID-19-crisis?		.735
Was there a decline in orders?		.855
Was there a decline in your turnover?		.995
Has the availability of capital decreased?		.641
Globalization		
CR = .89	AVE = .59	Factor loadings (CFA)
Many of our most important competitors' headquarters are abroad.		.617
Most of our main competitors have distribution channels in Asia and Europe.		.751
Cross-border flow of goods and capital normally happens in our industry without problems.		.663
Within the last ten years, trade with foreign countries has increased enormously.		.930
Within the last ten years, competition with overseas firms has increased enormously.		.783
Within the last ten years, we came to the conclusion in our firm that international sales are an important source for additional revenue.		.805

Past Performance		
CR = .90	AVE = .56	Factor loadings (CFA)
How would you rate your firm's current performance as compared to your competitors?		
Sales growth		.465
Growth in market share		.449
Growth in number of employees		.442
Increase in profitability		.845
Return on equity		.969
Return on assets		.967
Profit margin on sales		.863
Ability to fund growth from profits		.711
Executive Job Demands (marker variable)		
CR = .84	AVE = .52	Factor loadings (CFA)
To what extent do the following statements apply to your current position in your firm?		
I have to work fast		0.654
I have too much work to do		0.761
I have to work extra to finish a task		0.799
I work under time pressure		0.785
I have to deal with backlog at work		0.571
<i>Note.</i> AVE = average variance extracted; CR = composite reliability; CFA = confirmatory factor analysis.		

Table C-2. Construct validity of Crisis Resilience, Globalization, Past Performance, and Executive Job Demands (marker variable).

Based on the CFA, we eliminated items four and six of our *Crisis Resilience* construct. The remaining four items indicated sufficient reliability results and loaded onto a single factor (see Table C-2). For our marker variable *Executive Job Demands*, the CFA showed sufficient reliability results and that the items loaded onto one factor. We excluded items seven and eight due to their low loadings (lower than .4, see Hair et al., 2019) and excluded item five due to its detrimental effect on reaching the recommended AVE threshold of .5 (see Hair et al., 2017). For the remaining two multi-item constructs in our study – that is, *Globalization* and *Past Performance* – the CFA results indicated sufficient reliability results and that all measured items loaded onto a single factor and could thus be retained (see Table C-2).

C.4 Results

C.4.1 Descriptive Results and Correlations

Table C-3 contains the descriptive statistics of our variables (e.g., N, Mean, Median, SD) and

Table C-4 presents the correlation matrix. Due to the various scale levels of our variables, we used different measures of associations (e.g., *Pearson, Phi*; see the notes in Table C-4). There are several significant associations between the variables. However, there is no indication of multicollinearity issues since all the correlations are below the threshold of .7 (Dormann et al., 2013).

Variables	N	Mean	Min	Max	Median	SD
Crisis Resilience	115	3.96	1.00	7.00	4.00	1.64
Family Business	115	.67	.00	1.00	1.00	.47
Firm Size 250-499	115	.26	.00	1.00	.00	.44
Manufacturing	115	.63	.00	1.00	1.00	.48
Strategy	115	.44	.00	1.00	.00	.50
Past Performance	115	4.51	1.63	7.00	4.50	1.05
Level of Digitalization before the Crisis	115	37.77	.00	90.00	39.00	21.90
Globalization	115	3.87	1.00	6.83	4.33	1.80

Note. N = total number of cases; SD = standard deviation.

Table C-3. Descriptives

Variables	N	1	2	3	4	5	6	7	8	9
1 Crisis Resilience	115	1								
2 Family Business	115	.017	1							
3 Firm Size 250-499	115	-.128	-.172	1						
4 Manufacturing	115	-.286	.389	-.084	1					
5 Strategy	115	.061	.181	.147	.059	1				
6 Past Performance	115	.250	.167	-.108	.097	.286	1			
7 Level of Digitalization before the Crisis	115	.076	.091	-.151	-.101	-.040	.137	1		
8 Globalization	115	-.343	.159	.081	.631	.098	.110	.022	1	
9 Executive Job Demands (marker variable)	115	-.169	-.022	.091	.109	-.138	-.221	-.041	.152	1

Note. N = total number of cases; correlations significant at $p < .10$ are indicated in bold; *Point-biserial* correlation coefficients are used for correlations between metric and dichotomous variables; *Pearson* correlation coefficients are used for correlations between metric variables; *Phi* values are used between dichotomous variables (for further information see Field, 2018).

Table C-4. Correlation matrix

C.4.2 Multiple Regression Analyses

We used a hierarchical regression analysis to test our hypotheses (see Table C-5). Model 1 includes the main effects suggested in *H1* and Model 2 adds the interaction terms as proposed in *H2* through *H7*. Before creating the interaction terms, we mean-centered the involved variables (Cronbach, 1987; Field, 2018) and calculated their cross products. For all the models, we display the variance inflation factors (VIFs) to further assess potential multicollinearity issues. There are several guidelines for VIFs; however, as a general rule of thumb, they should not exceed 10 (e.g., Dormann et al., 2013; Hair et al., 2019). Our VIFs in Table C-5 are all well below this threshold: the maximum VIF value was 2.375. Consequently, from the VIFs and the above correlation matrix, we have no indications of multicollinearity issues that may threaten the validity of our results.

<i>Dependent Variable</i>	<i>Crisis Resilience</i>							
	Main effects only (Model 1)				Interaction effects added (Model 2)			
<i>Independent Variables</i>	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF
Constant		4.581	.000			4.399	.000	
Level of Digitalization before the Crisis	.010	.116	.908	1.099	.018	.204	.839	1.143
Globalization	-.269	-2.354	.020**	1.792	-.251	-2.216	.029**	1.854
Family Business	.063	.651	.516	1.303	.057	.572	.569	1.420
Firm Size 250-499	-.082	-.908	.366	1.135	-.086	-.952	.343	1.189
Manufacturing	-.174	-1.421	.158	2.068	-.192	-1.556	.123	2.201
Strategy	.022	.238	.812	1.176	-.031	-.333	.739	1.252
Past Performance	.270	2.944	.004***	1.154	.279	3.009	.003***	1.235
Level of Digitalization before the Crisis * Globalization					.291	2.265	.026**	2.375
Level of Digitalization before the Crisis * Family Business					-.168	-1.793	.076*	1.265
Level of Digitalization before the Crisis * Firm Size 250-499					-.086	-.947	.346	1.190
Level of Digitalization before the Crisis * Manufacturing					-.187	-1.472	.144	2.324
Level of Digitalization before the Crisis * Strategy					-.022	-.218	.828	1.409
Level of Digitalization before the Crisis * Past Performance					.048	.480	.632	1.425
R²			.223				.300	
Adjusted R²			.172				.210	
F			4.389***				3.324***	
N			115				115	

Note. VIF = variance inflation factor; R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases; Stand. β = standardized regression coefficient β .
* $p < .10$; ** $p < .05$; *** $p < .01$.

Table C-5. Hierarchical regression analysis

All the models show sufficient predictive validity as measured by R^2 . Our full model (Model 2) features a higher R^2 (.300) than Model 1, which supports our hierarchical regression setup. The F statistics indicate that both models are significant at $p < .01$. In addition, the two models should hold sufficient statistical power, as the 13 independent variables in Model 2 would require a minimum number of 65 ($13 * 5$) observations as of Hair et al. (2019) or 85 ($20 + 13 * 5$) as of Khamis and Kepler (2010). Our number of observations (115) is well above these thresholds.

Model 1 tests the direct effect proposed in *H1*. Besides *Past Performance* ($b = .270, p < .01$) and *Globalization* ($b = -.269, p < .05$), no further significant direct effect on *Crisis Resilience* can be found. In particular, Model 1 shows no direct positive effect of the *Level of Digitalization before the Crisis* on *Crisis Resilience*, which is why *H1* cannot be confirmed.

The significant predictors *Past Performance* ($b = .279, p < .01$) and *Globalization* ($b = -.251, p < .05$) are also confirmed by Model 2. In addition, two interaction effects turn out to be significant. First, the interaction between the *Level of Digitalization before the Crisis* and *Globalization* ($b = .291, p < .05$), and second, the interaction between the *Level of Digitalization before the Crisis* and *Family Business* ($b = -.168, p < .10$) are associated with *Crisis Resilience*, which supports *H2* and *H3*.

Figure C-2 and Figure C-3 plot the variables involved in our significant interaction effects. For plotting these effects, we categorizing the respective variables into two groups using a median split each. Figure C-2 indicates that firms barely affected by globalization that show a low level of digitalization feature the highest level of *Crisis Resilience* (i.e., 4.58). By contrast, and in line with *H2*, firms highly affected by globalization with a more digitalized business model emerge from our analyses as more resilient to pandemic crises than their less digitalized counterparts (see the solid slope in Figure C-2). In summary, as the solid slope is steeper than the dotted slope in Figure C-2, it seems as if the hypothesized relationship between the *Level of*

Digitalization before the Crisis and Crisis Resilience holds better for firms highly affected by globalization.

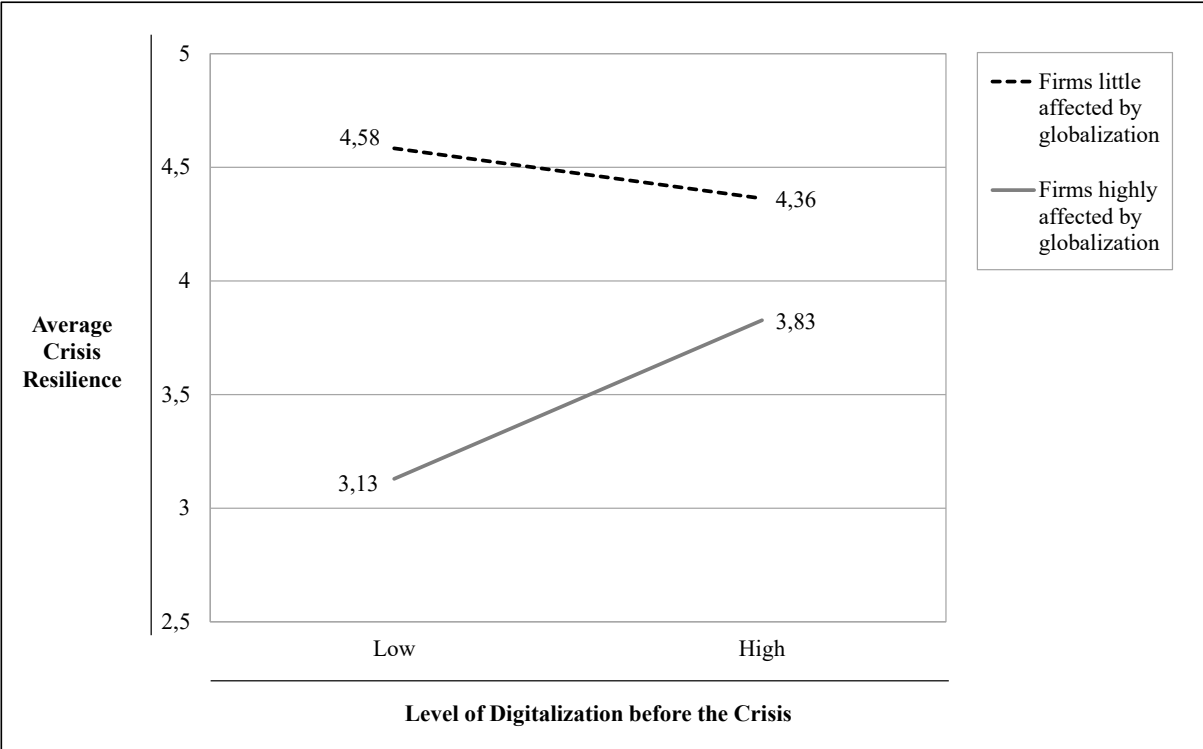


Figure C-2. Interaction between Level of Digitalization before the Crisis and Globalization

Figure C-3 indicates that non-family businesses with a little digitalized business model show the lowest level of *Crisis Resilience* (i.e., 3.64). By contrast, and in line with *H3*, non-family businesses with a more digitalized business model emerge from our analyses as more resilient to pandemic crises than their less digitalized counterparts and family businesses (see Figure C-3). Therefore, it seems as if the hypothesized relationship between the *Level of Digitalization before the Crisis* and *Crisis Resilience* holds better for non-family businesses.

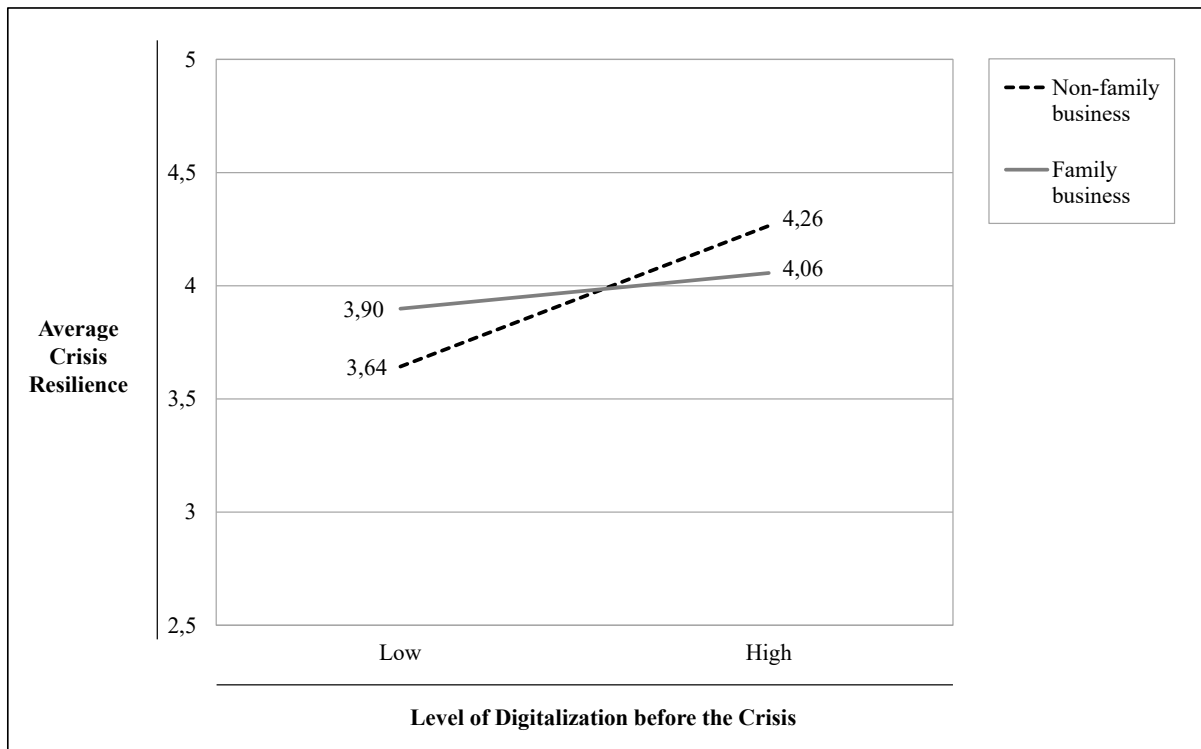


Figure C-3. Interaction between Level of Digitalization before the Crisis and Family Business

C.4.3 Robustness Check

As a robustness check of our results, we tested an alternative measurement of the level of digitalization – that is, the level of digitalization *during* the crisis. We did so as our data indicated that during the COVID-19 crisis, the average level of digitalization increased from 37.77% before the crisis to 45.28% during the crisis. Consequently, it could be argued that higher levels of digitalization during the crisis would affect *Crisis Resilience*, perhaps even more so than those levels before the crisis. We thus computed another battery of regression models, where the *Level of Digitalization During the Crisis* acts as the independent variable and as part of our interaction terms. Just as the variable *Level of Digitalization Before the Crisis*, the variable *Level of Digitalization During the Crisis* was constructed by asking the respondents to indicate the digitalization of their firm’s business model at the moment of answering our survey and thus during the COVID-19 crisis from 0% to 100% (cf. Niemand et al., 2021). The results of this exercise are reported in Table C-6 and confirm the two significant moderators *Globalization* and *Family Business*. Our results can thus be considered robust against potential

differences between the levels of digitalization before and during the crisis, which reinforces the important role of digitalization in creating resilience against pandemic crises.

<i>Dependent Variable</i>	<i>Crisis Resilience</i>							
	Main effects only (Model 3)				Interaction effects added (Model 4)			
<i>Independent Variables</i>	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF
Constant		4.535	.000			4.530	.000	
Level of Digitalization during the Crisis	.018	.193	.847	1.163	.038	.419	.676	1.209
Globalization	-.272	-2.348	.021**	1.843	-.231	-1.968	.052*	1.968
Family Business	.063	.651	.517	1.292	.062	.633	.528	1.377
Firm Size 250-499	-.079	-.850	.397	1.194	-.070	-.723	.471	1.325
Manufacturing	-.172	-1.402	.164	2.070	-.196	-1.597	.113	2.161
Strategy	.021	.232	.817	1.168	-.034	-.364	.716	1.245
Past Performance	.269	2.932	.004***	1.155	.246	2.669	.009***	1.221
Level of Digitalization during the Crisis * Globalization					.226	1.839	.069*	2.164
Level of Digitalization during the Crisis * Family Business					-.172	-1.931	.056*	1.142
Level of Digitalization during the Crisis * Firm Size 250-499					-.007	-.076	.939	1.263
Level of Digitalization during the Crisis * Manufacturing					-.124	-1.027	.307	2.082
Level of Digitalization during the Crisis * Strategy					-.012	-.130	.897	1.293
Level of Digitalization during the Crisis * Past Performance					.074	.824	.412	1.165
R²			.223				.295	
Adjusted R²			.172				.204	
F			4.394***				3.251***	
N			115				115	

Note. VIF = variance inflation factor; R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases; Stand. β = standardized regression coefficient β .

* $p < .10$; ** $p < .05$; *** $p < .01$.

Table C-6. Hierarchical regression analysis (robustness check)

C.5 Discussion, Implications and Limitations

C.5.1 Summary of Hypotheses Tests

Our results do not imply a universal impact of digitalization on crisis resilience as proposed in *H1*, but rather an effect contingent on the extent to which entrepreneurial firms are affected by globalization (as proposed in *H2*) and family influence (see *H3*). That is, our data lend support to hypotheses *H2* and *H3*, but hypotheses *H4*, *H5*, *H6*, and *H7* on additional moderating effects could not be supported. We thus concentrate the following discussion on the two hypotheses and moderating effects that could be confirmed in our study.

C.5.2 The Moderating Effect of Globalization

As shown in Figure C-2, the positive impact of digitalization on crisis resilience can only be found for entrepreneurial firms highly affected by globalization. This finding indicates that during pandemic crises, globalized firms are specifically reliant on digital technologies to continue their relationships with stakeholders worldwide. In turn, globalized entrepreneurial firms that have only a relatively low level of digitalization emerge from our study as those most affected by the COVID-19 pandemic and thus show the lowest resilience to this crisis.

In turn, for entrepreneurial firms less affected by globalization, Figure C-2 suggests that higher levels of digitalization do not increase their crisis resilience. This goes directly against our first hypothesis. A potential explanation of this finding is that entrepreneurial firms hardly affected by globalization are mostly active locally or regionally. Historically, such firms, at least German Mittelstand firms, have been highly embedded in their local communities (De Massis et al., 2018; Pahnke & Welter, 2019). However, as suggested by recent evidence on remote work (Soroui, 2020), a growing reliance on digital technologies may lead to disembedding dynamics. In our case, this could mean that Mittelstand firms, which were once locally embedded but now increasingly rely on digital technologies, may have lost some of this embeddedness due to their lower levels of personal contact and interaction (cf. Soroui, 2020). In times of crisis, the loss of local embeddedness may then come with lower levels of reciprocal support between locally or

regionally active firms with higher levels of embeddedness, and this could explain the lower levels of crisis resilience for more digitalized entrepreneurial firms that are not globalized.

C.5.3 The Moderating Effect of Family Business

As shown in Figure C-3, the positive impact of digitalization on crisis resilience can be found for both family and non-family entrepreneurial firms. Figure C-3 also shows that the positive effect is particularly evident for non-family businesses, which confirms our *H3*. This finding indicates that non-family firms are more reliant on digitalization to create resilience against pandemic crises than family firms. In turn, non-family entrepreneurial firms with a more digitalized business model emerge from our analyses as more resilient to pandemic crises than their similarly digitalized family entrepreneurial counterparts. As indicated in Section C.2, we suppose that this finding is due to family firms having a higher level of built-in crisis resilience (Amann & Jaussaud, 2012; Calabrò et al., 2021) due to their usual long-term orientation (De Massis et al., 2015) and risk aversion (Hiebl, 2013). Thus, our findings add to the nascent literature on the digitalization of family firms (Batt et al., 2020; Löhde et al., 2020; Soluk & Kammerlander, 2021) and suggest that in times of crisis, family firms may gain less than their non-family counterparts from digitalization. In turn, our findings provide a further case in point indicating that family firms may feature a higher level of built-in crisis resilience than non-family firms.

C.5.4 Theoretical Implications and Contributions

Our study adds to the nascent literature on the effects of pandemic crises on entrepreneurship. Two prominent recent additions to this literature (Bennett & Nikolaev, 2021; Rao & Greve, 2018) focus on the short- and long-term effects of Spanish flu and find the detrimental effects of this pandemic on entrepreneurial activities such as innovation (Bennett & Nikolaev, 2021) and organization building (Rao & Greve, 2018). Both studies explain this relationship using the Parasite Stress Theory of Values that suggests that “social distancing” leads to less

collaboration, interaction, and, as a consequence, entrepreneurial activity.

At the time of this writing (August 2021), the COVID-19 crisis is far from resolved and we cannot yet foresee the long-term effects of this pandemic. However, our data suggest that in the short run, more globalized entrepreneurial firms and non-family entrepreneurial firms have been more resilient to the crisis in case they had digitalized their business model before the crisis to a high degree. That is, our findings qualify the Parasite Stress Theory of Values, which has thus far focused on the reduction of personal contact but overlooked digital technologies that may provide an alternative to such contact. The reduction of personal contact can also be seen in the COVID-19 crisis (e.g., Lewnard & Lo, 2020). According to our findings, more intensive reliance on modern digital technologies seems to reduce the detrimental impact of social distancing for more globalized entrepreneurial firms and for non-family entrepreneurial firms. That is, despite social distancing measures introduced during a pandemic, higher levels of digitalization seem to help such firms in retaining cross-cultural interaction including its benefits such as transfers of technology and knowledge and keeping up intercultural trade (Nørfelt et al., 2020). As severe economic downturns are observed in most countries worldwide as a consequence of the outbreak of the COVID-19 pandemic (e.g., Fernandes, 2020), our findings imply that the extent to which globalized and non-family entrepreneurial firms are affected by such crises can be reduced by higher levels of digitalization. However, they do not imply that digitalization protects globalized and non-family entrepreneurial firms from pandemic crises perfectly. Hence, theoretically, our findings imply that the relationship between contagious diseases and entrepreneurship suggested by the Parasite Stress Theory of Values is moderated by the use of digital technologies or, more broadly, ways that support humans in maintaining interaction despite the reduction of personal contact.

In addition, our findings contribute to the literature on organizational resilience (Hillmann, 2021; Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017). This literature

highlights that organizational resilience is context-dependent but has so far overlooked what makes firms resilient in healthcare crises such as a pandemic. Considering that such pandemic crises have increased in frequency in the last century (Kraus et al., 2020), our study is among the first to deliver evidence on developing resilience to this important type of crisis and thus moves beyond existing qualitative evidence (Fath et al., 2021) and conceptual pieces (Beninger & Francis, 2021) on resilience in light of the COVID-19 crisis. Our findings confirm the context-dependency of organizational resilience (Linnenluecke, 2017) by showing that digitalization does not universally contribute to developing resilience to pandemic crises, particularly in non-family firms and firms more affected by globalization.

C.5.5 Practical Implications

For entrepreneurial practice, our findings imply that the value of digitalization as a protector against pandemic crises depends on the extent to which entrepreneurial firms are affected by globalization and the level of family influence they experience. Their resilience to pandemic crises seems to rise if they are globally active or controlled by non-family shareholders and invest in the digitalization of their business. In turn, for entrepreneurial firms that are not globally active, our results suggest that higher levels of digitalization are associated with less resilience to pandemic crises. As discussed above, this dynamic may be because of the lowering of local embeddedness due to digitalization and thus less reciprocal support from the local community. Furthermore, for family entrepreneurial firms, our results suggest that higher levels of digitalization are associated with an increased crisis resilience but lower in contrast with their non-family counterparts. As discussed above, this dynamic may be because of the family firms' long-term orientation and built-in crisis resilience, which makes digitalization less important for them. However, we can only theorize about these dynamics, and a closer examination is warranted. While these practical implications focus on increasing the resilience of entrepreneurial firms to pandemic crises, we do not rule out that higher levels of digitalization

may still help fight the ongoing COVID-19 crisis. However, as we specifically measured the level of digitalization before the crisis, we cannot provide evidence for this assumption.

C.5.6 Limitations

Our findings are not free from limitations. First, our study used empirical data from a specific geographical region – Germany. In particular, we draw on data on Mittelstand firms, which have been shown to feature different dynamics than other entrepreneurial firms (e.g., those situated in Silicon Valley; Pahnke & Welter, 2019). We do not think that this affects the generalizability of our findings to other countries with heavily globalized economies, as the findings on firms highly affected by globalization appear to be the strongest in our analyses. Nevertheless, this limitation must be kept in mind, and the corroboration of our results using data from other regions of the world is needed. Second, the data collection period represents a possible limitation. The data on the various constructs were collected during a global pandemic crisis. According to Podsakoff et al. (2003), respondents' answers depend strongly on their mood states, especially on relatively recent mood-forming events as well as on the way they see themselves and the world around them. Answering a survey at the time of a pandemic crisis may have resulted in different responses than in “normal” times. However, the focus of our survey necessitated this timing, and this limitation could not have been prevented; nevertheless, it must be kept in mind. Finally, respondents' answers are, in most cases, subjectively measured. That is, these answers depend strongly on their perception and, therefore, could deviate from firms' objective situation (Podsakoff et al., 2003). At the same time, we aimed to address top managers, who usually have a good overview of their firms, which helps mitigate this limitation.

References Section C

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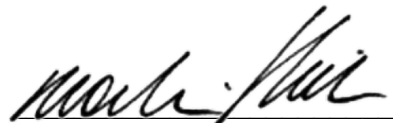
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D Management Control Effectiveness and Organizational Ambidexterity: The Moderating Role of Multiple Dimensions of Environmental Dynamism

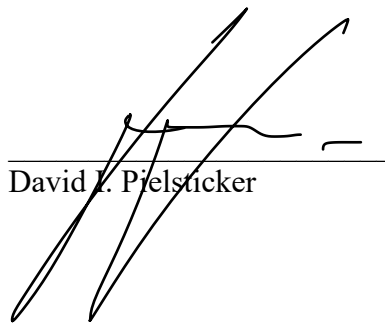
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We, the authors of the paper, hereby declare that this paper's first author, David I. Pielsticker, was responsible for collecting and analyzing most of the data, developing the multiple regression models, and writing most of the paper.



Martin R. W. Hiebl



David I. Pielsticker

D.1 Introduction

While long stressing the relevance of effective control systems (exempli gratia (e.g.), Merchant & van der Stede, 2017), the management accounting literature has only recently started to empirically investigate the effectiveness of entire control packages.¹⁷ That is, while many papers have investigated the effect of individual control systems or combinations thereof on organization-level outcomes such as innovation (e.g., Bedford, 2015; Ylinen & Gullkvist, 2014; Henri, 2006), to the best of our knowledge, the only article that empirically measures overall management control effectiveness is the study by Bedford et alii (et al.) (2016).¹⁸ Conceptually, Bedford et al. (2016) define management control systems as effective when they help the firm achieve its goals, and we adopt this view as well here. Empirically, Bedford et al. (2016) find that there are various configurations of how individual control systems can be combined to form an overall effective control system. At the same time, Bedford et al. (2016) show that these configurations are contingent to the respective firm's overall strategy. By following management control theory (Merchant & van der Stede, 2017), we aim to extend empirical insights on management control effectiveness and suggest that such effectiveness leads to positive firm-level outcomes. In this paper, we thus test the effect of management control effectiveness on organizational ambidexterity.

While management control systems may be an important driver of firm-level outcomes such as organizational ambidexterity, they – like any other firm-internal resource or capability – cannot alone account for such firm-level outcomes such as organizational ambidexterity

¹⁷ This paper is not intended to contribute to the discussion around control systems as a package or a system (e.g., Bedford, 2020; Demartini & Otley, 2020; Grabner & Moers, 2013; Malmi & Brown, 2008). As indicated by Merchant and Otley (2020), the overall control system in any specific organization is likely to involve some ingredients of the systems approach and some of the package approach, or – as put by Demartini and Otley (2020) – a tighter or looser coupling between individual control systems. Consequently, we only refer to the effectiveness of the overall control system, without focusing on how such a system's internal workings are designed, although we acknowledge recent work by Demartini and Otley (2020) who found that loosely coupled control systems are associated with higher management control effectiveness (in comparison to tightly coupled or uncoupled control systems). In other words, our point of departure is an organizations' overall control package, regardless of whether this package includes interdependence between individual controls or not (Bedford, 2020).

¹⁸ We acknowledge that recently, Demartini and Otley (2020) have suggested a measure for the overall effectiveness of an organization's performance management system. As of our reading, this measurement rests on the same conceptual foundations as and shares some commonalities with the one by Bedford et al. (2016). Since performance management systems are only one type of control system (Malmi & Brown, 2008), we rely on the measurement suggested by Bedford et al. (2016) for overall management control effectiveness.

(Kraaijenbrink et al., 2010). For instance, firm-level outcomes such as organizational ambidexterity are widely understood as contingent on many internal capabilities but also on environmental aspects such as competition and dynamism (Porter, 1985). Many prominent management and accounting scholars, therefore, argue that competitive advantage, and by association, firm-level outcomes cannot solely be explained with internal capabilities such as control systems, but necessarily includes both internal resources and capabilities and the influence of the environment a firm operates in (e.g., Demartini & Otley, 2020; Henri, 2006; Kraaijenbrink et al., 2010).

Thus, the assumed positive effect of management control effectiveness on firm-level outcomes such as organizational ambidexterity is unlikely to apply universally to all organizational contexts. In a single study, we cannot account for all variations of resources, capabilities and environments (Kraaijenbrink et al., 2010) but instead focus on overall control system effectiveness and environmental dynamism – an important aspect of a firm's environment. We do so because the existing management control literature has delivered multiple evidence that the effect of individual control systems or combinations thereof on firm-level outcomes is contingent to environmental dynamism. Put differently, environmental dynamism has frequently been found to moderate the relationships between individual control systems and organizational ambidexterity (e.g., Henri & Wouters, 2020). While we do not argue against this notion, such studies usually feature a one-dimensional measurement of environmental dynamism (e.g., Bisbe & Malagueño, 2012; Braumann et al., 2020; Demartini & Otley, 2020; Grabner et al., 2018). However, there are various indications that an organization's environment is not necessarily homogenous and thus, different parts of the environment may feature different levels of dynamism (e.g., Brouthers et al., 2002). In particular, stakeholder theory suggests that for achieving corporate goals, a firm has to strategically manage its stakeholder relationships by taking into account the various stakeholder groups' needs and interests (Freeman et al.,

2010). We know that there usually is mutual interaction between stakeholders and a particular organization (Berman et al., 1999) and that these stakeholder relationships are inherently dynamic and idiosyncratic (Aaltonen & Kujala, 2016; Elias et al., 2002; Fassin, 2010; Friedman & Miles, 2002; Kujala et al., 2012; Phillips, 2003). Thus, individual stakeholders, and by association, individual stakeholder groups may feature quite different levels of relationship dynamism. In this paper, we incorporate this notion and not only examine the relationship between management control effectiveness and organizational ambidexterity but also the moderating role of stakeholder-related dimensions of environmental dynamism.

Based on a survey of German firms, our results generally lend support to the suggested positive relationship between management control effectiveness and organizational ambidexterity. Our study thus contributes to the management control literature by being the first to empirically underpin the positive effect of an overall control package's effectiveness on ambidexterity. However, in line with our expectations, we also find a moderating role of some stakeholder groups' dynamism. A further contribution is thus that we empirically show that different stakeholder groups' dynamism has idiosyncratic effects on the relationship between management control effectiveness and organizational ambidexterity. This implies that future studies investigating environmental dynamism and management control systems may need to more closely – and empirically – account for such heterogeneity in an organization's environmental dynamism.

Given the fact that many empirical accounting studies have never been replicated and that some core results were found to be non-replicable (Brüggen et al., 2021; Hail et al., 2020), we additionally tested the replicability of our survey results by conducting a second survey study using Amazon Mechanical Turk (Mturk) and respondents situated in the United States (U.S.). To test the replicability of our results, we relied on new statistical replication procedures suggested from psychology (Bonett, 2021), which, as a field, has developed increased

awareness of the (non-)replicability of empirical research given the observed “replication crisis” in psychology (Maxwell et al., 2015; Shrout & Rodgers, 2018). The third and final contribution of this paper is thus of methodological nature. To the best of our knowledge, our paper is among the first accounting studies to include two separate survey studies for replication purposes and the first to showcase the applicability of two novel replication tests from psychology: strong effect-size replication and directional replication (Bonett, 2021). These two tests generally lend support to our survey findings from the first survey study but indicate that this support is stronger for some relationships than for others.

The rest of this paper is structured in the following way. In Section D.2, we review the related literature and draw on control theory and stakeholder theory to develop our hypotheses. Section D.3 then details our research methods. Section D.4 presents our results and Section D.5 concludes the paper with a discussion of these results and highlights the main implications and limitations of the study.

D.2 Background, Theory and Hypotheses

D.2.1 Organizational Outcomes of Management Control Effectiveness

There are various different definitions of what constitutes a management control system, but most of them agree that such control systems steer the behavior of the members of an organization (e.g., Malmi & Brown, 2008), for instance towards reaching the organization’s objectives or realizing its strategy (Merchant & van der Stede, 2017; Simons, 1994). It can thus be assumed that if these control systems work well – i.e., are effective – there is a higher chance of reaching organizational goals (Merchant & van der Stede, 2017). Organizations certainly differ widely in terms of their organizational goals, but some organizational goals are nevertheless shared by many organizations (Kotlar et al., 2018). Among these, and especially relevant for the for-profit setting (see, e.g., Hull & Lio, 2006; Ruvio et al., 2010) we focus on in our below empirical investigations, are innovation-related goals. In line with this notion,

earlier research on the outcomes of individual control systems or aspects of control systems such as their diagnostic or interactive usage has often focussed on the effect of control systems on ambidexterity – representing an innovation-related goal (e.g., Bedford, 2015; Ylinen & Gullkvist, 2014). Thus, while there are certainly further organization-level goals and outcomes of management control systems, we focus our study on the outcomes of management control effectiveness on organizational ambidexterity.

This organizational ambidexterity is important for various reasons. Managers of firms are repeatedly challenged over time to adapt their firms to the new developments in their environment and ultimately ensure innovation and efficiency in the long run (Tushman & O'Reilly, 1996). The ambidexterity literature suggests that for such long-term viability, organizations should simultaneously strive for high and balanced levels of exploiting existing capabilities (*id est* (i.e.), working towards refinement and efficiency) and exploring new capabilities. Such exploration includes search and flexibility. So organizational ambidexterity is defined as the simultaneous and balanced pursuit of exploratory and exploitative activities (Cao et al., 2009; O'Reilly & Tushman, 2013; Simsek, 2009). It is suggested that high levels of organizational ambidexterity ensure innovation and keep the organization profitable and competitive in the long-term (Cao et al., 2009; Chandrasekaran et al., 2012; Gibson & Birkinshaw, 2004; March, 1991; O'Reilly & Tushman, 2013).

For ambidexterity, a positive influence of management control effectiveness can be expected. More generally, management control systems have been shown to play a crucial role in translating an organization's ability to innovate into innovation performance (Grabner et al., 2018). Innovation may not be the number-one priority of all profit-seeking firms, but as found by the ambidexterity literature (see, e.g., Luger et al., 2018; Lubatkin et al., 2006 for firm performance), the long-term viability of firms is decisively driven by ambidexterity. This may explain why increasingly, firms adopt innovation-related objectives to master and survive ever

more rapid changes in their environment (Tushman & Nadler, 1986). Importantly for us, management control systems can be essential to develop and maintain an appropriate balance between exploration and exploitation, and thus, for reaching ambidexterity (McCarthy & Gordon, 2011). We thus assume that if overall management control packages are more effective, then the respective organization will feature higher levels of organizational ambidexterity. Our expectation receives support from existing empirical studies that have not investigated overall management control effectiveness but have found individual management control systems and aspects to be supporting and influencing ambidexterity (see, e.g., Bedford et al., 2016; Davila, 2000). Hence, we formulate the following hypothesis:

Hypothesis 1 (H1). Management control effectiveness is positively related to organizational ambidexterity.

D.2.2 Prior Research on the Effect of Environmental Dynamism on Management Accounting and Control

As indicated above, organizational ambidexterity is often perceived as being contingent on both internal resources and capabilities such as management control systems and environmental dynamics such as dynamism and competition (e.g., Demartini & Otley, 2020; Porter, 1985). Before we incorporate these environmental characteristics in our theoretical model, we first provide a brief recap of how prior management accounting and control research has viewed environmental dynamism and uncertainty.

Environmental uncertainty defines a status in which a person makes decisions without fully knowing one's relationship with the environment, the evolution of a situation within that environment, and what impact those evolutionary changes will have on the person-environment relationship and whether actions taken in response will be successful (Bstieler, 2005; Otley & Pierce, 1995). In this context, uncertainty can be an environment in which, for example, the future development of markets or technologies is difficult to predict (MacCormack et al., 2001);

hence, it is to be expected that actors' perception of the environment will influence their actions. For instance, managers have been found to make changes in organizational processes and structures in response to such uncertainty (Dill, 1958; Duncan, 1972).

As environmental uncertainty increases, a firm's environment will become more turbulent and maybe perceived as riskier (Bstieler 2005). Given this importance of environmental uncertainty for making plans and rendering decisions, environmental uncertainty has been identified as an essential contextual variable in numerous management accounting and control studies (e.g., Chen et al., 2020; Gordon & Narayanan, 1984; Gul & Chia, 1994; Janka & Guenther, 2018; Merchant, 1990; Otley & Pierce, 1995). A part of these studies does not frame the phenomenon as “uncertainty” but as “dynamism”. However, these two constructs are closely related to each other or sometimes viewed as indicators of each other (see, for instance, the review by Kreiser & Marino, 2002 or Miller & Friesen, 1983; Schilke, 2014). Consequently, for the sake of simplicity, we will stick to the latter wording, i.e., “environmental dynamism”, for the rest of our study.

Given the widespread usage of measures of environmental dynamism in management control research (Luft & Shields, 2003; Otley, 2016), there have developed various different conceptualizations of environmental dynamism. To get a better understanding of frequently applied conceptualizations, we searched for articles drawing on the concept in the four most frequently chosen outlets for high-quality management accounting survey research according to van der Stede et al. (2005) (i.e., the *European Accounting Review*, *Accounting, Organizations and Society*, the *Journal of Management Accounting Research* and *Management Accounting Research*). We restricted this search to survey-based articles since our study is survey-based, too, and the opportunities for measuring environmental dynamism are closely related to the way of data collection in empirical studies. Put differently, archival studies usually have to rely on rather crude proxies for environmental dynamism, whereas survey studies have the chance to

ask respondents for their assessments of several individual items of environmental uncertainty. We found a total of 28 such survey studies. Please see Appendix Section D Table A 1 for a list and a brief summary of the main findings of these articles regarding environmental dynamism. Our selection shows that articles can be classified in terms of how many dimensions their measure of environmental dynamism has. With the number of dimensions, we refer to how many variables were entered into the respective articles' main analyses, such as regression analyses. Note that our classification is not a distinction between single-item and multi-item measurements. In particular, most recently published studies summarized in the appendix rely on multi-item constructs but were still considered "one-dimensional" if they reduced their multiple items into one overall measure of environmental dynamism. Following this logic, we mostly found one-dimensional measurements (e.g., Bisbe & Malagueño, 2012; Braumann et al., 2020; Demartini & Otley, 2020; Grabner et al., 2018; Merchant, 1990; Otley & Pierce, 1995), only two two-dimensional measurements (Ghosh & Olsen, 2009; King et al., 2010) and likewise, only two three-dimensional measurements (Ferris, 1977; Sharma, 2002). While the measured dimensions of environmental dynamism are a methodological question, the dimensions also relate to the underlying view of environmental dynamism. That is, a one-dimensional measurement purports the notion that the influence of the environment on the organization in question is homogenous. In contrast, the seldom applied two- or three-dimensional measurements indicate an understanding that various aspects of the environment may have differing influence on the studied outcome variables.

Several of the selected articles include environmental dynamism as a moderator in the relationship between management control systems and organizational outcomes (see Bisbe & Malagueño, 2012; Braumann et al., 2020; Gul & Chia, 1994) or at least include hints on such a potentially moderating role (e.g., Demartini & Otley, 2020). However, all these studies draw on one-dimensional measures of environmental dynamism, which may unduly compress the

complexity of environmental dynamism into one dimension suggesting a homogenous influence of the environment on the studied management control phenomena and their outcomes. At the same time, several such one-dimensional measures include items that are related to stakeholders (e.g., suppliers, competitors and customers – see Braumann et al., 2020; Ezzamel, 1990; Grabner et al., 2018). These observations hint at the relevance of stakeholder groups for grasping environmental dynamism, although the complexity of such dynamism may be greatly compressed. We, therefore, suggest a multi-dimensional measurement of such dynamism that is rooted in stakeholder theory and detailed next.

D.2.3 Stakeholder Theory and Environmental Dynamism

Stakeholder theory offers a framework to capture firms' holistic environment and is found in different research disciplines, including management, marketing and business ethics (Parmar et al., 2010). Following stakeholder theory, the firm is viewed as a network of groups of stakeholders (Aguilera & Jackson, 2003). To achieve corporate goals, Freeman et al. (2010) suggest that the firm has to strategically manage its stakeholder relationships by taking into account the various stakeholder groups' needs and interests. According to Kacperczyk (2009), the firm's overall attention to its stakeholders, in particular, seems to be a determining factor in the development of firm performance.

Stakeholders can be defined as individuals or groups of individuals who affect and are affected by the firm's decisions, practices, and actions in achieving its goals (Freeman, 1984; Freeman et al., 2007; Frooman, 1999). In consequence, there can usually be observed mutual interactions between stakeholders and a particular firm (Berman et al., 1999). At the same time, stakeholder research stresses the notion that these stakeholder relations are inherently dynamic. That is, various stakeholder groups' demands, interests, or their influencing strategies may be continually changing and not necessarily in line with the demands, interests and strategies pursued by other stakeholder groups (Aaltonen & Kujala, 2016; Elias et al., 2002; Fassin, 2010;

Friedman & Miles, 2002; Kujala et al., 2012; Phillips, 2003). Such stakeholder dynamism can also be rooted in an increase in complexity by enlarging and consolidating a specific firm's network of stakeholder groups and the relationships between the individual stakeholders (Fassin, 2010; Lawrence & Weber, 2017; Rowley, 1997; Windsor, 2010). Such dynamism usually leads to individual firms' experiencing challenges in managing their relations to individual stakeholders and stakeholder groups (Beaulieu & Pasquero, 2002; Blanco-Mesa et al., 2018; Kujala et al., 2012; Windsor, 2010).

Also, we know that a wide variety of stakeholders may influence and contribute to a firm's value creation process (Berman et al., 1999; Choi & Wang, 2009; Hillman & Keim, 2001, Kassinis & Vafeas, 2006) and thus may have an impact on innovation. Not least, this influence makes stakeholders an essential factor in many firms' set of economic exchanges (Clarkson, 1995).

So we can take on board from the literature on stakeholder theory that various stakeholder groups usually have a decisive influence on a specific firm and firm innovation. At the same time, the relationships between a specific firm and its stakeholder groups may be very dynamic but not necessarily equally dynamic for all relevant stakeholder groups. From stakeholder theory, we thus infer a need to distinguish between stakeholder groups and their dynamics in more closely grasping their impact on the relationships between management control effectiveness and firm innovation.

D.2.4 The Moderating Role of Multiple Stakeholder Dimensions of Environmental Dynamism

Against the backdrop of our conclusions from Sections D.2.2 and D.2.3 and similar to past management control literature (e.g., Bisbe & Malagueño, 2012; Braumann et al., 2020; Gul & Chia, 1994), we assume a moderating role of environmental dynamism in the relationship summarized in *H1*. Unlike most of such research, we incorporate the diversity in a firm's stakeholder relationships and the variance in these relationships' dynamism as observed in prior

empirical stakeholder research (Elias et al., 2020; Fassin, 2010; Friedman & Miles, 2002; Phillips, 2003). In consequence, we do not model environmental dynamism as a unidimensional construct but as a multidimensional one. As a proxy for such multidimensional environmental dynamism, we focus on the three stakeholder groups that are acknowledged by many stakeholder theorists as being among, if not *the* three most important stakeholder groups for most profit-oriented firms: customers, suppliers, and employees (e.g., Berman et al., 2003; Buysse & Verbeke 2003; Freeman, 1984; Freeman et al., 2007, 2010; Greenwood, 2007).

Two of these stakeholder groups – customers and suppliers – are considered as *primary external* stakeholders (Buysse & Verbeke 2003). That is, these actors are stakeholders not included in the inner workings of a firm, thus external, but have direct formal relationships with and influence on a firm, thus primary (Buysse & Verbeke 2003; Greenwood, 2007). Sources of a relatively high relational dynamism between a firm and its customers and suppliers can usually be observed in markets with short product lifecycles, rapid technological change, intense competition, swiftly changing customer wants and needs and less stable demands for goods provided by suppliers (Johnson et al., 2004; Otley, 2016).

Past management research shows that in such dynamic environments, firms respond to changing conditions by exhibiting strategic flexibility (Perez-Valls et al., 2016). As part of such flexibility, Wang and Li (2008) found that firms in dynamic environments need to adapt their corporate capabilities to “be able to keep up with the frequent changes in product and technological conditions” (p. 930). In consequence, in dynamic environments, firms may need to adapt their corporate objectives more frequently than firms in less dynamic and more stable environments (Baines & Langfield-Smith, 2003). To be able to have effective control systems in response to such change, firms in dynamic environments would need to adapt their control systems equally quickly to be able to effectively control the changed objectives, too. However, we know from research on management accounting change that such change is usually slow

and rather reactive (e.g., Johansson & Siverbo, 2009; Ribeiro & Scapens, 2006; Sulaiman & Mitchell, 2005). Indeed, this is why Baines & Langfield-Smith (2003) have included a time lag of up to three years in their survey research design to account for the time lags between changes in the environment and the adoption of management accounting and control practices. We thus posit that if firms need to frequently change their corporate objectives in response to environmental dynamism, closely linking corporate objectives to control systems may not be beneficial to organizational ambidexterity as firms may end up using old control systems while having established new objectives. This thinking is similar to Demartini and Otley (2020), who have argued that closely coupling control systems with each other may be less beneficial in dynamic environments since too tight coupling leaves little room to change control systems in tandem with changing environments. Since effective control systems are conceptually defined as reflecting a close linking between corporate objectives and control systems (Bedford et al., 2016; Demartini & Otley, 2020), we hypothesize that in situations of low customer and supplier relational dynamism, management control effectiveness is more beneficial for reaching high levels of ambidexterity than in situations of high customer and supplier relational dynamism:

Hypothesis 2 (H2). The relationship suggested in H1 is more pronounced for situations of low customer relational dynamism.

Hypothesis 3 (H3). The relationship suggested in H1 is more pronounced for situations of low supplier relational dynamism.

Employees, too, feature direct formal relationships with and exert influence on a firm, but unlike customers and suppliers, employees are included in the inner workings of a firm and are thus usually considered as *primary internal* stakeholders (Buysse & Verbeke 2003). At the same time, employee relations can be rather stable or dynamic and thus be a source of environmental dynamism. For instance, firms may experience more employee relational

dynamism if employee turnover is high (e.g., Carley, 1992).

In situations of high employee relational dynamism, however, effective management control systems may be particularly useful. As defined above, management control systems steer employee behavior in a direction that is aligned with their employing firms' corporate goals (Malmi & Brown, 2008). If there is high employee dynamism, it can be expected that employee turnover will be high, too, and that new employees enter and leave the firm more frequently than in environments with more stable employee relations. If corporate objectives are well reflected in control systems, and thus management control systems are effective, we theorize that in situations of high employee relational dynamism, new entrants to the firm will find it easier to align their behavior with corporate strategy since control systems and strategic objectives are in sync. So new employees can orient themselves along these management control systems and their motivation and performance can be expected to benefit (Malmi & Brown, 2008; Merchant & van der Stede, 2017). In consequence, new employees will sooner be able to contribute positively to reaching corporate objectives, which should benefit organizational ambidexterity.

Otherwise, if employee relational dynamism is high and management control effectiveness is low, new employees enter the firm frequently but may be confused by control systems and corporate objectives being not well aligned. In the latter situation, we can expect that organizational ambidexterity will suffer due to new employees needing more time – if they manage at all – to adapt their behavior in line with corporate strategy.

In situations of low employee relational dynamism, effective management control systems as proposed in *HI*, can be expected to be beneficial, too. However, since in such situations there is lower employee turnover and employee relations are more stable, incumbent employees may receive less of a benefit from effective control systems. After some time with the firm, they are likely to understand well how their behavior can be aligned with corporate strategy (Merchant

& van der Stede, 2017). That is, the guidance offered by effective control systems to new employees will be less beneficial than for long-standing employees. This is why effective control systems can be expected to be less important in situations of stable employee relations and more important in situations of dynamic employee relations:

Hypothesis 4 (H4). The relationship suggested in H1 is more pronounced for situations of high employee relational dynamism.

Figure D-1 visualizes our research model and summarizes our hypotheses. As can be seen from this figure, we expect a differing influence of these three stakeholder-related dimensions of environmental dynamism on the direct effects proposed in H1. While we expect that low customer relational dynamism (H2) and low supplier relational dynamism (H3) will make the relationship expressed in H1 more pronounced, we expect the opposite for employee relational dynamism (H4).

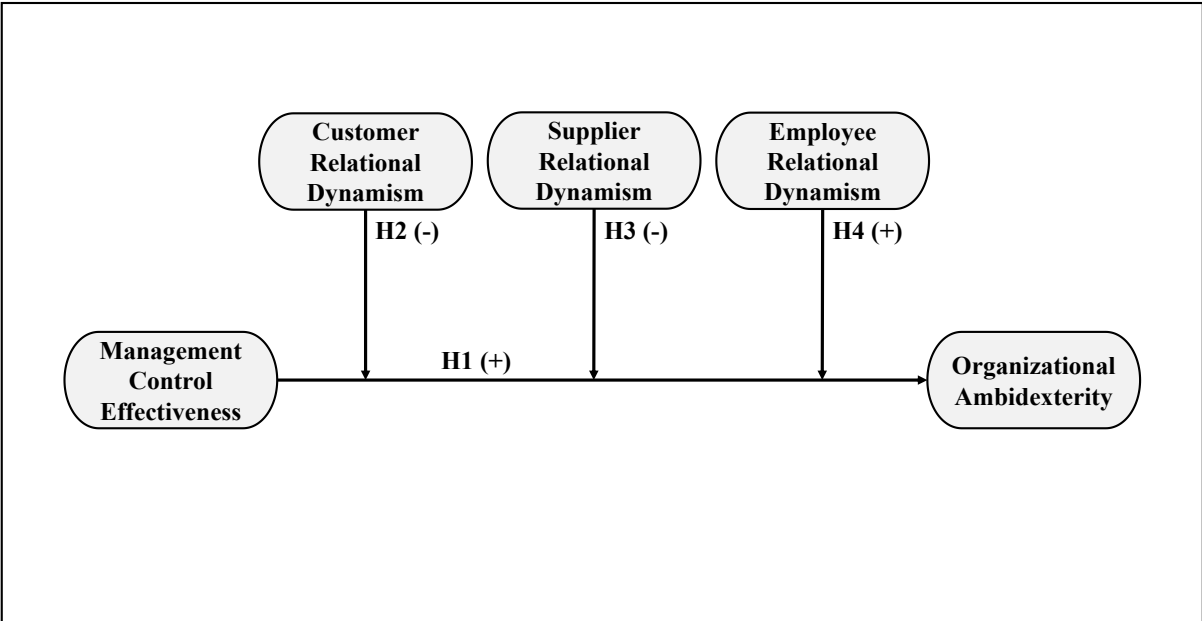


Figure D-1. Research model

D.3 Methods

D.3.1 Empirical Strategy

To test our hypotheses, we first conducted a survey among Chief Executive Officers (CEOs) of

German firms in 2020, where we found some confirmation for our hypotheses. The total number of observations in this first study (i.e., 139) was comparable to other well-published management accounting research (e.g., De Harlez & Malagueno, 2016; Voußem et al., 2016) but could still be regarded as rather small. Not least to such limited sample sizes, accounting researchers have recently criticized that many of our published research results may be limited in their external validity, have never been replicated or validated in other cultural contexts and have thus called for more replication studies in accounting research (e.g., Brügger et al., 2021; Hail et al., 2020). To validate our research results, we thus opted to conduct a second survey among finance and accounting personnel working in the U.S. in 2021 and adopted new tests for replication evidence that emanate from psychological research (Bonett, 2021). In the following, we refer to the study among German top managers as “Study 1” and the survey among finance and accounting personnel in the U.S. as “Study 2”. We first describe our data collection procedures for these two studies in Section D.3.2. We then detail our variable measurement in Section D.3.3, which has been used in both studies, before we discuss the two tests that we will use to examine our replication evidence in Section D.3.4.

D.3.2 Empirical Settings and Samples

D.3.2.1 Study 1, Germany

The first survey study targeted German non-financial Mittelstand firms (firms with up to 3,000 employees, see Becker et al., 2008) that were located close to the sponsoring university’s location since research on survey studies in entrepreneurial firms shows that such geographical closeness promises higher response rates (Bartholomew & Smith, 2006). Similar to other management accounting research based on German firms (e.g., Heinicke et al., 2016; Erhart et al., 2017), we identified our target firms from the Amadeus database (Bureau van Dijk). We then conducted a manual search for the e-mail addresses of the top managers of the respective firms such as CEOs. We focused on CEOs, as it can be assumed that they are the most

knowledgeable respondents regarding firm-level phenomena we focus on in this study (Bowman & Ambrosini, 1997; Grabner, 2014; Snow & Hrebiniak, 1980; Zahra, 1991). Our final target population included a total of 1,118 Mittelstand firms.

We sent our survey invitations to the respective top managers in early July 2020. We know that response rates in management accounting research have decreased significantly in recent decades (Hiebl & Richter, 2018; van der Stede et al., 2005), and reaching top managers such as CEOs has proven especially challenging (Cycyota & Harrison, 2006). Besides drawing on our geographical proximity to the target firms, we used additional measures to ensure a solid response rate. We clearly indicated that our survey was sponsored by a university (Mellahi & Harris, 2016), sent out several reminders (Dillman et al., 2014) and offered two kinds of incentives to our participants (Singer & Ye, 2013): a detailed research report and a donation of EUR 10 to a charity of their choice, of which the respondents could choose to receive none, one, or both incentives upon completion of the questionnaire. In the end, we achieved a total of 156 partially or fully completed questionnaires and a resulting response rate of 14%. This response rate is very similar to recent management accounting studies (e.g., Baerdemaeker & Bruggeman, 2015; Braumann et al., 2020; Grabner, 2014). Due to incomplete information, we excluded 17 cases, resulting in a final sample of 139 cases with full information on all variables of interest in this study.

To measure our variables, we predominantly used established constructs from the English-language literature. Since our target group for the survey was the German Mittelstand, we translated the entire questionnaire into German. To ensure that this questionnaire was adequate in terms of comprehensibility and structure, we then conducted pretests with five academics and five practitioners (confer (cf.) Hunt et al., 1982; Reynolds & Diamantopoulos, 1998; van der Stede et al., 2005). Also, we asked an independent research colleague to translate the survey back into English (cf. Brislin, 1970; Mullen, 1995) to check the quality of our German

translations of the original English questionnaire items. Based on the feedback from pretesters and this back-translation, we slightly adapted our final German questionnaire.

We know that non-response bias can significantly influence survey studies (van der Stede et al., 2005; van Loon, 2003). Based on the idea that non-respondents are similar to late respondents (Armstrong & Overton, 1977), we thus aimed to compare the mean values between early and late respondents for the variables of interest in this study. To identify proper tests for such potential mean differences, we first performed a Kolmogorov-Smirnov to test our variables for normality. In addition, we performed a Shapiro-Wilk test because it often has more power to detect differences from normality (Field, 2018). Our results showed that only *Management Control Effectiveness* and *Organizational Ambidexterity* were normally distributed, and all other variables were not. We used the parametric T-test for *Management Control Effectiveness* and *Organizational Ambidexterity* and the non-parametric Mann-Whitney U-test for all variables except for the dichotomous variables *Strategy*, *Industry* and *Firm Size*. For these dummy variables, we used the Chi-square test. Table D-1 shows the respective results, which indicate that there are no significant differences in our variables of interest between early and late respondents. We interpret these results as having not no indication of non-response bias in our sample (Armstrong & Overton, 1977).

As detailed above, we opted for a single respondent approach targeting top managers. While this approach promises higher response rates and sample sizes (Montabon et al., 2018), it may also be prone to common-method bias (Bowman & Ambrosini, 1997; Flynn et al., 2018; Montabon et al., 2018; Speklé & Widener, 2018). Following Podsakoff et al. (2003), we thus took several measures to prevent common-method as good as possible: (1) in the questionnaire, we introduced a delay between our measures for the dependent and the independent variables, (2) we made sure that our questions were phrased simply, precisely and concisely; hence, the respondents were not confronted with complicated syntax our constructs – this was safeguarded

by mostly drawing on established constructs, by our pre-tests and by our back-translation procedures as noted above, (3) we ensured the anonymity of the respondents. In addition, we conducted a Harman's one-factor test (Podsakoff & Organ, 1986), which indicated that the likelihood of a common method bias in our data set was low since the largest factor emanating from this test only accounting for 17.14% of total variance.

Variable	Early Respondents	Late Respondents	p-value
	Mean	Mean	
Firm Size 100 – 249	.23	.14	.192
Firm Size 250 – 499	.23	.37	.356
Firm Size >499	.49	.43	.631
Manufacturing	.51	.66	.225
Retail	.11	.06	.393
Strategy	.31	.46	.220
Stakeholder Interaction Customers	5.24	4.98	.249
Stakeholder Interaction Suppliers	4.44	4.39	.841
Management Control Effectiveness	24.30	22.71	.498
Customer Relational Dynamism	1.87	2.10	.221
Supplier Relational Dynamism	1.64	1.66	.557
Employee Relational Dynamism	1.84	1.82	.586
Organizational Ambidexterity	188.01	199.73	.462

Table D-1. Comparison of the variables of the late respondents to early respondents (Study 1, Germany)

D.3.2.2 Study 2, U.S.

To validate our initial findings from Study 1 in Germany, we carried out a second survey study in the U.S. in 2021 and used MTurk for this purpose. MTurk has developed into a popular data source in psychology in the past few years (e.g., Chmielewski & Kucker, 2020; Cheung et al., 2017; Dannals et al., 2021) and has been increasingly used in management (Aguinis et al., 2021) and accounting research (e.g., Buchheit et al., 2018; Hunt & Scheetz, 2019; Kreilkamp et al., 2020) as well in recent years. Although surveys conducted via MTurk feature their own set of challenges (see below), a frequent recent application in various research fields was to replicate earlier studies drawing on different populations (e.g., Dannals et al., 2021; Israel et al., 2020). Indeed, as found by Chmielewski and Kucker (2020), MTurk can be a powerful and cost-efficient tool for replication purposes such as ours if several measures to ensure response validity are used. We will detail the measures we took to ensure data validity below.

Advice from psychological research suggests that replication studies need to adhere to some specific features. In Study 2, we specifically tried to adhere to Bonett's (2021) recently published methodological recommendations on follow-up studies for replication purposes in organizational research. According to Bonett (2021), a study can be considered as a comparable follow-up study if:

- (a) the samples from a population believed to be similar to the population used in the initial study (our Study 1),
- (b) uses the same research design and includes the same treatment conditions as in the initial study (our Study 1),
- (c) estimates the same type of effect size parameters of the population with the same control variables that were used in the initial study (our Study 1),
- (d) used the same measuring scales that were used in the initial study (our Study 1).

We could fully adhere to criteria (b), (c), and (d) by including exactly the same measures and the same regression model setups as in Study 1. However, criterion (a) is probably difficult to achieve in a study targeting CEOs, and specifically when drawing on MTurk. It seems likely that not too many CEOs of larger businesses are active on MTurk. In addition, if MTurk workers would pretend to be CEOs, questions around character misrepresentation could raise doubts about the survey results' credibility and validity (cf. Aguinis et al., 2021; Hunt & Scheetz, 2019; Sharpe Wessling et al., 2017). Consequently, we did not try to address CEOs via MTurk, but we targeted personnel working in finance and accounting functions in firms located in the U.S. We made this choice since finance and accounting personnel, too, often has insights into control practices, how a firm's strategic objectives may be operationalized and the performance of a firm relative to its peers (Merchant & van der Stede, 2017). We specifically targeted the U.S. since this country represents a different cultural environment than Germany, as called for by Brügggen et al. (2021) to replicate existing results in accounting research with data from other

cultural environments. In addition, MTurk workers located in the U.S. have been found to deliver higher data quality than from other locations and are less prone to character misrepresentation (Litman et al., 2015; Smith et al., 2016).

To ensure that our participants were in a finance or accounting role and located in the U.S., we used MTurk's additional paid filters on job function, their country of residence and a high approval rate in earlier tasks conducted on MTurk. In addition, and following Aguinis et al. (2021), we clearly communicated our target responses on the entry page to our survey. We also made clear that workers would not be paid if we found evidence that they (a) would not be working in a finance or accounting role, (b) would not work in a for-profit firm, (c) would work in the financial services sector, (4) would not pass our attention checks built into the questionnaire, (5) would not pass our consistency checks built into the questionnaire, (6) would complete the survey more than once, or (7) would be under the age of 18 years. For the attention check, we drew on the "workplace facilities" question suggested by Kung et al. (2018). If the workers failed to pass this check, they were not paid and excluded from our analyses. For the consistency check, we asked the respondents twice for their personal age: once via their year of birth and once directly for their current age (e.g., Aguinis et al., 2021). If the two numbers deviated by more than one year, those responses were not paid and excluded from further analysis. Likewise, duplicate responses by the same workers were not paid and excluded from analysis.

The MTurk workers were given 15 minutes to fill out the survey and had to complete their participation actively. During data collection and in response to decreasing responses to our survey in individual batches, we increased the remuneration between early June 2021 and late July 2021 from originally \$ 5 to \$ 10 and rebatched the survey 11 times in total. As found by Buhrmester et al. (2011) and Litman et al. (2015), such differences in payment levels do not usually affect data quality. Using these procedures, we collected a total of 320 responses.

However, due to failing one or several of the above noted conditions and checks, we declined 221 survey responses. The final MTurk sample for Study 2 thus includes 99 cases.

Similar to Study 1, we also ran a test for potential non-response biases and applied the same measures to prevent common-method bias as far as possible. Our results on potential non-response biases can be found in the Appendix Section D Table A 2, indicating no significant differences in the variables between early and late respondents. Likewise, we have no indications of common-method variance since the largest single factor emerging from Harman's single factor test only accounted for 26.77% of total variance.

D.3.3 Variable Measurement

As indicated above, the same measures were used both in Study 1 and Study 2. These multi-item constructs were measured using seven-point Likert scales and were derived exclusively from established constructs in the literature. Consequently, in line with recommendations for handling established constructs (Bedford & Speklé, 2018; Hair et al., 2019), we conducted confirmatory factor analyses (CFA) for all these measures (see Table D-2 for Study 1 and Appendix Section D Table A 3 for Study 2). Field (2018) notes that all factors with loadings above .4 can be interpreted. We calculated the average variance extracted (AVE) for the construct and reliability analyses (the AVE value should not be less than .5). A composite reliability (CR) value of at least .6 is considered acceptable (Henseler et al., 2009; Schloderer et al., 2009). Hair et al. (2019) suggest a complementary threshold of greater than or equal to .7, which all our computed values clearly exceeded (the smallest value was .763). After all these checks and – in some instances – the removal of some items, we calculated the final values for the first-order multi-item measures by computing the mean values of the underlying items. Regarding potential collinearity issues in the second-order construct *Organizational Ambidexterity*, we additionally calculated the variance inflation factors (VIFs), which were all well below suggested thresholds (Hair et al., 2019) (see Table D-2 and Appendix Section D

Table A 3).

Stakeholder Interaction Suppliers (<i>First-order construct reflectively measured</i>)		
CR = .895	AVE = .740	Factor loadings (CFA)
We involve our suppliers closely in the cooperation in development projects.		.855
We communicate intensively with our suppliers.		.863
We emphasize the firm's overall strategy through close cooperation and dialogue with our suppliers.		.862
Stakeholder Interaction Customers (<i>First-order construct reflectively measured</i>)		
CR = .808	AVE = .593	Factor loadings (CFA)
We involve our customers closely in the cooperation in development projects.		.608
We communicate intensively with our customers.		.712
We emphasize the firm's overall strategy through close cooperation and dialogue with our customers		.950
Supplier Relational Dynamism (<i>First-order construct reflectively measured; reverse coded</i>)		
CR = .851	AVE = .588	Factor loadings (CFA)
The relationship between your firm and your suppliers is ...		
Unstable – stable		.748
Short-term – long-term		.768
Unsecure – secure		.764
Unsteady – steady		.786
Customer Relational Dynamism (<i>First-order construct reflectively measured; reverse coded</i>)		
CR = .865	AVE = .621	Factor loadings (CFA)
The relationship between your firm and your customers is ...		
Unstable – stable		.910
Short-term – long-term		.852
Unsecure – secure		.742
Unsteady – steady		.617
Employee Relational Dynamism (<i>First-order construct reflectively measured; reverse coded</i>)		
CR = .919	AVE = .739	Factor loadings (CFA)
The relationship between your firm and your employees is ...		
Unstable – stable		.848
Short-term – long-term		.885
Unsecure – secure		.872
Unsteady – steady		.833
Organizational Ambidexterity (<i>Second-order construct formatively measured</i>)		
		Factor loadings (CFA)
Exploitation (Formative weight (path coefficient) = .491***; VIF = 1.339) (<i>First-order constructs reflectively measured</i>) (CR = .763; AVE = .529)		
Our firm is one that commits to improve quality and lower costs.		.733
Our firm is one that continuously improves the reliability of its products and services.		.891
Our firm is one that fine-tunes what it offers to keep its current customers satisfied.		.507
Exploration (Formative weight (path coefficient) = .659***; VIF = 1.339) (<i>First-order constructs reflectively measured</i>) (CR = .827; AVE = .555)		

Our firm is one that looks for novel technological ideas by thinking “outside the box”.	.939
Our firm is one that bases its success on its ability to explore new technologies.	.811
Our firm is one that creates products or services that are innovative to the firm.	.577
Our firm is one that looks for creative ways to satisfy the needs of customers.	.588

Note. AVE = average variance extracted; CR = composite reliability; VIF = variance inflation factor; CFA = confirmatory factor analysis.

* $p < .10$; ** $p < .05$; *** $p < .01$.

Table D-2. Construct validity of multi-item constructs (Study 1, Germany)

D.3.3.1 Dependent Variables

Organizational Ambidexterity. Consistent with previous literature, our dependent variable *Organizational Ambidexterity* was measured using the 12-item construct by Lubatkin et al. (2006). Initially, the construct included six statements each about a firm’s exploitation and exploration orientation. Consequently, we asked respondents to indicate their level of agreement with these 12 statements. We used a seven-point Likert scale from “strongly disagree” to “strongly agree”.

We operationalize *Organizational Ambidexterity* as a second-order construct, with first-order factors measured reflectively and second-order factors measured formatively (see Table D-2). First, we ran a CFA according to Field (2018) and Hair et al. (2019) for reflectively measured first-order constructs. All 12 items showed factor loadings $> .4$ and could thus be interpreted (Field, 2018). However, since the original AVE was below $.5$, we followed the recommendations by Hair et al. (2017) and analyzed the effects of deleting items to move AVE to acceptable levels. We thus removed a total of five reflective items until we reached the recommended AVE threshold of $.5$ (Hair et al., 2019).

To calculate our variable *Organizational Ambidexterity*, we followed the approach by Bedford et al. (2019). Hence, we calculated *Organizational Ambidexterity* by subtracting the absolute value of the difference between exploitation and exploration from seven. After that, we computed the product of the exploitation and exploration values. Consequently, we calculated the second-order construct value for *Organizational Ambidexterity* of a given firm i as follows:

$$\text{ORGANIZATIONAL AMBIDEXTERITY}_i = (7 - | \text{EXPLOITATION}_i - \text{EXPLORATION}_i |) *$$

EXPLOITATION_i * EXPLORATION_i.

We performed bootstrapping to determine the statistical significance of the formative weights (path coefficients) in addition to the VIF concerning potential multicollinearity problems (Hair et al., 2019). We used the repeated indicator approach by reusing the manifest indicators of the first-order constructs for the second-order construct (e.g., Braumann et al., 2020; van Riel et al., 2017). In line with Hair et al. (2019), the results show that no VIF value was above three, indicating no multicollinearity problems and that all formative weights were significant. To make the factor loadings applicable to the regression analyses, we calculated each subscale's mean of the items. *Organizational Ambidexterity* is thus scaled metrically.

D.3.3.2 Independent Variable

Management Control Effectiveness is our independent variable and is metrically scaled. Our measurement closely follows Bedford et al. (2016). These authors suggested a ratio between five priorities (Priority₁ to Priority₅) that a firm may have and the contribution that their current controlling system of the respective firm makes to achieving these priorities (Contribution₁ to Contribution₅). Again, we drew on 7-point Likert scales. We then calculated the second-order construct value for the *Management Control Effectiveness* of a given firm *i* as follows: MANAGEMENT CONTROL EFFECTIVENESS_i = \sum (PRIORITY_i * CONTRIBUTION_i) / 5.

D.3.3.3 Moderator Variables

Customer Relational Dynamism. The metric moderator variable *Customer Relational Dynamics* is based on the four-item measurement by Johnson et al. (2004) and has been applied in various other studies (e.g., Yang, 2013; Yang et al., 2008). We used a seven-point Likert scale and did not use the original relational *stability* scores but performed a reverse coding to obtain relational *dynamism*. Our CFA confirmed that all four items loaded on one factor. Also, the AVE and CR scores were adequate for this construct (see Table D-2).

Supplier Relational Dynamism. For the second moderator variable on suppliers, we adopted the

same operationalization as for customers just described. That is, we took the original customer-related measurement by Johnson et al. (2004) and replaced customers by suppliers (see Table D-2). Consequently, also this construct is based on four items, all of which loaded onto one factor according to a CFA. AVE and CR statistics exceeded the above noted thresholds (see Table D-2), and thus, the four underlying items were averaged to obtain the final variable. *Employee Relational Dynamism*. Similar to *Supplier Relational Dynamism*, we took the original measure by Johnson et al. (2004) and replaced customers with employees. Again, all four resulting items (see Table D-2) loaded onto one factor according to our CFA and the AVE and CR statistics did not indicate any problems with convergent validity or the reliability of this construct.

D.3.3.4 Control Variables

Stakeholder Interaction Customers. There are indications in the management literature that not only relational dynamism with certain stakeholder groups but also close interaction with key stakeholder groups may contribute to shaping firm-level outcomes (e.g., Berman et al., 1999; Choi & Wang, 2009; Foss et al., 2011; Smith & Umans, 2015). We thus included the three-item construct *Stakeholder Interaction Customers* by Foss et al. (2011) in our analyses. After having conducted a CFA and making sure that all three items loaded onto one factor, we calculated the AVE and CR values which signaled adequate convergent validity and internal consistency (see Table D-2).

Stakeholder Interaction Suppliers. Similar to *Stakeholder Interaction Customers*, we also took on board *Stakeholder Interaction Suppliers*. For measuring this construct, we amended the original customer-oriented measurement by Foss et al. (2011) and replaced customers with suppliers in all three underlying items (see Table D-2). The CFA indicated unidimensionality. Also, the calculated AVE and CR values seemed adequate (see Table D-2).

Firm Size. The management accounting literature on small businesses indicates that such firms

often feature less formal control systems as compared to larger firms and may also use these control systems for different purposes (e.g., Lavia Lopez & Hiebl, 2015; Pelz, 2019), which might affect the effectiveness of these control systems and their firm-level effects. Likewise, small businesses might have less resources for exploratory activities than large firms, potentially affecting their ability to reach high levels of *Organizational Ambidexterity* (Kim & Atuahene-Gima, 2010; Zhang et al., 2017). Earlier survey-based accounting research has frequently measured *Firm Size* by the number of employees (e.g., Bisbe & Malagueño, 2012; Burkert & Lueg, 2013; Sharma, 2002) and we follow this tradition. Similar to Speckbacher and Wentges (2012), we measured *Firm Size* with the help of the following three dichotomous variables (firms with less than 100 employees served as the reference class):

- *Firm Size 100 – 249*: coded as “1” if the firm had more than 99 and less than 250 employees;
- *Firm Size 250 – 499*: coded as “1” if the firm had more than 249 and less than 500 employees;
- *Firm Size > 499*: coded as “1” if the firm had more than 499 employees.

Industry. Past research has indicated that a firm’s industry might affect its abilities to reach high levels of *Organizational Ambidexterity* (He & Wong, 2004) which is why we control for Industry, too. Similar to other accounting research drawing on survey data (e.g., Burkert & Lueg, 2013), we operationalized a firm’s main industry affiliation using two dummy variables (firms with primary affiliations in industries served as the reference class):

- *Retail*: coded as “1” if the respondents chose the retail industry as the main industry where their firm was active in;
- *Manufacturing*: coded as “1” if the respondents chose the manufacturing industry as the main industry where their firm was active in.

Strategy. Finally, there are also indications in the literature that a firm’s strategic orientation

may influence its ability to reach ambidexterity (e.g., Menguc & Auh, 2008). To measure *Strategy*, we drew on the two widely used (e.g., Lamminmaki, 2008; Snow & Hrebiniak, 1980; Yuan et al., 2020) strategic archetypes of prospectors and defenders (Miles et al., 1978). In our questionnaire, we presented participants with two types of firms, one corresponding to the defender strategy and the other to the prospector strategy. On this basis, the participants had to decide which of the two situations best suited their firm. In consequence, the dichotomous variable *Strategy* was coded as “1” for prospectors and as “0” for defenders.

D.3.4 Applied Types of Replication Evidence

In a recent methodological piece, Bonett (2021) suggests two new types for replication evidence adopted from psychology to be applied to organizational studies. In particular, these new tests are motivated by the observation that too often, scholars in organizational studies have assumed that non-replication evidence would be given if the initial study came up with significant results and the follow-up study failed to reproduce the same significant results. However, as detailed by Bonett (2021, page (p.) 514), this thinking is faulty “because a statistically nonsignificant result in a follow-up study does not provide evidence of a null effect (i.e., a failure to reject the null hypothesis does not imply that the null hypothesis is true).” In consequence, Bonett (2021) suggests that organizational scholars should take advantage of recent advancements in psychology, which as a field has more strongly engaged with replication tests in the past few years given the alleged “replication crisis” in psychology (Maxwell et al., 2015; Shrout & Rodgers, 2018). In particular, Bonett (2021) suggests two adequate types of replication evidence and their testing, both of which will be applied below. Before that, we will briefly introduce the thinking behind these types of replication evidence.

D.3.4.1 Strong Effect Size Replication

The first type of replication evidence we apply is strong effect size replication. This type of replication evidence rests on equivalence tests (Bonett, 2021). Equivalence tests have now been

applied in pharmacokinetics and other fields such as psychology for many years or even decades (Counsell & Cribbie, 2015) but are still rarely found in business-related research fields (e.g., Stoker et al., 2019).

In general, equivalence tests rest on the assumption that parameters from individual studies “are similar enough that there is no practical consequence to assuming that they are equal” (Counsell & Cribbie, 2015, p. 294). In order to determine equivalence between the parameters from two studies, the researcher has to select an interval ($-\delta$ as lower bound, δ as upper bound). The distance between zero and these bounds are called the range of practical equivalence (Bonett, 2021), in which a parameter difference between two studies can be viewed as insignificant if it is situated within the selected interval (Counsell & Cribbie, 2015). The null hypothesis H_0 can be accepted if the difference between two parameters lies outside this predefined equivalence interval. The alternative hypothesis H_1 is that the effect size lies within the equivalence interval (Counsell & Cribbie, 2015, Bonett, 2021). Thus, this procedure basically flips the traditional null hypothesis testing framework “on its head” because “in classic null hypothesis testing, the null hypothesis is that there is no difference, but in equivalence testing, the null hypothesis is that there is a certain difference” (Dick et al., 2019, p. 699). In this paper, we apply this test by comparing the equivalence of standardized regression coefficients (β) between Study 1 and Study 2. To accept replication evidence, the differences between the regression coefficients need to be small enough to fall within the pre-defined interval and can thus be considered as practically irrelevant (Bonett, 2021).

In choosing an appropriate range of practical equivalence, we followed the suggestions by Bonett (2021) and Cohen (1988). For relatively small sample sizes, which applies to both our Studies 1 and 2, they suggest a liberal range of practical equivalence that can be defined as half the difference between Cohen’s (1988) suggestions on large (.8) and small (.2) standardized mean differences. That is, in our two studies with small samples sizes, δ can be defined as (.8

$-.2) / 2 = .3$, and thus $-\delta$ as $-.3$ (Bonett, 2021). For the confidence intervals (CIs), we relied on an α level of $.1$ and a 90% CI since the lowest level for regression coefficients to be regarded as significant in comparable management accounting survey studies is regularly set at $.1$ (e.g., Bedford et al., 2016; Braumann et al., 2020; Heinicke et al., 2016; Erhart et al., 2017). If the differences between the standardized regression coefficients between Study 1 and Study 2 and their accompanying 90% CIs fall entirely within the bounds of practical equivalence (between $-.3$ and $.3$), we reject the null hypothesis, conclude practical equivalence and thus view this result as evidence of strong effect-size replication (Bonett, 2021).

D.3.4.2 Directional Replication

The second type of replication evidence suggested by Bonett (2021) is directional replication. Here, the two parameters to be compared need to be both above or below 0 and their CIs need to exclude 0. In our case, this means that the standardized regression coefficients of the respective effects both need to be above or below 0 and their 90% CIs need to exclude 0. If both conditions are met, we can ascertain directional replication evidence between the two studies (Bonett, 2021).

D.4 Data Analysis and Results

In Sections D.4.1 and D.4.2, we present the results from Study 1 since this was the earlier study we conducted and where we found some confirmation for our above hypotheses. We then turn to the tests for the two types of replication evidence as suggested by Bonett (2021), where we compare the respective results between Study 1 and Study 2 to check whether the significant results we found in Study 1 (Germany) also hold in Study 2 (U.S.). That is, we do not display the individual results in this section, but these can be obtained from the appendix (see Appendix Section D Table A 2 through Appendix Section D Table A 6).

D.4.1 Descriptive Results and Correlations (Study 1, Germany)

Table D-3 shows descriptive results on all variables included in our analyses and Table D-4

presents a correlation matrix for these variables. Since the different variables have different scaling levels, we applied different measures of association between the variables (see the Notes to Table D-4). From Table D-4, we conclude that all correlation values have values (well) below the threshold of .7 (Dormann et al., 2013); hence, from this correlation matrix, we had not indications pointing to multicollinearity issues.

Variables	N	Mean	Min	Max	Median	SD
Firm Size 100 – 249	139	.28	.00	1.00	.00	.45
Firm Size 250 – 499	139	.25	.00	1.00	.00	.44
Firm Size >499	139	.40	.00	1.00	.00	.49
Manufacturing	139	.59	.00	1.00	1.00	.49
Retail	139	.09	.00	1.00	.00	.28
Strategy	139	.46	.00	1.00	.00	.50
Stakeholder Interaction Customers	139	5.04	1.67	7.00	5.00	1.23
Stakeholder Interaction Suppliers	139	4.40	1.00	7.00	4.67	1.40
Management Control Effectiveness	139	23.52	2.20	49.00	24.40	9.48
Customer Relational Dynamism	139	2.12	1.00	5.50	2.00	.87
Supplier Relational Dynamism	139	1.77	1.00	5.00	1.75	.70
Employee Relational Dynamism	139	1.87	1.00	5.50	2.00	.85
Organizational Ambidexterity	139	190.96	37.78	343.00	193.67	68.29

Note. N = total number of cases; SD = standard deviation.

Table D-3. Descriptives (Study 1, Germany)

Variables	N	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Firm Size 100 – 249	139	1												
2 Firm Size 250 – 499	139	-.362	1											
3 Firm Size >499	139	-.513	-.477	1										
4 Manufacturing	139	-.033	-.123	.088	1									
5 Retail	139	.093	-.001	-.044	-.369	1								
6 Strategy	139	-.031	.162	-.053	-.022	.127	1							
7 Stakeholder Interaction Customers	139	.020	.004	-.038	.260	-.135	.112	1						
8 Stakeholder Interaction Suppliers	139	.087	.030	-.100	.177	.048	.079	.514	1					
9 Management Control Effectiveness	139	.075	.071	-.084	.051	-.071	.115	.292	.173	1				
10 Customer Relational Dynamism	139	-.005	.071	-.018	-.173	-.036	-.179	-.311	-.369	-.058	1			
11 Supplier Relational Dynamism	139	-.038	.135	-.035	-.101	.030	-.016	-.127	-.183	.016	.519	1		
12 Employee Relational Dynamism	139	-.020	-.002	.008	-.179	.026	-.089	-.264	-.228	-.058	.402	.410	1	
13 Organizational Ambidexterity	139	-.053	-.044	.034	.185	-.099	.290	.432	.275	.265	-.264	-.152	-.155	1

Note. N = total number of cases; *Pearson* correlation coefficients are used for correlations between metric variables; *Phi* values are used between dichotomous variables; *Point-biserial* correlation coefficients are used for correlations between metric and dichotomous variables (for further information, see Field, 2018). Correlations significant at $p < .10$ are marked in bold.

Table D-4. Correlation matrix (Study 1, Germany)

D.4.2 Multiple Regression Analyses (Study 1, Germany)

Table D-5 shows our multiple regression analysis to test our hypotheses on Study 1 data. Since these hypotheses include the dependent variable (*Organizational Ambidexterity*), we performed one regression analysis with three individual models. The first model in Table D-5 only included control variables, the second model additionally included the direct effects of interest and the third model added the interaction terms. For computing these interaction terms, we relied on a grand mean centering approach of the variables included in the respective terms (Hair et al., 2019; Cronbach, 1987).

In all three models, we included VIFs to unveil potential collinearity issues. The largest VIF we observed was 4.532 and thus well below the threshold of 10 (Dormann et al., 2013; Hair et al., 2019). Hence, also from the regression model, we did not have an indication that our results would suffer from multicollinearity.

Since our sample size is rather small, we checked whether our regression analyses hold sufficient statistical power. In the case of 15 independent variables as in the full regression model in Table D-5, Hair et al. (2019) suggest a minimum sample size of $N = 75$ ($15 * 5$), while Khamis and Kepler (2010) suggest a minimum sample size of $N = 95$ ($15 * 5 + 20$). Our sample size ($N = 139$) clearly exceeds both thresholds; hence, we assume that our analysis holds sufficient statistical power.

In all three models displayed in Table D-5, the same four control variables (*Firm Size 100 – 249*, *Firm Size 249 – 499*, *Strategy*, *Stakeholder Interaction Customers*) emerge as being significantly related to *Organizational Ambidexterity*. These results suggest that in our sample, smaller firms with less than 100 employees, firms following a prospector strategy and firms with more intense customer interaction seem to reach higher levels of ambidexterity.

Regarding our variables of interest, in Models 2 and 3 in Table D-5, we found a significant positive effect of *Management Control Effectiveness* on *Organizational Ambidexterity*, which

supports *H1*. In addition, the results in Model 3 of Table D-5 support hypotheses *H2* and *H4* but do not support hypothesis *H3*. That is, in the interaction terms *Management Control Effectiveness * Customer Relational Dynamism (H2)* and *Management Control Effectiveness * Employee Relational Dynamism (H4)* emerge from our analyses as significantly related to *Organizational Ambidexterity*, while the interaction term *Management Control Effectiveness * Supplier Relational Dynamism (H3)* is not significant in Model 3 of Table D-5. To summarize the results of Study 1, only the direct effect of *Management Control Effectiveness* on *Organizational Ambidexterity* and thus hypothesis *H1* could be confirmed. Likewise, the moderating role of *Supplier Relational Dynamism* in the relationship between *Management Control Effectiveness* and *Organizational Ambidexterity* was not supported by our data, which is why we need to reject hypothesis *H4*, too. However, as detailed above, the moderating role of *Customer Relational Dynamism* and *Employee Relational Dynamism* as proposed in hypotheses *H2* and *H4* was supported for the dependent variable in Study 1.

Similar to other accounting studies (e.g., Cardinaels, 2008; Klein & Speckbacher, 2020), we performed a simple slope analysis as suggested by Aiken and West (1991) to further interpret these significant interaction terms (see Figure D-2 and Figure D-3). This way, we wanted to check whether the shape and meaning of the simple slopes were supporting our hypotheses. This slope analysis is based on the following simple regression equation:

$$Y = (b_1 + b_3 Z) X + (b_2 Z + b_0)$$

where b_0 = constant; b_1 = regression coefficient of the independent variable; b_2 = regression coefficient of the moderator variable; b_3 = regression coefficient of the interaction term; X = independent variable; Y = dependent variable; Z = moderator variable (Aiken & West, 1991; Lam et al., 2019). As suggested by Aiken and West (1991), we have centered all variables so that the mean value of each variable takes the value 0. We then performed another regression analysis with all centered variables (control variables, main effects, and interaction effects).

Afterwards, we used values greater than one standard deviation (+ 1SD, high) and less than one standard deviation (- 1SD, low) from the mean of each X and Z variable for the plot. Finally, we calculated the T-test for the simple slopes to check whether the simple regression lines differed from 0 (Aiken & West, 1991; Dawson & Richter, 2006).

Figure D-2 shows that the solid black line representing a low level of *Customer Relational Dynamism* has a significant positive slope ($t = 3.469$, $p < .01$) and represents a positive relationship between *Management Control Effectiveness* and *Organizational Ambidexterity*. As can be seen from Figure D-2, this solid black line is steeper than the solid grey line, indicating that the relationship between *Management Control Effectiveness* and *Organizational Ambidexterity* is more pronounced for low levels of *Customer Relational Dynamism*. The dashed line in Figure D-2 represents a high level of *Customer Relational Dynamism* and even has a negative but insignificant slope ($t = -.876$, $p > .1$). To summarize, from Figure D-2, hypothesis *H2* is supported. We can thus conclude from Study 1 that the relationship between *Management Control Effectiveness* and *Organizational Ambidexterity* is more pronounced in situations of low *Customer Relational Dynamism*.

Moving to hypothesis the plots regarding hypothesis *H4*, Figure D-3 shows that the solid black line representing a low level of *Employee Relational Dynamism* has a slightly negative but insignificant slope ($t = -.068$, $p > .1$), while the dashed line representing a high level of *Employee Relational Dynamism* has a significant positive ($t = 2.876$, $p < .01$) and a much steeper slope than the slopes on the two other levels of *Employee Relational Dynamism*, which supports *H4*. To summarize the conclusion from Figure D-3, the plot confirms that the effect of *Management Control Effectiveness* on *Organizational Ambidexterity* is more pronounced in situations of high *Employee Relational Dynamism*. This finding confirms hypothesis *H4* for Study 1.

<i>Dependent Variable</i>	<i>Organizational Ambidexterity</i>											
	Model 1				Model 2				Model 3			
<i>Independent Variables</i>	Stand. β [90% CI]	t value	p value	VIF	Stand. β [90% CI]	t value	p value	VIF	Stand. β [90% CI]	t value	p value	VIF
Constant		3.028	.003			2.609	.010			2.342	.021	
<i>Control variables</i>												
Firm Size 100 – 249	-.246 [-.490, -.001]	-1.666	.098*	3.942	-.260 [-.508, -.013]	-1.746	.083*	4.061	-.255 [-.496, -.013]	-1.747	.083*	4.119
Firm Size 250 – 499	-.269 [-.510, -.027]	-1.845	.067*	3.848	-.271 [-.517, -.025]	-1.827	.070*	4.027	-.259 [-.499, -.019]	-1.790	.076*	4.063
Firm Size >499	-.190 [-.448, .067]	-1.223	.223	4.382	-.194 [-.453, .065]	-1.242	.217	4.461	-.196 [-.450, -.057]	-1.284	.201	4.532
Manufacturing	.040 [-.098, .179]	.481	.632	1.270	.039 [-.100, .179]	.468	.641	1.297	.053 [-.083, .189]	.646	.519	1.311
Retail	-.065 [-.201, .072]	-.787	.433	1.225	-.056 [-.193, .081]	-.680	.497	1.241	-.030 [-.163, .103]	-.374	.709	1.254
Strategy	.281 [.153, .408]	3.648	.000***	1.074	.259 [.130, .389]	3.318	.001***	1.117	.240 [.113, .366]	3.146	.002***	1.126
Stakeholder Interaction Customers	.335 [.187, .484]	3.744	.000***	1.455	.288 [.133, .442]	3.081	.003***	1.591	.308 [.157, .459]	3.378	.001***	1.613
Stakeholder Interaction Suppliers	.087 [-.060, .233]	.981	.329	1.419	.060 [-.091, .211]	.655	.514	1.516	.065 [-.081, .212]	.740	.461	1.520
<i>Main effects added</i>												
Management Control Effectiveness					.156 [.026, .286]	1.981	.050*	1.131	.140 [.012, .267]	1.819	.071*	1.143
Customer Relational Dynamism					-.056 [-.216, .103]	-.585	.560	1.699	.000 [-.158, .158]	.002	.998	1.758
Supplier Relational Dynamism					-.054 [-.206, .097]	-.592	.555	1.525	-.072 [-.220, .076]	-.806	.422	1.540
Employee Relational Dynamism					.016 [-.127, .158]	.184	.854	1.347	.013 [-.128, .153]	.149	.882	1.387
<i>Interaction effects added</i>												
Management Control Effectiveness * Customer Relational Dynamism									-.273 [-.426, -.120]	-2.963	.004***	1.647
Management Control Effectiveness * Supplier Relational Dynamism									.121 [-.025, .268]	1.376	.171	1.511
Management Control Effectiveness * Employee Relational Dynamism									.186 [.035, .337]	2.036	.044**	1.614
R²			.282				.310				.366	
Adjusted R²			.238				.244				.288	
F			6.398***				4.715***				4.728***	
N			139				139				139	

Note. VIF = variance inflation factor; CI = confidence interval. R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases; Stand. β = standardized regression coefficient β .
* $p < .10$; ** $p < .05$; *** $p < .01$.

Table D-5. Hierarchical regression analysis with Organizational Ambidexterity as dependent variable (Study 1, Germany)

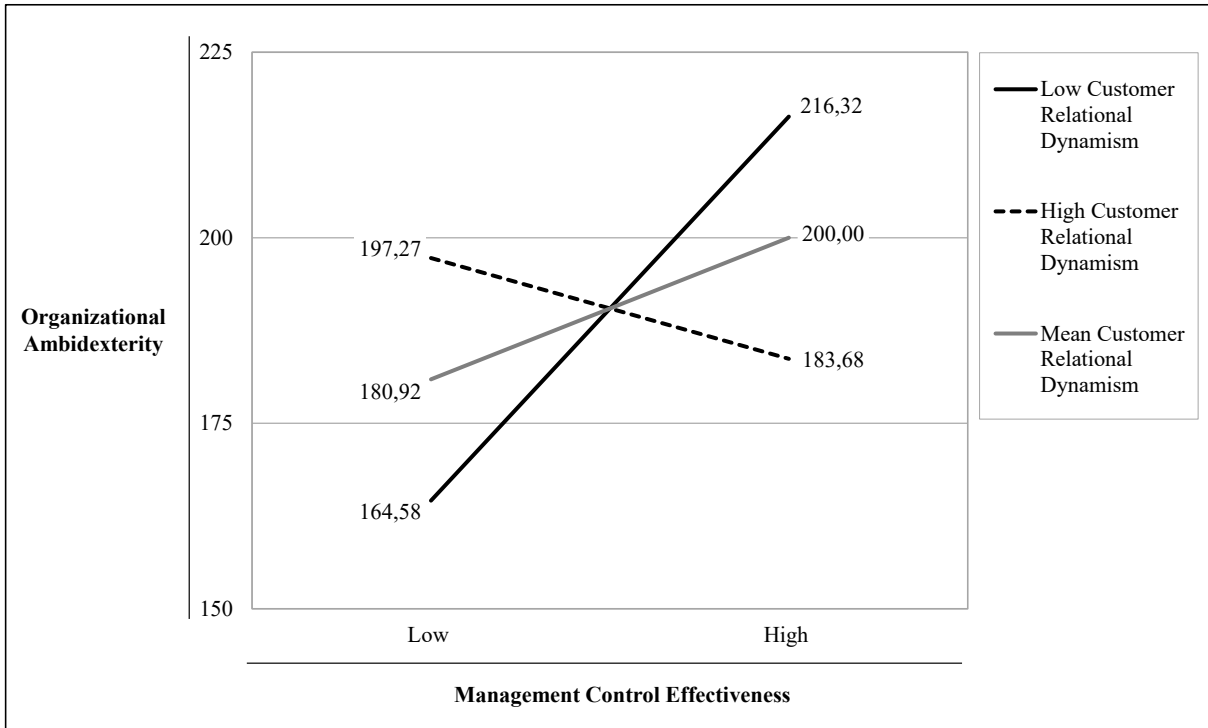


Figure D-2. Interaction effect between Customer Relational Dynamism and Management Control Effectiveness on Organizational Ambidexterity (Study 1, Germany)

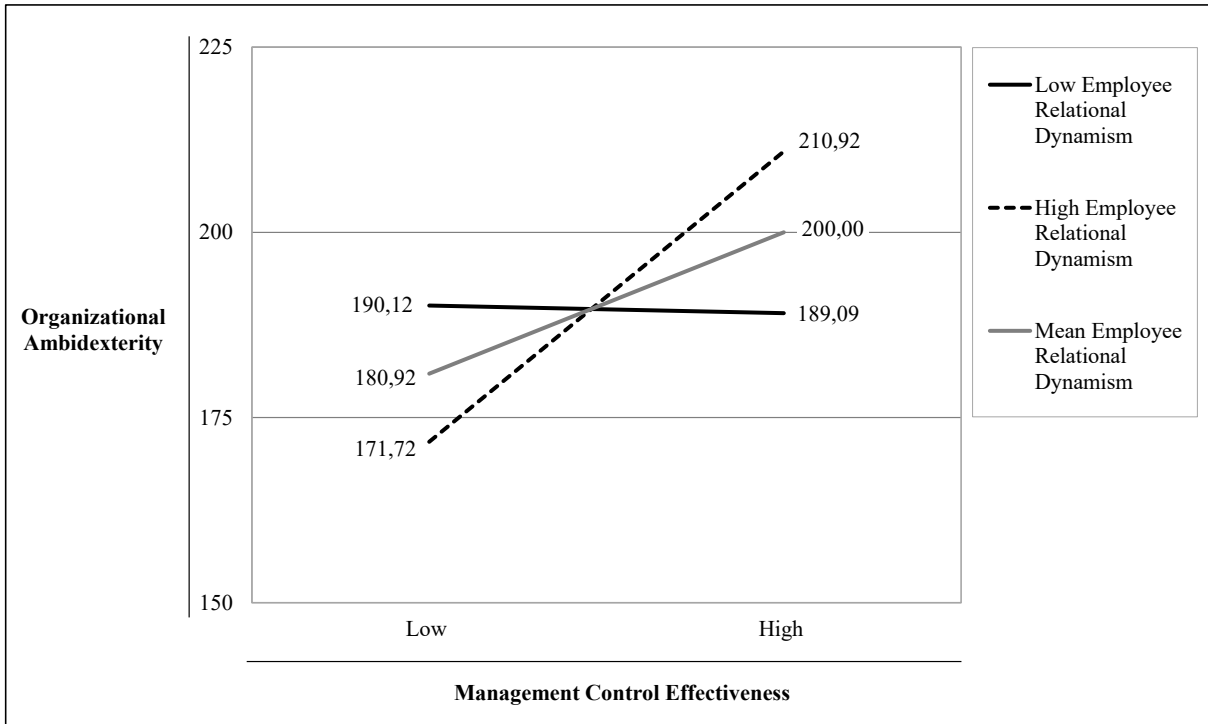


Figure D-3. Interaction effect between Employee Relational Dynamism and Management Control Effectiveness on Organizational Ambidexterity (Study 1, Germany)

Effects [hypothesis]	Study	Stand. regression coefficient β [90% CI]	Stand. regression coefficient differences $\beta_1 - \beta_2$ [90% CI]	Strong effect size replication details	Strong effect size replication confirmed	Directional replication details	Directional replication confirmed
Management Control Effectiveness \rightarrow Organizational Ambidexterity [H1]	Germany	.140 [.012, .267]		H ₁ assumed ($\beta_1 - \beta_2$ 90% CI is completely within the equivalence bounds $\delta = -.3$ and $\delta = .3$)	✓	H ₁ assumed (β_1 90% CIs > 0 and β_2 90% CIs > 0)	✓
Management Control Effectiveness \rightarrow Organizational Ambidexterity [H1]	U.S.	.172 [.002, .342]	-.032 [-.075, .010]				
Management Control Effectiveness * Employee Relational Dynamism \rightarrow Organizational Ambidexterity [H4]	Germany	.186 [.035, .337]		H ₁ assumed ($\beta_1 - \beta_2$ 90% CI is completely within the equivalence bounds $\delta = -.3$ and $\delta = .3$)	✓	H ₀ assumed	✗
Management Control Effectiveness * Employee Relational Dynamism \rightarrow Organizational Ambidexterity [H4]	U.S.	-.015 [-.167, .137]	.201 [.200, .202]				
Management Control Effectiveness * Customer Relational Dynamism \rightarrow Organizational Ambidexterity [H2]	Germany	-.273 [-.426, -.120]		H ₀ assumed	✗	H ₀ assumed	✗
Management Control Effectiveness * Customer Relational Dynamism \rightarrow Organizational Ambidexterity [H2]	U.S.	.041 [-.111, .192]	-.314 [-.315, -.312]				
Management Control Effectiveness * Supplier Relational Dynamism \rightarrow Organizational Ambidexterity [H3]	Germany	.121 [-.025, .268]		H ₁ assumed ($\beta_1 - \beta_2$ 90% CI is completely within the equivalence bounds $\delta = -.3$ and $\delta = .3$)	✓	H ₀ assumed	✗
Management Control Effectiveness * Supplier Relational Dynamism \rightarrow Organizational Ambidexterity [H3]	U.S.	-.159 [-.306, -.012]	.280 [.280, .281]				

Note. CI = confidence interval; standardized regression coefficients β and 90% confidence intervals (equivalence bounds $\delta = -.3$ and $\delta = .3$) for 8 effects (hypotheses) for two studies (Germany, U.S.). To prove a directional replication, both null hypotheses H₀: $\beta_1 = 0$ and H₀: $\beta_2 = 0$ must be rejected and the same directional alternative hypotheses H₁ (β_1 90% CIs > 0 and β_2 90% CIs > 0 or β_1 90% CIs < 0 and β_2 90% CIs < 0) assumed (Bonett, 2021). To prove a strong effect size replication (equivalence test), the resulting CI has to fall entirely within the bounds of the equivalence interval; hence we can conclude practical equivalence (have evidence of strong effect-size replication, H₁ assumed) and reject the null hypothesis H₀ (if CI is completely outside the bounds of the equivalence interval) (Bonett, 2021)

Table D-6. Replication evidence

D.4.3 Results on Replication Evidence

We now turn to our tests whether the significant results from Study 1 could be validated by our replication Study 2. Our tests on the two types of replication evidence as detailed in Section D.3.4 are displayed in Table D-6. The significant direct effect of *Management Control Effectiveness* on *Organizational Ambidexterity* as proposed in hypothesis *H1* is supported by both types of replication evidence. Not just in Study 1 but also in Study 2, the standardized regression coefficient for *Management Control Effectiveness* is positive and the 90% CI excludes 0, which signals directional replication (Bonett, 2021). In addition, the difference between the 90% CIs for the standardized regression coefficient of *Management Control Effectiveness* fully lies within the set range of practical equivalence, which signals strong effect size replication (Bonett, 2021).

For the moderating role of *Employee Relational Dynamism* in the relationship between *Management Control Effectiveness* and our dependent variable (*Organizational Ambidexterity*) only strong effect size replication could be confirmed, but not directional replication. Classified via Bonett's (2021) three types of inconclusive replication evidence, we thus see "inconclusive directional nonreplication" for this interaction term. As argued by Bonett (2021), such replication results have traditionally been interpreted as a replication failure, but actually, they are only reflecting inclusive replication evidence. In our case, Study 1 found a significant effect for this interaction term, while from Study 2, this term did not emerge as significant (see Appendix Section D Table A 6). A reason for this inconclusive replication evidence could be that in Study 2, the "small sample [was] too small" (see Bonett, 2021, p. 524). Nevertheless, since strong effect size replication is given for the moderating role of *Employee Relational Dynamism*, we still see some confirmation for hypothesis *H4* from both studies.

In a similar way, the replication evidence for the moderating role of *Customer Relational Dynamism* as suggested in *H2* is inconclusive. Also, for the interaction term *Management*

*Control Effectiveness * Customer Relational Dynamism*, we see from Table D-6 that the 90% CIs of the standardized regression coefficients include 0, which again points to “inconclusive directional nonreplication” as put by Bonett (2021). In addition, the differences between the CIs for these CIs lie fully without the range of practical equivalence (below -.3 for both dependent variables). The latter replication result points to “strong effect-size nonreplication” as of Bonett (2021). Such nonreplication evidence does not suggest “that the results of the original study are necessarily wrong or that the follow-up study was conducted inappropriately” (Bonett, 2021, p. 523) but may point to differences in the characteristics of the survey populations in Study 1 and Study 2, as will be further discussed below. To summarize, our findings imply that the moderating effect of *Customer Relational Dynamism* was only present in the German setting in Study 1, but not in the US setting in Study 2.

D.5 Discussion and Conclusions

Our study's objective was to test the relevance of effective control system for reaching beneficial firm-level outcomes such as organizational ambidexterity. While for individual control systems, past research has already shown such effects (e.g., Bedford, 2015; Ylinen & Gullkvist, 2014), our study is among the first to establish this relationship empirically for the effectiveness of entire control systems by drawing on the conceptual and empirical measures suggested by Bedford et al. (2016). Based on an initial survey study conducted among German executives, we found confirmation for a direct effect of management control effectiveness on organizational ambidexterity. In addition, by drawing on new procedures to test replication evidence, our second study conducted in the U.S. strongly supports this effect. Thus, our study contributes to the nascent literature on management control effectiveness (Bedford et al., 2016) by delivering evidence from Germany and the U.S. suggesting that effective control systems benefit reaching high levels of organizational ambidexterity.

At the same time, we interpret the findings in light of critics of exclusive resource-based

thinking (e.g., Kraaijenbrink et al., 2010) that firm resources alone are not sufficient to explain firm-level performance outcomes such as organizational ambidexterity. Just as prior management control studies, our study, too delivers evidence - although not fully conclusive across our two survey studies – that management control systems may not have a direct effect on firm-level outcomes, but only in specific cases of environmental dynamism or uncertainty (e.g., Bisbe & Malagueño, 2012; Braumann et al., 2020; Demartini & Otley, 2020; Gul & Chia, 1994; Henri & Wouters, 2020; Merchant, 1990; Otley & Pierce, 1995). We extend this prior management accounting literature by showing that not only the effect of individual control systems but also of the effectiveness of a firm’s entire control package hinges on environmental dynamism and uncertainty. We further extend this literature by more closely making use of stakeholder theory and suggesting that environmental dynamism may unfold its effects not just unidimensionally but in different forms and directions. To this end, our paper suggests that splitting up dynamism into dynamism related to specific stakeholder groups may allow for a better understanding in which situations effective management control systems make most or make least sense. From Study 1, we found that such effective control systems are most beneficial in situations of low customer relational dynamism and in situations of high employee dynamism. The latter moderating effect (employee-related dynamism) also found some support from Study 2 and our checks for replication evidence, while the first moderator (customer-related dynamism) delivered nonreplication evidence. As explained by Bonett (2021), such nonreplication evidence does not mean that either our Study 1 or our Study 2 was flawed, but that the moderating effect of customer relational dynamism was only present in our German sample where we addressed top managers. In contrast, in our Study 2, we addressed finance and accounting personnel from the U.S. Bonett (2021) suggests that nonreplication evidence may point to moderators that have not yet been examined but may lie in the population characteristics of the initial and the follow-up study. When comparing the descriptive statistics

between Study 1 (see Table D-3) and Study 2 (see Appendix Section D Table A 4), we see that the mean values for all three stakeholder-related dimensions of environmental dynamism (*Customer Relational Dynamism*, *Supplier Relational Dynamism*, *Employee Relational Dynamism*) are higher in Study 2 (U.S.) than in Study 1 (Germany). While this is well in line with macro-economic assessments that the U.S. economy is (currently) generally more dynamic than European economies such as Germany, these higher levels of dynamism may make effective control systems less of a benefit in the U.S. than in Germany – except for *Employee Relational Dynamism*, where we hypothesized and mostly found the effect that control effectiveness is more beneficial in situations of high *Employee Relational Dynamism* in both geographies.

Alternatively, our nonreplication evidence may not be rooted in the different geographies of our two studies, but in the type of respondents, we addressed. While both studies ended up with similar assessments of their firm's levels of *Organizational Ambidexterity* (see Table D-3 and Appendix Section D Table A 4), the executives surveyed in Study 1 found their firms to have lower *Management Control Effectiveness* in comparison to the finance and accounting personnel addressed in Study 2. While we cannot ascertain as to one group of participants being more or less optimistic versus “true” levels of control effectiveness or performance, our comparison between the two studies at least shows that the German executives surveyed in Study 1 were less positive about both constructs when compared to the US finance and accounting personnel addressed in Study 2 that had a more positive view on control effectiveness and overall performance.

So to summarize, we could broadly find evidence for the positive effects of management control effectiveness and our general argument that different dimensions of environmental dynamism may impact this relationship in different ways. At the same time, our new procedures for testing replication evidence, as proposed by Bonett (2021), give rise to the notion that single-country

studies on management control phenomena may indeed not generalize in their entirety to other geographical settings and other groups of respondents. This reinforces calls for more replication evidence in management accounting research (e.g., Brügger et al., 2021; Hail et al., 2020). Complementing these calls, our paper contributes to the literature by showcasing the applicability of new tests for replication evidence in the management accounting field and for treating nonreplication evidence. As suggested by Bonett (2021), such nonreplication evidence may not necessarily be a problem but may present a chance to learn about so-far not known moderators or boundary conditions of seemingly established knowledge on management accounting and control phenomena.

Appendix Section D

Measurement of Environmental Dynamism	Study	Detailed Measure(s) for Environmental Dynamism	Main Findings regarding Environmental Dynamism
One-dimensional	Bisbe and Malagueño (2012)	Environmental uncertainty was measured by computing the standard error of the regression of industry sales for a defined period (used initially by Harrington et al., 2004 and others).	The study's findings show, on the one hand, that a positive relationship between strategic performance measurement systems and firm performance, and on the other hand, that the level of environmental dynamics negatively moderates this relation.
	Braumann et al. (2020)	The perceived environmental uncertainty dimension (the extent to which firms can predict, for instance, competitor behavior, patterns of customers and others) is based on and adapted from Moers (2006), following Govindarajan (1984) (based initially on Miles & Snow (1978)) and Merchant (1990) (based initially on Lorsch & Allen, 1973).	The results show on the one hand that the effect of tone from the top and interactive control becomes significantly more vital in a situation with high perceived environmental uncertainty and on the other hand that the tone from the top and diagnostic control are complements in terms of risk awareness in situations with low perceived environmental uncertainty and substitutes in situations with high perceived environmental uncertainty.
	Budding (2004)	Environmental uncertainty was measured as an instrument (uncertainty predictability, uncertainty influence) based on Hartmann (1997) (based initially on Merchant, 1990 and Govindarajan, 1984) but slightly adapted to a governmental context.	The study shows that managers do not perceive environmental uncertainty as an obstacle to implementing responsible management.
	Burkert and Lueg (2013)	The perceived environmental uncertainty dimension (predictability of the environment categories in which the firm operates, including product market, competitive and others) is based on items developed by Miller (1993).	The results show that the top management team's high perceived environmental uncertainty is significantly associated with lower value-based management sophistication.
	Chen et al. (2020)	Environmental uncertainty was measured with the variation in return on equity (ROE) (calculated as the time-series variance over the previous three years).	The results indicate that the likelihood of a firm adjusting subjective and objective performance measures between the top and middle managers increases with environmental uncertainty.
	Demartini and Otley (2020)	Environmental uncertainty is measured as a multi-item one-dimensional construct, but no references are given for this measurement in the paper.	No clear relationships between environmental uncertainty and the level of coupling between individual control systems have been found. According to the authors, this non-finding is most likely due to the limited variance found in the environmental uncertainty variable in this study.
	Ezzamel (1990)	Perceived environmental uncertainty was measured using a 23-item questionnaire asking the perceived level of uncertainty for items as actions of suppliers, competitors actions, customer demands and others developed by Miles and Snow (1978) following Dill (1958).	The results show that compared to the firm context variables measured by management autonomy and size, the perceived environmental uncertainty seems to have a more significant impact on the design of budget characteristics. The results also suggest that perceived environmental uncertainty is much more significant for larger firms than for smaller firms.
	Ferris (1982)	Three dimensions of perceived uncertainty (lack of information, not knowing how to respond, not knowing the outcome of a decision) based on Sathe (1974) and Duncan (1972).	The findings show that a significant positive association between the reported level of organizational coping and employee performance was found.
	Fisher (1996)	Three dimensions of perceived uncertainty (lack of information, the impact of external factors, not knowing the outcome of a decision) based on Duncan (1972) and used by Chenhall and Morris (1986).	The study shows that as perceived environmental uncertainty increases, internals on the locus of control scale perceive information with a broader scope and be temporally valid than externals on the locus of control scale. Also, the study indicates that people do not respond uniformly to a perceived level of uncertainty.

Gordon and Narayanan (1984)	Environmental uncertainty was measured as an instrument (single scale including respondents' perceptions about predictability and stability in aspects of their firm's economic, competitive and others environment) based on and slightly adapted from Khandwalla (1972) and Khandwalla (1977).	The study results show that the information characteristics perceived as necessary by the decision-makers are related to the perceived environmental insecurity. The findings also indicate that when decision-makers perceive more significant environmental uncertainty, they tend to look for non-financial information and thus increasingly lead to an organic form of a firm.
Govindarajan (1984)	The perceived environmental uncertainty dimension (predictability of factors, for instance, manufacturing technology, market demand in the context of their business unit and others) is based on an instrument developed by Miles and Snow (1978) and used as an index of environmental uncertainty.	The study shows that managers of business units faced with higher environmental uncertainty levels use more subjective judgment when assessing performance. Managers of business units that are faced with less environmental uncertainty levels are increasingly relying on financial data to evaluate performance. The results also show that the relationship between environmental uncertainty and performance evaluation style (percentage of bonus) is significant for more effective units.
Grabner et al. (2018)	The perceived environmental uncertainty dimension (the extent to which firms can predict, for instance, competitor and customers behavior and others) is based on and adapted from Moers (2006), following Govindarajan (1984) (based initially on Miles & Snow (1978)).	The findings indicate that high external uncertainty does not uniformly reinforce the effects of management control practices in an innovation context but instead alters the cost-benefit ratio of management control systems in the innovation context.
Gul and Chia (1994)	The measurement was adopted from the instrument developed by Duncan (1972) and Sathe (1974).	On the one hand, the results show that decentralization and management accounting systems were associated with higher management performance under conditions of high perceived environmental uncertainty. On the other hand, the findings indicate that under conditions of low perceived environmental uncertainty, decentralization and management accounting systems of broad scope and aggregation were associated with lower management performance.
Hartmann et al. (2010)	Environmental uncertainty was measured with five attributes (based initially on scales by Merchant, 1990 and Govindarajan, 1984).	The results show that using objective performance measures is positively associated with environmental uncertainty.
Heinicke and Guenther (2020)	Perceived environmental uncertainty was measured as a nine-item instrument (including political, economic and societal environment) based on Andrews (2008).	Results for perceived environmental uncertainty are untabulated.
Henri (2010)	Perceived environmental uncertainty was measured using a seven-point Likert scale (initially based on the instrument by Govindarajan, 1984).	Perceived environmental uncertainty is negatively related to performance. Also, firms confronted with a higher perceived environmental uncertainty are more likely to review performance indicators regularly.
Janka and Guenther (2018)	The dimensions of perceived environmental uncertainty (hostility, complexity, unpredictability and dynamism) are based on an instrument developed by Gordon and Narayanan (1984)	The results show that firms exhibit two completely different responses in terms of their management control of new product development when faced with high perceived environmental uncertainty.
Kihn (2007)	Perceived environmental uncertainty was measured using a 14-item instrument with a five-point scale. The rates of change were evaluated concerning various stakeholders such as customers, relations with government and sales partners.	The results indicate that perceived environmental uncertainty moderates the relationship between headquarters' focus on non-financial controls and short-term profitability positively.
Merchant (1990)	The perceived environmental uncertainty dimension (rate of change scale including six categories of their profit center's environment: Strategies, industry pricing patterns and others) is based on an instrument developed by Lorsch and Allen (1973).	Managers who work in a relatively uncertain environment reacted significantly more often to budget pressure by drawing profits from the following year into the current year than those who work in a relatively safe environment.

	Merchant et al. (2011)	Environmental uncertainty was measured using a five-item instrument with a five-point Likert scale.	The results show that environmental uncertainty is associated with dealership competition, general manager delegation, general manager experience, dealership size and spiff.
	Otley and Pierce (1995)	The perceived environmental uncertainty dimension (encounter certain situations in decision-making activities, lack of information, the impact of external factors) is based on an instrument developed by Rebele and Michaels (1990) from earlier work by Duncan (1972).	The study shows that two serious forms of dysfunctional behavior are significantly related to the two leadership dimensions (consideration and structure). These relationships are stronger when perceived environmental uncertainty increases.
	Pondeville et al. (2013)	The dimension was measured using an instrument (related, for instance, to environmental demand, green competition) based on and adapted from Lewis and Harvey (2001)	The results show that firms that perceive more significant environmental uncertainty are less likely to develop a proactive environmental strategy, a formal environmental management control system or an environmental information system.
	Thomas (1986)	Environmental uncertainty was measured using share price data (share price variability: systematic risk, specific risk, the specific risk was chosen).	This research examines whether specific disclosure and measurement practices in corporate reporting depend on environmental uncertainty. The results indicate that disclosure of forecast information is associated with environmental homogeneity.
	Viator (2001)	The perceived environmental uncertainty dimension is based on scale items adopted from Rebele and Michaels (1990) and Otley and Pierce (1995) (at least one question from each of the three dimensions: lack of information, the impact of external factors, own decisions, defined by Duncan, 1972).	The results indicate that informal mentors were associated with less perceived uncertainty about the work environment to a lesser extent. However, the results were not robust across multiple employees' organizational levels.
Two-dimensional	Ghosh and Olsen (2009)	The environmental uncertainty dimension is defined as the coefficient of variation for sales and as the analyst forecast dispersion.	Overall, the evidence suggests that managers use discretionary accruals to further reduce the variability of reported earnings when firms operate under high uncertainty.
	King et al. (2010)	The dimensions of perceived environmental uncertainty (hostility, dynamism) are based on an instrument developed by Gordon and Narayanan (1984)	The results show that for firms that use written budgets, the level of use is related to environmental uncertainty.
Three-dimensional	Ferris (1977)	Three dimensions of perceived uncertainty (lack of information, the impact of external factors, own decisions) are based on Duncan (1972) and Sathe (1974).	The study results show that perceived uncertainty impacted job satisfaction (also antecedents of job satisfaction as employee motivation).
	Sharma (2002)	The dimensions of perceived environmental uncertainty (turbulence, competition for market and unpredictability) are based on an instrument developed by Gordon and Narayanan (1984) (an adaption of the instrument by Khandwalla, 1972 and Khandwalla, 1977).	The results show that various perceived environmental uncertainty dimensions affect differently budget system characteristics and organizational structure.

Note. We searched in the European Accounting Review (EAR), Management Accounting Research (MAR), the Journal of Management Accounting Research (JMAR) and Accounting, Organization and Society (AOS) for survey studies touching upon management accounting and control phenomena where environmental uncertainty or dynamism was included in the empirical models. We chose these four journals for our scoping review because these are by far the journals most likely to publish high-quality management accounting survey research (van der Stede et al., 2005). The numbers of dimensions displayed in this table for every article depend on how many variables have been used in the articles' main empirical analyses.

Appendix Section D Table A 1. Prior Research on Environmental Dynamism and Management Accounting and Control Systems

Variable	Early Respondents	Late Respondents	p-value
	Mean	Mean	
Firm Size 100 – 249	.20	.16	.713
Firm Size 250 – 499	.16	.28	.306
Firm Size >499	.28	.48	.145
Manufacturing	.28	.24	.747
Retail	.12	.12	1.000
Strategy	.44	.40	.774
Stakeholder Interaction Customers	5.28	5.41	.815
Stakeholder Interaction Suppliers	5.55	5.23	.401
Management Control Effectiveness	31.58	33.71	.393
Customer Relational Dynamism	1.99	2.02	.875
Supplier Relational Dynamism	1.64	1.94	.108
Employee Relational Dynamism	2.13	2.39	.777
Organizational Ambidexterity	198.64	194.72	.860

Appendix Section D Table A 2. Comparison of the variables of the Late Respondents to Early Respondents (Study 2, U.S.)

Stakeholder Interaction Suppliers (<i>First-order construct reflectively measured</i>)		
CR = .886	AVE = .721	Factor loadings (CFA)
We involve our suppliers closely in the cooperation in development projects.		.820
We communicate intensively with our suppliers.		.811
We emphasize the firm's overall strategy through close cooperation and dialogue with our suppliers.		.913
Stakeholder Interaction Customers (<i>First-order construct reflectively measured</i>)		
CR = .828	AVE = .617	Factor loadings (CFA)
We involve our customers closely in the cooperation in development projects.		.838
We communicate intensively with our customers.		.693
We emphasize the firm's overall strategy through close cooperation and dialogue with our customers		.818
Supplier Relational Dynamism (<i>First-order construct reflectively measured; reverse coded</i>)		
CR = .882	AVE = .658	Factor loadings (CFA)
The relationship between your firm and your suppliers is ...		
Unstable – stable		.855
Short-term – long-term		.552
Unsecure – secure		.885
Unsteady – steady		.901
Customer Relational Dynamism (<i>First-order construct reflectively measured; reverse coded</i>)		
CR = .848	AVE = .586	Factor loadings (CFA)
The relationship between your firm and your customers is ...		
Unstable – stable		.762
Short-term – long-term		.637
Unsecure – secure		.781
Unsteady – steady		.864
Employee Relational Dynamism (<i>First-order construct reflectively measured; reverse coded</i>)		
CR = .924	AVE = .754	Factor loadings (CFA)
The relationship between your firm and your employees is ...		
Unstable – stable		.911
Short-term – long-term		.739
Unsecure – secure		.918
Unsteady – steady		.893
Organizational Ambidexterity (<i>Second-order construct formatively measured</i>)		
		Factor loadings (CFA)
Exploitation (Formative weight (path coefficient) = .487***; VIF = 1.810) (<i>First-order constructs reflectively measured</i>) (CR = .810; AVE = .590)		
Our firm is one that commits to improve quality and lower costs.		.667
Our firm is one that continuously improves the reliability of its products and services.		.887
Our firm is one that fine-tunes what it offers to keep its current customers satisfied.		.734
Exploration (Formative weight (path coefficient) = .606***; VIF = 1.810) (<i>First-order constructs reflectively measured</i>) (CR = .844; AVE = .576)		
Our firm is one that looks for novel technological ideas by thinking “outside the box”.		.690
Our firm is one that bases its success on its ability to explore new technologies.		.783

Our firm is one that creates products or services that are innovative to the firm.	.842
Our firm is one that looks for creative ways to satisfy the needs of customers.	.711

Note. AVE = average variance extracted; CR = composite reliability; VIF = variance inflation factor; CFA = confirmatory factor analysis.

* $p < .10$; ** $p < .05$; *** $p < .01$.

Appendix Section D Table A 3. Construct validity of multi-item constructs (Study 2, U.S.)

Variables	N	Mean	Min	Max	Median	SD
Firm Size 100 – 249	99	.15	.00	1.00	.00	.36
Firm Size 250 – 499	99	.22	.00	1.00	.00	.42
Firm Size >499	99	.32	.00	1.00	.00	.47
Manufacturing	99	.22	.00	1.00	.00	.42
Retail	99	.13	.00	1.00	.00	.34
Strategy	99	.42	.00	1.00	.00	.50
Stakeholder Interaction Customers	99	5.15	1.33	7.00	5.33	1.35
Stakeholder Interaction Suppliers	99	5.14	1.00	7.00	5.33	1.25
Management Control Effectiveness	99	30.69	3.20	49.00	31.20	9.18
Customer Relational Dynamism	99	2.17	1.00	4.75	2.00	.94
Supplier Relational Dynamism	99	2.01	1.00	5.25	2.00	.88
Employee Relational Dynamism	99	2.35	1.00	6.50	2.25	1.17
Organizational Ambidexterity	99	182.78	8.89	343.00	193.67	71.99

Note. N = total number of cases; SD = standard deviation.

Appendix Section D Table A 4. Descriptives (Study 2, U.S.)

Variables	N	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Firm Size 100 – 249	99	1												
2 Firm Size 250 – 499	99	-.226	1											
3 Firm Size >499	99	-.292	-.369	1										
4 Manufacturing	99	-.090	.006	.098	1									
5 Retail	99	.086	.080	-.077	-.208	1								
6 Strategy	99	-.078	.033	.062	-.262	-.031	1							
7 Stakeholder Interaction Customers	99	.044	.044	.106	.025	-.006	.063	1						
8 Stakeholder Interaction Suppliers	99	.134	-.085	.039	.058	-.043	.124	.576	1					
9 Management Control Effectiveness	99	.004	.002	.015	.071	-.028	.228	.545	.577	1				
10 Customer Relational Dynamism	99	-.188	.087	-.123	-.095	.091	.060	-.393	-.351	-.308	1			
11 Supplier Relational Dynamism	99	-.084	.002	.056	-.019	.031	.104	-.305	-.443	-.195	.417	1		
12 Employee Relational Dynamism	99	-.065	.117	.063	-.086	.179	-.053	-.417	-.415	-.366	.397	.416	1	
13 Organizational Ambidexterity	99	-.046	.078	-.004	.094	-.116	.346	.559	.504	.542	-.280	-.193	-.417	1

Note. N = total number of cases; *Pearson* correlation coefficients are used for correlations between metric variables; *Phi* values are used between dichotomous variables; *Point-biserial* correlation coefficients are used for correlations between metric and dichotomous variables (for further information, see Field, 2018). Correlations significant at $p < .10$ are marked in bold.

Appendix Section D Table A 5. Correlation matrix (Study 2, U.S.)

<i>Dependent Variable</i>	<i>Organizational Ambidexterity</i>											
	Model 1				Model 2				Model 3			
<i>Independent Variables</i>	Stand. β [90% CI]	t value	p value	VIF	Stand. β [90% CI]	t value	p value	VIF	Stand. β [90% CI]	t value	p value	VIF
Constant		-.600	.550			.416	.679			.430	.668	
<i>Control variables</i>												
Firm Size 100 – 249	-.082 [-.226, .062]	-.941	.349	1.322	-.073 [-.221, .075]	-.819	.415	1.421	-.038 [-.189, .112]	-.424	.672	1.481
Firm Size 250 – 499	.012 [-.137, .160]	-.132	.895	1.408	.045 [-.106, .195]	.492	.624	1.479	.070 [-.084, .224]	.758	.451	1.554
Firm Size >499	-.116 [-.268, .035]	-1.276	.205	1.460	-.084 [-.241, .074]	-.884	.379	1.615	-.039 [-.202, .123]	-.404	.687	1.729
Manufacturing	.146 [-.011, .281]	1.795	.076*	1.166	.118 [-.017, .254]	1.451	.150	1.193	.111 [-.026, .248]	1.348	.181	1.226
Retail	-.066 [-.196, .063]	-.851	.397	1.070	-.046 [-.176, .085]	-.580	.563	1.107	-.061 [-.192, .070]	-.778	.439	1.125
Strategy	.328 [.195, .462]	4.098	.000***	1.130	.291 [.153, .429]	3.503	.001***	1.239	.281 [.143, .419]	3.394	.001***	1.245
Stakeholder Interaction Customers	.418 [.262, .575]	4.444	.000***	1.560	.313 [.142, .485]	3.035	.003***	1.914	.283 [.110, .456]	2.723	.008***	1.960
Stakeholder Interaction Suppliers	.228 [.070, .386]	2.399	.018**	1.587	.157 [-.023, .337]	1.449	.151	2.109	.148 [-.033, .328]	1.363	.177	2.130
<i>Main effects added</i>												
Management Control Effectiveness					.150 [-.019, .318]	1.475	.144	1.852	.172 [.002, .342]	1.681	.097*	1.892
Customer Relational Dynamism					-.052 [-.206, .102]	-.565	.573	1.540	-.028 [-.183, .127]	-.297	.767	1.575
Supplier Relational Dynamism					.053 [-.101, .207]	-.571	.570	1.551	.062 [-.094, .218]	.658	.513	1.597
Employee Relational Dynamism					-.139 [-.297, .018]	-1.471	.145	1.613	-.174 [-.340, -.008]	-1.742	.085*	1.801
<i>Interaction effects added</i>												
Management Control Effectiveness * Customer Relational Dynamism									.041 [-.111, .192]	.447	.656	1.502
Management Control Effectiveness * Supplier Relational Dynamism									-.159 [-.306, -.012]	-1.798	.076*	1.417
Management Control Effectiveness * Employee Relational Dynamism									-.015 [-.167, .137]	-.161	.873	1.512
R²			.489				.522				.542	
Adjusted R²			.443				.455				.459	
F			10.750***				7.819***				6.542***	
N			99				99				99	

Note. VIF = variance inflation factor; CI = confidence interval. R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases; Stand. β = standardized regression coefficient β .
* $p < .10$; ** $p < .05$; *** $p < .01$.

Appendix Section D Table A 6. Hierarchical regression analysis concerning Organizational Ambidexterity (Study 2, U.S.)

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E Automation and the Stability of Employee Relations: The Moderating Role of Organizational Ambidexterity

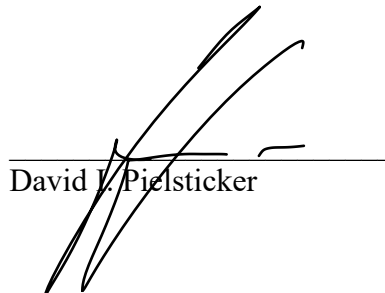
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We, the authors of the paper, hereby declare that this paper's second author, David I. Pielsticker, was responsible for collecting and analyzing most of the data, developing the multiple regression models, and writing most of the paper.



Martin R. W. Hiebl



David I. Pielsticker

E.1 Introduction

Stakeholder orientation directly influences and contributes to a firm's value creation process (Hillman & Keim, 2001), as stakeholders are involved in a firm's economic exchange, without which a firm could not continue its activities and processes (Clarkson, 1995). This notion is supported by several studies (exempli gratia (e.g.), Berman et alii (et al.), 1999; Choi & Wang, 2009; Garcia-Castro & Francoeur, 2016), which found a positive empirical link between a firm's performance and its relationships with stakeholders. In particular, the literature has focused on stakeholder orientation toward firm employees (Harrison et al., 2010; Hillman & Keim, 2001). As suggested by stakeholder theory (e.g., Freeman et al., 2010), the firm balances and considers stakeholders' needs and, in turn, benefits from their recognition. Hence, widespread attention to stakeholders appears to be a critical variable that explains firm performance (Kacperczyk, 2009).

However, current business trends around process innovations such as automation can be expected to pose a threat to stakeholder relations, especially to employee relations. Generally, automation can be seen as a concept of the transfer of functions of the operational process – especially process control tasks – from humans to artificial systems, which will gradually replace human work with machine work (Arntz et al., 2017; Autor, 2015). As firms worldwide continue to strive to uphold or increase their competitiveness, they try to adopt process innovations and increasingly rely on automation to improve their efficiency (Wright & Schultz, 2018). This sharp recent increase in the automation of business processes in conjunction with artificial intelligence is predicted to affect a great number of employees in industrial countries (Autor, 2015; Morrar et al., 2017; Wong & Ngin, 1997). Evidence suggests that benefits associated with firms' automation, such as reducing costs, production efficiencies, and reliable production (Parthasarthy & Sethi, 1992), are often given greater weight than the detrimental effects of automation on employees such as lay-offs (Gasteiger & Prettnner, 2017). In

consequence, due to automation, employees may lose their attachment to and trust in their employers. Thus, not only from a research perspective but also for employer firms, it would be interesting to know whether automation negatively affects employee relational stability. Currently, available research has not yet examined this question, but we do so in the present paper. In particular, we test the assumption that higher levels of automation have a negative effect on employee relational stability.

This direct negative relationship, however, between process innovation in the form of automation and employee relational stability may not hold universally. In contrast, organizational ambidexterity could be the missing link to understand more fully this relationship. Generally, organizational ambidexterity can be understood as achieving a balance between the exploitation of current knowledge and the exploration of new knowledge (March, 1991; O'Reilly & Tushman, 2013). By exploiting current capabilities, firms can achieve sufficient earnings, while exploration is seen as the foundation for creating new capabilities that can safeguard earnings and the firm's further existence in the future (O'Reilly et al., 2009). So, highly ambidextrous firms manage to create products or services in an efficient way, but at the same time also constantly work on innovating or creating new products or services (Heavey et al., 2015; O'Reilly & Tushman, 2013; Raisch & Birkinshaw, 2008). Below, we theorize that such a strategy creates a signal to employees that the firm aims to retain this balance, but if the balance is distorted due to more automation, the stability of relations with employees will suffer.

We test these predictions based on survey data on German Mittelstand firms. While our results do not confirm a direct effect of automation on employee relational stability, the moderation effect receives empirical support. These findings contribute to the literature on the tensions and downsides around organizational ambidexterity (e.g., Birkinshaw & Gupta, 2013; Luger et al., 2018; Montealegre et al., 2019; Rothaermel & Alexandre, 2009), to the literature on

applications of stakeholder theory to phenomena of ambidexterity (e.g., Gambeta et al., 2019), and to the literature on the outcomes of automation on employee relations (Wright & Schultz, 2018).

The present study is structured as follows. In the next section, we present a short overview of the core literature relevant to our analyses and develop two formal hypotheses. Afterward, in Section E.3, we describe our methods and discuss the descriptive characteristics of our respondents and their firms. In Section E.4, we present the results of our analyses (see Table E-3 to Table E-5), and in Section E.5, we conclude the paper with a discussion, our conclusions, and the main limitations of this research.

E.2 Related Literature and Hypotheses

The expansion of automated production processes is becoming increasingly important in many firms (e.g., Wong & Ngin, 1997). Automation can be understood as a specific form of business process innovation (Lewis et al., 2007) and, more specifically, as a concept for transferring functions of the operational process from humans to artificial systems (Autor, 2015). Automation has increased significantly in recent years and is leading to the gradual replacement of human work steps (Arntz et al., 2017; Autor, 2015). For instance, the manufacturing industry's automation processes generally range from the use of hand tools and manual machines to the use of computer-controlled process technologies (e.g., Brownell & Merchant, 1990).

Automation, which is also referred to as the fourth industrial revolution (Morrar et al., 2017), offers many advantages, such as cost reduction, production efficiency, and reliable production (Parthasarthy & Sethi, 1992). In fact, to remain competitive in an increasingly globalized marketplace, firms may need to increase their efficiency by reaping the possibilities offered by business process innovation concepts such as automation (Wright & Schultz, 2018), including flexible manufacturing systems, robotics, computer-aided manufacturing, and computer-

integrated manufacturing (Hayes & Jaikumar, 1988).

At the same time, automation also affects many firms' key stakeholders such as consumers, suppliers, and the wider net of stakeholders, including governments and the society (Wright & Schultz, 2018). The stakeholder group that may be affected most are firm employees (Autor, 2015; Morrar et al., 2017; Wong & Ngin, 1997). Here, automation raises new ethical, moral, but also systematic questions about how employees can keep their jobs (e.g., Parschau & Hauge, 2020) or be included in a new collaborative form of work between humans and machines. Many employees fear losing their jobs due to the introduction of automated technologies, and this is a subject of intense recent research (e.g., Asatiani et al., 2020; Parschau & Hauge, 2020).

For a long time, such fears may not have been substantiated by evidence. That is, Bessen's (2019) results indicate that, in particular, employment growth was initially boosted by productivity and increasing automation for more than a century, as demand was highly elastic. However, more recently, demand saturation has led to job losses, so that today's technologies could lead to employees losing their jobs and having to make disruptive transitions to new industries in the future, which may necessitate the acquirement of new skills and occupations (Bessen, 2019). According to Gasteiger and Prettnner (2017), automation can thus harm formerly trustful firm-employee relationships. From the perspective of stakeholder theory, automation may be perceived by employees as the deliberate move by firms to break potentially trustful and long-lasting firm-employee relationships. Consequently, due to automation, we can expect tensions between realizing efficiency gains through business process innovation and managing stakeholder relationships, and we expect that the stability of these employee relations is suffering due to automation.

In general, high employee relational stability is a relevant aspect for managing human resources (Barnard & Rodgers, 2000), as such stability helps to keep employee turnover and the

associated costs for monitoring, adjustments, and other frictions (e.g., hiring and lay-offs) low (Failla et al., 2017; Lallemand et al., 2005). Trustful and stable employee relations and the recognition of employees are also linked to higher employee performance (Barnard & Rodgers, 2000), which is why measures attacking such employee relational stability such as automation may lower employee performance (Cropanzano et al., 2017). While firms may deliberately condone such costs arising from automation, there is also evidence that they may underestimate the detrimental employee effects associated (Carbonero et al., 2020; Makridakis, 2017). We thus propose the following hypothesis:

Hypothesis 1 (H1). The increasing degree of automation in firms leads to a decrease in employee relational stability.

However, we do not anticipate that the relationship expressed in *H1* is universally applicable to all firms. In particular, we expect organizational ambidexterity to be an important moderator of the automation-employee relational stability relationship. As explained above, firms that feature high levels of organizational ambidexterity show a simultaneous pursuit of exploiting existing capabilities, and thus efficiency, and exploring new capabilities, thus leading to innovation and securing the long-term viability of the firm (Chandrasekaran et al., 2012; Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2013). So as per the definition (e.g., Cao et al., 2009; Hiebl, 2015; Simsek, 2009), firms with high levels of organizational ambidexterity feature a balanced approach to combining high levels of efficiency gains with high levels of innovation.

In such firms, employees can be expected to be an important driver to reach such a balance. In fact, in certain forms of realizing organizational ambidexterity, such as contextual ambidexterity, individual employees are expected to show such balance themselves and conduct both exploration and exploitation activities (Chang, 2016; Gibson & Birkinshaw, 2004; Güttel & Konlechner, 2009). Not least, such individual-level ambidexterity may well equip

employees to develop entrepreneurial activity (Yeganegi et al., 2019).

However, recent research has found that the pursuit of organizational ambidexterity may also come with specific tensions or outright downsides (e.g., Birkinshaw & Gupta, 2013; Luger et al., 2018; Montealegre et al., 2019; Rothaermel & Alexandre, 2009). For instance, a strong orientation towards ambidexterity may limit a firm's strategic opportunities as employees will expect that exploration and exploitation need to be balanced. This may be especially relevant for situations of business process innovation such as automation. When a firm strikes a new path by leaning more heavily towards automation, the balance between exploration and exploitation may be distorted as a higher focus on automation may lead a firm more towards exploitation (Montealegre et al., 2019), and thus away from ambidexterity. In such situations, employees may be irritated by their firms moving away from a balance between exploration and exploitation. Consequently, we expect that such employees will start to question whether the declining balance will also have an effect on themselves and whether a higher focus on automation and thus exploitation may endanger their jobs. Consequently, such employees may feel less attachment to their employer and thus less employee relational stability. Similar to this argument, Wright and Schultz (2018) have suggested that between employees and firms, there exist norms that are not stipulated by contract but established by implied agreements. Wright and Schultz (2018) assume that these norms will be violated if the firm swings into a higher focus on automation. We assume that the balance between exploration and exploitation can be considered such a norm, and by implication, firms with high levels of organizational ambidexterity should feature a higher vulnerability in terms of automation, resulting in lower employee relational stability.

This notion receives support from prior research indicating that firms' abilities to reach high levels of ambidexterity rely mainly on their employees' ability to pursue both exploration and exploitation (e.g., Chang, 2016). So, stakeholder theory would predict that high-ambidexterity

firms need to uphold close relationships with and not alienate key stakeholders such as employees to keep up their competitiveness. However, by moving more strongly towards automation, these key stakeholders may be unsettled. This is why we expect high-ambidexterity firms to be particularly prone to automation, leading to lower levels of employee relational stability.

In contrast, consider firms that are primarily focusing on efficiency gains, thus featuring a high orientation towards exploitation but focusing little on exploration and, consequently, low levels of organizational ambidexterity. In fact, we know from prior research that low levels of ambidexterity are predominantly due to higher levels of exploitation and low levels of exploration, but not vice versa (Block et al., 2013; Hiebl, 2015). In exploitation-oriented firms, employees may be seen more as a transactional resource and not as a source of ambidexterity. Such employees may be used to new technology being implemented to improve cost efficiency further by reducing the number of employees (e.g., Merchant, 2014). In such low-ambidexterity firms, it can therefore be expected that new efficiency leaps promised by automation will not surprise employees. Thus, it will not have a big impact on employee relational stability as the firms have always sought efficiency gains and thus an exploitation orientation. All these considerations lead us to the expectation that higher levels of organizational ambidexterity are exacerbating the detrimental effect of automation on employee relational stability, as suggested in *H1*. We thus further hypothesize the following:

Hypothesis 2 (H2). The relationship described in H1 is moderated by organizational ambidexterity in the sense that in firms featuring a high level of ambidexterity, the degree of automation will have a bigger impact on employee relational stability as compared with firms featuring a low level of ambidexterity.

Figure E-1 presents a summary visualization of our research model and the two hypotheses to

be tested.

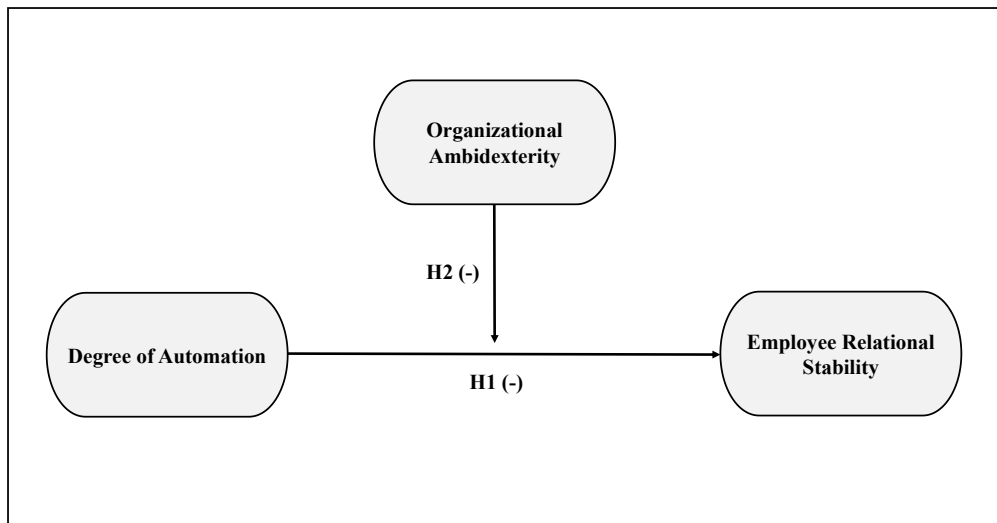


Figure E-1. Research model

E.3 Methods

E.3.1 Sampling and Data

In order to test our hypotheses, we conducted an online survey of German Mittelstand firms. Similar to previous research (e.g., Mitze & Makkonen, 2020), we relied on the Amadeus database to identify survey addressees. From this database, we also extracted information on the number of firm employees, firm industry affiliations, and firm contact information. Then, we manually searched for the email addresses of the top managers of each firm and specifically targeted Chief Executive Officers and other members of the top management team, as Zahra (1991) has shown that these top managers usually have a broad overview of the firm's activities. This seems especially true for Mittelstand firms, as they are usually smaller in size and thus top managers tend to have long tenures in their firms and a very close understanding of the processes going on, including aspects of automation and employee relations (Berghoff, 2006; Festing et al., 2013). In line with De Massis et al. (2018), we relied on the definition by Becker et al. (2008) and defined Mittelstand firms as those with a maximum of 3,000 employees. In addition, we focused on firms that were located close to our university since higher response rates can be expected for firms geographically proximal to a university sponsoring a survey

(Bartholomew & Smith, 2006). In total, we identified a sample of 1,118 Mittelstand firms that served as our target population.

We sent out survey invitations by email to the respective firms' top managers at the beginning of July 2020. Also, we reminded our targeted group of top managers in mid-August 2020 and assured their anonymity. A previous study by Edwards et al. (2002) has shown that incentives may positively affect response rates. Consequently, we offered our survey participants two options for incentives after they completed the survey (participants could choose to receive none, one, or both incentives):

- a donation of EUR 10 to a charity of their choice, and/or
- a detailed research report.

The majority of our questionnaire items were based on established constructs from the English language literature. We translated the respective English-language questions into German, the language used in our survey. To ensure that the questionnaire was appropriate for the survey concerning comprehensibility and structure (Hunt et al., 1982; Reynolds & Diamantopoulos, 1998), we conducted a pretest and asked ten experts (five scientists and five practitioners) for feedback on the questionnaire. Our questionnaire was translated back into the English language by a research colleague who was not involved in our research project. The aim of using the newly translated version was to check for possible translation errors (cf. Brislin, 1970). Based on the results of the pretests and the back-translation procedures, we made slight changes to the German-language questionnaire.

In total, we received 156 questionnaires that were completed in full or in part. This resulted in a response rate of approximately 14%, consistent with comparable recent studies (e.g., Abbate et al., 2021; Ng et al., 2020; Pierrakis & Saridakis, 2019). The absolute response rate level may not be high when compared to meta-analytic results obtained by Baruch (1999) and Pielsticker and Hiebl (2020). However, these studies also found that response rates in management

research have decreased in the last few decades, in particular for surveys addressing top managers (Cycyota & Harrison, 2006). This is why we deem the achieved response rate as satisfactory. Out of our 156 cases, we removed 29 due to a lack of information on some of our study's variables of interest. Our final sample thus contains 127 cases.

A further potential issue in survey studies is non-response bias (e.g., Rupp et al., 2002; van Loon, 2003). Consequently, we compared the mean values between early and late respondents for all variables involved in our study, as non-responders are considered to be similar to late respondents (Armstrong & Overton, 1977). To use the appropriate statistics for the mean value comparisons, we first tested the variables in our sample for normal distribution using a Kolmogorov-Smirnov test and a Shapiro-Wilk test, with the result that only the variable *Organizational Ambidexterity* was normally distributed. Consequently, we used the non-parametric Chi-square test for the dichotomous variables *Retail* and *Firm Size > 499* and the non-parametric Mann-Whitney U-test for all other variables except *Organizational Ambidexterity*. For the variable *Organizational Ambidexterity*, we used the T-test. As detailed in Table E-1, we found no significant differences concerning the variables between early and late respondents. Consequently, we do not have evidence that would point to a non-response bias.

As found by Bowman and Ambrosini (1997), much empirical work has been published in management research that uses the single respondent approach, and respondents are frequently selected who are members of a firm's top management team. Empirical research that opts for such a single-respondent approach is particularly confronted with potential common-method bias (Kull et al., 2018; Montabon et al., 2018). Consequently, in line with suggestions from the literature (e.g., Podsakoff et al., 2003), we have taken several established measures to avoid the development of common method bias:

- First, we guaranteed the anonymity of the respondents.

- Second, we implemented a delay between the independent and dependent variables in our questionnaire’s flow to avoid participants building their own mental models that could distort our findings.
- Third, we relied on scale items that had been pretested in prior studies and for which we additionally conducted our own pretests to ensure that our questions were simple, succinct, specific, and did not feature complicated syntax (Podsakoff et al., 2003).

Finally, to check for the potential problem of common method variance, we performed a Harman’s one-factor test (Podsakoff et al., 2003). The basic assumption of this test is that there is common method variance when only a single factor is extracted or when a factor explains much of the covariance between variables involved in a study (Podsakoff & Organ, 1986; Podsakoff et al., 2003). From our Harman’s one-factor test, the highest value for a single factor is 26.45%, which shows that no single factor explains most of the covariance between the variables involved in our study. Therefore, we have no indication that our data would suffer from common method variance.

Variable	Early Respondents	Late Respondents	p-value
	Mean	Mean	
Employee Relational Stability	6.15	6.35	.553
Firm Size >499	.52	.43	.382
Retail	.10	.05	.397
Employee Loyalty	5.56	5.42	.432
Past Performance Return	4.47	4.54	.798
Past Performance Growth	5.04	4.76	.293
Degree of Automation	10.19	10.29	.871
Organizational Ambidexterity	170.76	168.94	.889
Exploitation	5.53	5.51	.632
Exploration	4.86	4.98	.918

Table E-1. Comparison of the variables of late respondents and early respondents

E.3.2 Measures

For constructs with multiple elements, we used seven-point Likert scales to measure the underlying variables. To factor-analyze these constructs, we performed principal component analyses (PCA) to determine both content and construct validity. As suggested by Field (2018),

in the factor analyses, we suppressed factor loadings less than the recommended minimum .3. We chose the varimax rotation to maximize the loads' dispersion within the factors (Field, 2018). Besides, we also calculated Cronbach's Alpha (should be greater than .7, see Field, 2018), average variance extracted (AVE) (AVE value should not be less than .5, see Hair et al., 2019), and composite reliability (CR) (CR threshold should be greater than or equal to .7, see Hair et al., 2019) for our construct and reliability analyses. Also, the Bartlett test for item correlation (Bartlett test = .0) was tested. The unidimensionality was checked using Kaiser-Meyer-Olkin statistics (KMO = .5 as a bare minimum, see Field, 2018). Where we were able to confirm that several individual items belonged to a factor, we averaged the answers over the items of the respective construct to calculate the final values of our variables.

E.3.2.1 Dependent Variable

Employee Relational Stability was measured using a scale based on the work of Johnson et al. (2004), who measured the stability of relationships with the respective firm's suppliers. The construct was also used in studies by Yang et al. (2008) and Yang (2013). We have adapted the original questions on suppliers to fit our focus on the stability of relationships with employees. The resulting multi-item construct *Employee Relational Stability* is based on four items and is metrically scaled. All items showed sufficient reliability results (see Table E-2).

E.3.2.2 Independent Variable

Our measurement of the *Degree of Automation* is based on the measurement by Inkson et al. (1970) and has been further developed by Brownell and Merchant (1990). Brownell and Merchant (1990) have used a three-part measurement construct to measure a firm's process automation. While this measurement may seem old for an apparently recent phenomenon such as automation, we deem the contents of this construct as capable of fitting the contemporary context well. This assessment is supported by relatively recent and well-published studies that have drawn on this measurement (e.g., van Veen-Dirks, 2010). The first part of the construct requires an assessment of the degree of automation of the majority of the respondents' firm

production equipment. The evaluation is carried out on a six-level scale (for the individual wording of these six levels, see Brownell & Merchant, 1990), and using the same scale, the second part of the evaluation assesses the *Degree of Automation* of the most automated piece of equipment used in the respondent's firm. The third part assesses the degree of automation of the final product's quality control on a three-point scale. We have slightly adapted the third sub-question for our specific empirical setting, which involves firms from various sectors and not just manufacturing firms. That is, depending on the primary industry affiliation chosen by respondents, they were asked to assess the quality control of "their products" (for manufacturing firms), "their retail goods" (for retail firms), or "their services" (for service firms). As suggested by Brownell and Merchant (1990), the final values for our *Degree of Automation* variable were calculated by adding up the answers to the three items. That is, the higher the sum, the higher the respective firm's level of automation.

E.3.2.3 Moderator Variable

In line with prior literature, our moderator variable *Organizational Ambidexterity* was measured on a 12-item construct based on the work of Lubatkin et al. (2006). The respondents were asked to indicate the degree of agreement to six statements about their firm's exploration orientation and six statements about their firm's exploitation orientation on a seven-point Likert scale (from "completely disagree" to "completely agree"). Based on a PCA with varimax rotation, we excluded items four and nine due to cross-loadings. The remaining items loaded on four factors, which all showed sufficient reliability results (see Table E-2). The results of the factor analysis show that the exploration orientation consisted of two factors (C1 and C4), and the exploitation orientation also consisted of two factors (C2 and C3). We proceeded by computing the mean values of the two exploration factors (C1, C4) and the two exploitation factors (C2, C3).

For the following calculation of our *Organizational Ambidexterity* variable, we adopted the approach by Bedford et al. (2019). This approach is based on the notion that a high degree of

Organizational Ambidexterity is achieved when exploitation and exploration are not only balanced but when each reaches high levels (Bedford et al., 2019). Bedford et al. (2019) propose a calculation of *Organizational Ambidexterity* by subtracting the absolute value of the difference between exploitation and exploration from seven (due to our seven-point Likert scale) and then computing the product with the exploitation and exploration scores. That is, we conceptualize the variable *Organizational Ambidexterity* as a second-order formative construct and have calculated it for a given firm i as follows: $\text{ORGANIZATIONAL AMBIDEXTERITY}_i = (7 - |\text{EXPLOITATION}_i - \text{EXPLORATION}_i|) * \text{EXPLOITATION}_i * \text{EXPLORATION}_i$.

Employee Relational Stability (Reflectively measured)			
Cronbach's α = .914	CR = .940	AVE = .797	Factor loadings (PCA)
The relationship between your firm and your employees is			
Unstable–stable			.884
Short-term–long-term			.906
Insecure–secure			.916
Unsteady–steady			.863

Employee Loyalty (Reflectively measured)			
Cronbach's α = .449	CR = .791	AVE = .654	Factor loadings (PCA)
Employees talk up their organization to their friends as a great organization to work for			.809
Employees feel very little loyalty to their organization (r)			.809

Organizational Ambidexterity (Reflectively measured)	Factor loadings (PCA)				
	Exploitation		Exploration		
	C2	C3	C1	C4	
Our firm is one that looks for novel technological ideas by thinking “outside the box”.			.877		
Our firm is one that bases its success on its ability to explore new technologies.			.912		
Our firm is one that creates products or services that are innovative to the firm.			.718		
Our firm is one that aggressively ventures into new market segments.				.848	
Our firm is one that actively targets new customer groups.				.825	
Our firm is one that commits to improving quality and lowering costs.		.904			
Our firm is one that continuously improves the reliability of its products and services.		.842			
Our firm is one that constantly surveys existing customers' satisfaction.	.779				
Our firm is one that fine-tunes what it offers to keep its current customers satisfied.	.804				
Our firm is one that penetrates more deeply into its existing customer base.	.756				
	Cronbach's α	.722	.817	.834	.681
	CR	.823	.865	.877	.823
	AVE	.608	.763	.705	.700

Past Performance (Reflectively measured)	Factor loadings (PCA)		
	Growth	Return	
How would you rate your firm's current performance as compared with your competitors?			
Growth in sales	.943		
Growth in market shares	.944		
Growth in profitability		.837	
Return on equity		.933	
Return on total assets		.939	
Profit margin on sales		.892	
Ability to fund growth from profits		.703	
	Cronbach's α	.934	.931
	CR	.942	.936
	AVE	.890	.749

Note. AVE = average variance extracted; CR = composite reliability; PCA = principal component analysis; for the variables *Employee Relational Stability* and *Employee Loyalty*, one component each could be extracted from

Table E-2. Construct validity of Employee Relational Stability, Organizational Ambidexterity, Employee Loyalty, and Past Performance

E.3.2.4 Controls

Based on the previous literature (e.g., Bartholomew & Smith, 2006; Wiklund & Shepherd, 2003), we introduce several control variables into our model that could affect *Employee Relational Stability*.

Firm Size. Smaller firms are often portrayed as offering employees more direct contact with top managers and a more friendly work environment. Consequently, employees in smaller firms have been found to show higher levels of job satisfaction (García-Serrano, 2011; Tansel & Gazioğlu, 2014), which may indicate that *Employee Relational Stability* is also higher in small firms. As is typical in business research (e.g., Woerter, 2012; Yu & Lee, 2017), we operationalize *Firm Size* by drawing on the number of employees. That is, we classified the firms into two size classes: the variable *Firm Size* >499 is coded as “1” if the firm has more than 499 employees (N= 53), and “0” if otherwise.

Retail. The industry a firm operates in may influence the work environment and employees’ job satisfaction (García-Serrano, 2011) and, by implication, *Employee Relational Stability*. Consequently, we include the nominally scaled variable *Retail* in our analyses. This variable is coded as “1” if the firm belongs to the retail industry and “0” if otherwise.

Employee Loyalty. Following Loveman (1998), employee loyalty can manifest itself in service length, thus the employees’ intention to stay with the firm, which is closely related to *Employee Relational Stability*. Hence, higher *Employee Loyalty* may have a positive effect on *Employee Relational Stability*. *Employee Loyalty* was measured using a scale established by Antoncic and Antoncic (2011). The final construct was validated by a PCA, showed sufficient reliability results, and was thus calculated as the mean value of two underlying items and is metrically scaled (see Table E-2). Note that the Cronbach’s α value for *Employee Loyalty* is low, but since

this construct is only based on two items, the CR value is more meaningful for this construct (Hair et al., 2017) and indicates the construct’s sufficient validity.

Past Performance. An organization’s superior *Past Performance* can enable higher investments in employees’ work environment, which is closely linked to job satisfaction (Raziq & Maulabakhsh, 2015). Consequently, better-performing firms may show higher *Employee Relational Stability*. We operationalize our *Past Performance* variable by a construct suggested by Eddleston and Kellermanns (2007) that initially included eight dimensions of performance. For each of these eight dimensions, we asked our survey respondents whether their firm’s performance in the three preceding years had been “lower” or “higher” when compared with their competitors’ performance. Based on a reliability analysis, we eliminated one of the eight items. Afterward, we conducted a PCA with varimax rotation. The PCA results showed that two items related to business growth were loading on one factor, which we label as *Past Performance Growth*. The five other items were more related to profitability and loaded on a second factor, which we term *Past Performance Return*. Also, the two factors showed sufficient reliability results (see Table E-2). The two *Past Performance* variables are metrically scaled and were computed as the mean value of the underlying items.

E.4 Results

E.4.1 Descriptive Results and Correlations

Variables	N	Mean	Min	Max	Median	SD
Employee Relational Stability	127	6.17	2.50	7.00	6.25	.85
Firm Size >499	127	.42	.00	1.00	.00	.50
Retail	127	.08	.00	1.00	.00	.27
Employee Loyalty	127	5.39	2.00	7.00	5.50	1.02
Past Performance Return	127	4.41	1.00	7.00	4.60	1.19
Past Performance Growth	127	4.82	1.00	7.00	5.00	1.12
Degree of Automation	127	10.03	3.00	15.00	10.00	3.49
Organizational Ambidexterity	127	164.60	30.36	343.00	163.28	60.48

Note. N = total number of cases; SD = standard deviation.

Table E-3. Descriptives

Table E-3 shows the descriptive results of our variables. Table E-4 presents a correlation matrix

including the correlations between the independent variables and the dependent variable. Depending on the variables' underlying scale levels (e.g., ordinal, metric), we have used different correlation measures (e.g., *Pearson* and *Phi*). Table E-4 shows no correlation levels of .7 or higher and thus no indication of multicollinearity issues (Dormann et al., 2013).

	Variables	N	1	2	3	4	5	6	7	8
1	Employee Relational Stability	127	1							
2	Firm Size >499	127	-.028	1						
3	Retail	127	-.067	-.010	1					
4	Employee Loyalty	127	.555	-.010	-.011	1				
5	Past Performance Return	127	.233	.093	.012	.224	1			
6	Past Performance Growth	127	.030	.118	.009	.144	.426	1		
7	Degree of Automation	127	.004	.153	-.171	.127	.126	.253	1	
8	Organizational Ambidexterity	127	.129	.088	-.021	.167	.312	.334	.352	1

Note. N = total number of cases; correlations significant at $p < .10$ are indicated in bold; *Pearson* correlation coefficients are used for correlations between metric variables; *Point-biserial* correlation coefficients are used for correlations between metric and dichotomous variables; *Phi* values are used between dichotomous variables (for further information, see Field, 2018).

Table E-4. Correlation matrix

E.4.2 Multiple Regression Analyses

To test our hypotheses, we rely on a hierarchical regression analysis (see Table E-5). In Model 1, we only included control variables, while Model 2 adds the hypothesized main effect and the moderator variable (*Degree of Automation* and *Organizational Ambidexterity*) and Model 3 adds the interaction term *Degree of Automation * Organizational Ambidexterity*. For creating the interaction term, we computed a grand mean centering of the variables included in the interaction effect so that we could better interpret the main effects (Cronbach, 1987; Field, 2018). Concerning potential multicollinearity issues, we also include the variance inflation factors (VIFs) in our models. The critical threshold of VIF values of 10 (Dormann et al., 2013; Hair et al., 2019) was clearly not exceeded, as the highest VIF value in Table E-5 is 1.333. Consequently, we have no indication that our analyses would suffer from multicollinearity problems.

All the models show sufficient predictive validity, as measured by R^2 . Model 3 features a R^2 of .359. The F statistics indicate that all four models are significant at $p < .01$. Although our total number of observations ($N = 127$) is not large, our N would allow for up to 21 independent variables without getting into problems with statistical power (Khamis & Kepler, 2010). Since our models only feature a maximum of nine independent variables, we see no indication of problems with statistical power or overfitting.

As expected in our above discussion of control variables, the results in Model 1 (Table E-5) suggest that *Past Performance Return* ($b = .165, p < .10$) is significantly and positively related to *Employee Relational Stability*. In addition, and as expected, *Employee Loyalty* is also positively associated with *Employee Relational Stability* ($b = .533, p < .01$). The results in Model 2 show no change in the significant relationships. That is, Model 2 shows no direct positive effect of the *Degree of Automation* on *Employee Relational Stability*, which is why $H1$ cannot be confirmed. In addition to the significant correlations between *Employee Loyalty* ($b =$

.528, $p < .01$) and *Past Performance Return* ($b = .155$, $p < .10$), Model 3 suggests a significant negative effect of the interaction term (*Organizational Ambidexterity * Degree of Automation*) on *Employee Relational Stability* ($b = -.126$, $p < .10$), which supports *H2*.

Also, we conducted a simple slope analysis according to Aiken and West (1991) (see Figure E-2) and computed the T-test for the simple slopes to check whether the simple regression line differs from zero (Aiken & West, 1991; Dawson & Richter, 2006). Figure E-2 shows that the solid black line representing a lower level of *Organizational Ambidexterity* (mean *Organizational Ambidexterity* – 1 SD = low) has only a slightly positive but non-significant slope ($t = 1.385$, $p > .1$), while the dashed line representing higher levels of *Organizational Ambidexterity* (mean *Organizational Ambidexterity* + 1SD = high) has a significantly negative slope ($t = -3.035$, $p < .01$). These results suggest that only firms with high levels of *Organizational Ambidexterity* will see a negative effect of the *Degree of Automation* on *Employee Relational Stability*, which confirms *H2*.

<i>Dependent Variable</i>	<i>Employee Relational Stability</i>											
	Control variables only (Model 1)				Main effect added (Model 2)				Interaction effect added (Model 3)			
<i>Independent Variables</i>	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF
Constant		9.041	.000			8.980	.000			9.155	.000	
Firm Size >499	-.025	-.334	.739	1.018	-.016	-.218	.828	1.036	-.007	-.090	.929	1.042
Retail	-.062	-.843	.401	1.001	-.076	-1.007	.316	1.034	-.081	-1.075	.284	1.036
Employee Loyalty	.533	6.997	.000***	1.058	.536	6.964	.000***	1.073	.528	6.902	.000***	1.077
Past Performance Return	.165	1.983	.050*	1.267	.154	1.815	.072*	1.312	.155	1.832	.069*	1.312
Past Performance Growth	-.114	-1.380	.170	1.235	-.108	-1.255	.212	1.332	-.103	-1.216	.227	1.333
Degree of Automation					-.088	-1.062	.291	1.234	-.101	-1.227	.222	1.245
Organizational Ambidexterity					.058	.687	.493	1.292	.070	.833	.406	1.301
Degree of Automation * Organizational Ambidexterity									-.126	-1.696	.093*	1.024
R²			.336				.343				.359	
Adjusted R²			.308				.304				.315	
F			12.238***				8.874***				8.246***	
N			127				127				127	

Note. VIF = variance inflation factor; R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases. Stand. β = standardized regression coefficient β .
* $p < .10$; ** $p < .05$; *** $p < .01$.

Table E-5. Hierarchical regression analysis

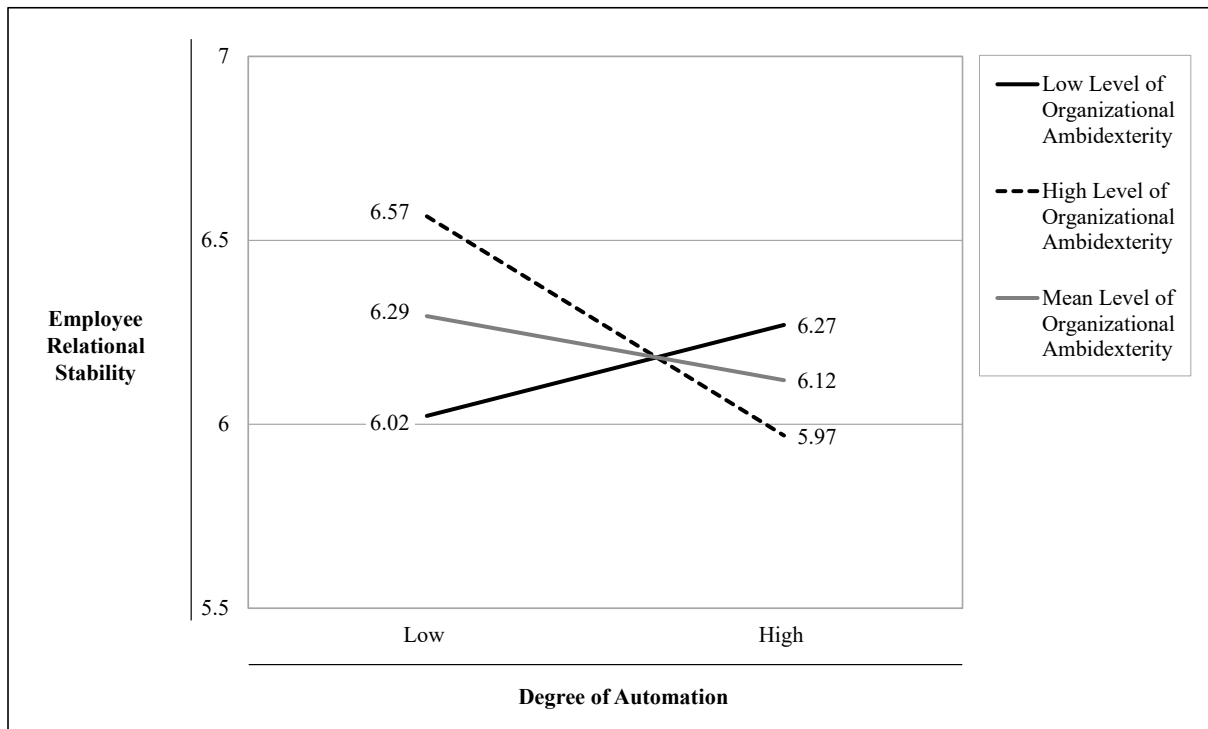


Figure E-2. Interaction between the Degree of Automation and Organizational Ambidexterity on Employee Relational Stability

E.5 Discussion, Conclusions, and Limitations

Given the growing concerns with the outcomes of increasing automation in the business landscape on employees, we have analyzed the impact of automation on employee relational stability. While we did not find a significant universal direct effect in this relationship, our results indicate that for highly ambidextrous firms, higher levels of automation result in lower employee relational stability. We have theorized that this interaction effect is due to employees in ambidextrous firms being used to a balance between exploration and exploitation, and if this balance is distorted due to a growing focus on automation and thus exploitation, the stability of employee relations will suffer.

These findings add to the literature in basically three ways. First, our results add to the so-far limited research on the tensions around and downsides of ambidexterity (e.g., Birkinshaw & Gupta, 2013; Luger et al., 2018; Montealegre et al., 2019; Rothaermel & Alexandre, 2009). The existing ambidexterity literature has overwhelmingly stressed the benefits of a firm-level balance between exploration and exploitation (e.g., Raisch & Birkinshaw, 2008; Raisch et al.,

2009). Recently, it has also been shown that employees' individual-level ambidexterity may foster their entrepreneurial activity (Yeganegi et al., 2019). Our results do not directly challenge these potential positive effects of ambidexterity since our correlation matrix also indicates a significant and positive correlation between ambidexterity and performance (see Table E-4). However, in an environment of increased orientation towards business process innovation and automation, high levels of ambidexterity may come with their idiosyncratic tensions and downsides. In particular, our results indicate that due to their ambidexterity, firms may create an implicit promise to employees that a balance between exploration and exploitation will be upheld. If, however, a firm does not uphold this balance, which can be the case with increased focus on automation and thus exploitation, employees may be irritated or disappointed, which can explain our finding on the negative impact on employee relational stability. This way, our findings also contribute to research suggesting that over extended periods of time, ambidexterity may be hard to uphold (cf. O'Reilly & Tushman, 2013). For business practice, these findings imply that highly ambidextrous firms should examine the effects of increasing levels of automation on their employee relations extremely cautiously, while for limitedly ambidextrous firms, increasing levels of automation do not seem to be a major concern.

Second, our study is among the first to investigate the explanatory power of stakeholder theory for ambidexterity phenomena. While Gambeta et al. (2019) recently theorized and found that good firm-employee relationships are able to predict organizational exploration and exploitation behavior, we theorize and find that a firm's level of ambidexterity may also play a role in shaping firm-employee relationships. That is, based on stakeholder theory, we theorize that if implied ambidexterity norms between a firm and its stakeholders are violated, stakeholders such as employees will be irritated and their relational stability with the firm may suffer.

Third, we add to the growing research on the outcomes of automation for employees. In this

domain, Wright and Schultz (2018) have called for more research on the role of unwritten norms in the relationship between automation and its impact on employees. Our findings suggest that organizational ambidexterity can be considered such a norm and, if threatened through a greater reliance on automation and thus exploitation, the norm may be considered violated, which can explain why we find a negative impact of automation on employee relational stability in highly ambidextrous firms. Our findings are thus among the first to confirm empirically the predictions by Wright and Schultz (2018) on the harmful effects of automation on stakeholder relations. However, our findings qualify this effect by showing that it could only be found for highly ambidextrous firms. This suggests that Wright and Schultz's (2018) propositions, inspired by stakeholder theory, may not hold universally and are moderated by ambidexterity.

While we believe these contributions are important, our underlying research, of course, is not free from limitations. First, our underlying single-respondent data may be a limitation. As we know from Podsakoff et al. (2003), respondents' answers depend heavily on their moods, particularly relatively recent mood-building events and how they see themselves and the world around them. That is, as the respondents' answers represent subjective assessments of their firms, these answers depend heavily on the individual respondent's perception and, therefore, may differ from the firm's objective situation (Podsakoff et al., 2003). Second, in our above theorizing, we basically assume a specific sequence of events. That is, we assume that firms are highly or limitedly ambidextrous in the first place, and then they increasingly turn towards automation (or not), which has an effect on employee relational stability. While recent literature on automation and its effects on employees (e.g., Wright & Schultz, 2018) lend support to this kind of sequence, our cross-sectional data do not allow us to test such a sequence of events directly. Studies based on longitudinal data, including in-depth case studies or time-lagged surveys, are thus needed to corroborate the theory we have developed above on the sequence

of events. Finally, our data stems from Mittelstand firms located near to our university. Since the German Mittelstand is sometimes portrayed as featuring idiosyncratic benefits such as high innovativeness, but also downsides such as limited resources (Audretsch & Elston, 1997; De Massis et al., 2018; Pahnke & Welter, 2019), our findings need corroboration from other regions and types of firms.

References Section E

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F The Impact of Transformational Leadership on Sustainable Supplier Relations: The Moderating Role of Automation and Globalization

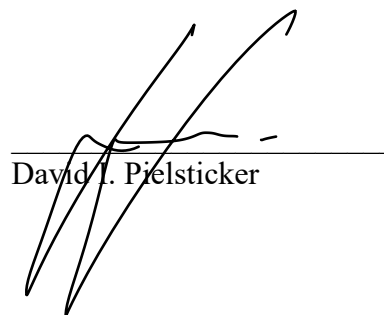
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We, the authors of the paper, hereby declare that this paper's first author, David I. Pielsticker, was responsible for collecting and analyzing most of the data, developing the multiple regression models, and writing most of the paper.



Martin R. W. Hiebl



David I. Pielsticker

F.1 Introduction

Stakeholder theory proposes that a firm must weigh and consider its stakeholders' needs to create its value process and benefit from their recognition (Freeman et alii (et al.), 2010). Berman et al. (1999) and Choi and Wang (2009) showed empirical evidence for the positive influence between a firm's stakeholder relationships and firm performance. In particular, the broad awareness of stakeholders seems to be a critical variable for explaining firm performance (Kacperczyk, 2009). To create such awareness, a firm's leadership may be decisive. According to Rowold and Poethke (2017), transformational leadership can redirect stakeholders' attitudes toward the firm to more often think about its goals. Transformational leaders drive change and growth by overcoming the status quo and inspiring their followers with their visions and goals, thus motivating all of a firm's stakeholders to achieve their full potential (Bass & Avolio, 1993; Men, 2014).

The existing literature indicates the potential impacts of transformational leadership on firms' supply chain relationships (B2B relationships between buyer and supplier firms) (exempli gratia (e.g.), Burawat, 2019; Camarero Izquierdo et al., 2015; Hult et al., 2000, 2007). In organizations with transformational leadership, partnerships with suppliers are generally managed effectively (id est (i.e.), close relationships with suppliers are maintained and management communicate to the firm's employees the importance of partnering with those suppliers), which increases employees' buy-in and encourages them to engage in this partnership (Birasnav, 2013). According to stakeholder theory, which states that achieving organizational goals requires the strategic management of all stakeholder relationships (Freeman et al., 2010), effective supply chain management appears to be essential due to the need for close communication and relationships with suppliers (Burawat, 2019; Hult et al., 2000). Transformational leaders implement a technological infrastructure (Birasnav, 2013) that leads to more information sharing between the firm and its suppliers (Birasnav, 2013; Birasnav

et al., 2015) and can build solid, long-term relationships (Birasnav et al., 2015). Therefore, we assume that transformational leadership affects sustainable supplier relations.

However, the findings in the existing literature (e.g., Burawat, 2019; Camarero Izquierdo et al., 2015; Hult et al., 2000, 2007) are not universally valid and trends such as growing automation and globalization present a changing subject of inquiry concerning the transformational leadership's effects. In recent years, automation has become increasingly important in many industries such as manufacturing and services (Krzywdzinski, 2017). Globalization, defined as the increasing interdependence of markets and production for such stakeholders as suppliers and customers (B2B and B2C) in different countries (Knight, 2000; Smeral, 1998), has also increased in recent years. On the one hand, growing process automation affects the stakeholders of different firms and existing process structures (Wright & Schultz, 2018), changing relationships by making them less personal. On the other hand, the increasing uncertainty of globalization (e.g., unstable countries due to political situations, low product quality) can lead to threats such as global competition, the relocation of production activities, and eventually, the closure of firms (Parrilli et al., 2013), meaning a risk that relationships could fail faster. Therefore, we assume that automation and globalization affect the strength of transformational leadership's effect on sustainable supplier relations.

We test our assumptions based on a survey carried out in 2020 among Mittelstand firms in Germany. Our results indicate that transformational leadership positively affects sustainable supplier relations. However, we also find that in the contemporary environment of growing automation and globalization, this effect no longer applies universally. Our interaction results indicate that transformational leadership is less effective for reaching high levels of sustainable supplier relations when the buyer firm features lower levels of automation and is less affected by globalization. For Mittelstand firms, these results imply that for firms with a low degree of automation and those little affected by globalization, a transformational leader seems most

valuable for upholding stable relations with their suppliers.

The present study has the following structure. First, we present our hypotheses and the literature's corresponding derivations in Section F.2. Section F.3 describes our research methods (sampling and data description). Section F.4 then explains our procedures to ensure valid data and presents the results of our regression, correlation and descriptive analyses. Finally, Section F.5 provides a discussion, including a conclusion and the limitations of the present study.

F.2 Literature Review and Hypotheses

Stakeholder theory proposes that a firm must weigh and consider its stakeholders' needs to create its value process and benefit from their recognition (Freeman et al., 2010). Berman et al. (1999) and Choi and Wang (2009) showed empirical evidence for the positive influence between a firm's stakeholder relationships and firm performance. In particular, the awareness for stakeholders seems to be a critical variable for explaining firm performance (Kacperczyk, 2009). To create such awareness, a firm's leadership may be decisive. According to Rowold and Poethke (2017), transformational leadership can redirect stakeholders' attitudes toward the firm to more often think about its goals. Transformational leaders drive change and growth, overcome the status quo, and inspire their followers with their vision and goals, thus motivating all of a firm's stakeholders to achieve their full potential (Bass & Avolio, 1993; Men, 2014). As transformation leaders create change by listening to and incorporating others' opinions into their decision-making and caring for their followers' feelings and well-being, they are primarily characterized by a high level of interaction and communication with others to better understand and respond to their needs (Men, 2014).

Further, transformational leadership may improve firms' supply chain relationships (B2B relationships) (e.g., Burawat, 2019; see Hult et al., 2000, 2007, for relationship commitment). Camarero Izquierdo et al. (2015) found evidence that the application of transformational

leadership to purchasing managers can enhance the relationship between the firm and its suppliers, allowing for greater coordination with the supplier and higher cost efficiency. In this line, Hult et al. (2007) also showed that transformational leadership positively moderates the relationship between buying centers and supply chain performance. The study by Birasnav (2013) likewise indicated that in firms with transformational leadership, partnerships with suppliers are generally managed effectively (i.e., close relationships with suppliers are maintained and management communicate to the firm's employees the importance of building or maintaining partnerships with suppliers), which increases employees' acceptance and encourages them to engage in this partnership. Furthermore, under stakeholder theory, which states that the achievement of corporate goals requires the strategic management of all stakeholder relations (i.e., taking into account the interests of all stakeholders) (Freeman et al., 2010), effective supply chain management is essential due to the need for close communication and relationships with suppliers (Burawat, 2019; Hult et al., 2000). According to Hult et al. (2000), powerful leadership at all levels of the process is essential for supply chain efficiency. Transformational leaders implement a technological infrastructure and generate a knowledge-supportive culture that promotes organizational learning as well as information sharing between the firm and its suppliers that results in solid, long-term relationships (Birasnav, 2013; Birasnav et al., 2015). Hence, transformational leadership's ability to bring about change through communication may improve supplier relational stability. Therefore, we present the following hypothesis:

Hypothesis 1 (H1). Transformational leadership is positively related to supplier relational stability.

However, the findings in the existing literature (e.g., Burawat, 2019; Camarero Izquierdo et al., 2015; Hult et al., 2000, 2007) are not universally valid and trends such as growing automation and globalization present a changing subject of inquiry concerning the transformational

leadership's effects. In recent years, the phenomenon of automation has become increasingly important in many industries such as manufacturing and services (Krzywdzinski, 2017). According to Arntz et al. (2017) and Autor (2015), automation transfers the firm's operational process from humans to artificial systems. The automation process ranges from hand tools to computer-controlled process technologies (Brownell & Merchant, 1990), and current developments include flexible robots that can create collaborative workplaces with humans (Krzywdzinski, 2017). The increase in process automation in conjunction with artificial intelligence affects a number of the firm's stakeholder groups and changes existing process structures (Wright & Schultz, 2018) and relations. Hence, firms may benefit from production efficiency, reliable production and cost reduction (Parthasarthy & Sethi, 1992).

With the growing introduction of lean automation production processes, suppliers have been given increasingly more responsibility in product development and problem-solving (Pérez & Sánchez, 2001). Partner firms increasingly concentrate on their core skills and outsource all other tasks (Christopher, 2000; Gilley & Rasheed, 2000). To maintain these relationships as a supplier, investments in proportion to a partner firm's order are made; hence, a high dependence on suppliers and partner firms is unavoidable (Christopher, 2000) and suppliers adapt to their partner firms' production systems to generate future profits. These adapted and closed stable collaborations enable a highly competitive supply chain alliance (Dyer, 1996; Yang et al., 2008) and the maintenance of this long-term stable relationship is crucial for mutual business success (Yang et al., 2008; Yang, 2013), as any disruption to the supply chain alliance can lead to costly efficiency losses (Pérez & Sánchez, 2001).

Further, due to the rising degree of automation in recent years, transformational leadership supports and drives the implementation of a technological infrastructure and increases information sharing between the buyer firm and its stakeholders such as suppliers (Birasnav, 2013). According to Birasnav (2013), this implementation is primarily related to supply chain

practices. Hence, we assume that transformational leadership has played an essential role in increasing automation in recent years, especially when the focal firm has a low level of automation. Although transformational leadership is primarily characterized by a high degree of personal communication with stakeholder groups (Burawat, 2019; Hult et al., 2000), this can be limited by rising automation. Hence, whether the idea of transformational leadership remains meaningful and essential is also uncertain. We, therefore, assume that the effect of transformational leadership is moderated by the degree of automation and formulate the following hypothesis:

Hypothesis 2 (H2). The relationship between a firm's transformational leadership and supplier relational stability is more pronounced when the buyer firm features little automation.

According to Knight (2000) and Smeral (1998), globalization is the increasing interdependence of markets and production for such stakeholders as suppliers and consumers in different countries. Globalization and the resulting economic pressures are having a growing impact on firms (Ali et al., 2020; Parrilli et al., 2013). On the one hand, firms that want to go global in their procurement activities are increasingly confronted with developing business relationships with unknown foreign suppliers (Min, 1994). Hence, cost rationalization (e.g., lowering administrative, production and material flow costs) and knowledge absorption through relationships with foreign suppliers (Holmlund & Kock, 1996; Parrilli et al., 2013) appear attractive at first sight. These relationships are often challenging to maintain in the long term and only last as long as the interacting partners remain satisfied (Holmlund & Kock, 1996). However, global procurement is still considerably uncertain, as selecting global suppliers is complicated and risky (Min, 1994). This increasing uncertainty of globalization (e.g., unstable countries due to political situations, low product quality) may lead to threats such as global competition, the relocation of production activities and finally, firm closures (Parrilli et al.,

2013), which could increasingly lead relationships to fail. Further, manufacturers are often faced with the fundamental decision to make a direct sale with the end customer, which is becoming increasingly important due to the rise of internet-based commerce (Yang et al., 2015). Hence, a partner relationship is no longer necessary or the contact between these partners declines. In this line, transformational leaders implement a technological infrastructure that leads to more information sharing in B2B relationships (Birasnav, 2013; Birasnav et al., 2015) and can build solid, long-term relations (Birasnav et al., 2015). However, although transformational leadership is primarily characterized by a high degree of communication and direct contact with various stakeholder groups (see Burawat, 2019; Hult et al., 2000) in B2B relations, this can be limited by the impact of globalization. In addition, as noted earlier, whether the idea of transformational leadership remains meaningful and essential in globalized B2B relationships is uncertain. We, therefore, assume that the effect of transformational leadership is moderated by the impact of globalization and present the following hypothesis (Figure F-1 summarizes our research model and the three hypotheses):

Hypothesis 3 (H3). The relationship between a firm's transformational leadership and supplier relational stability is more pronounced when the buyer firm is little affected by globalization.

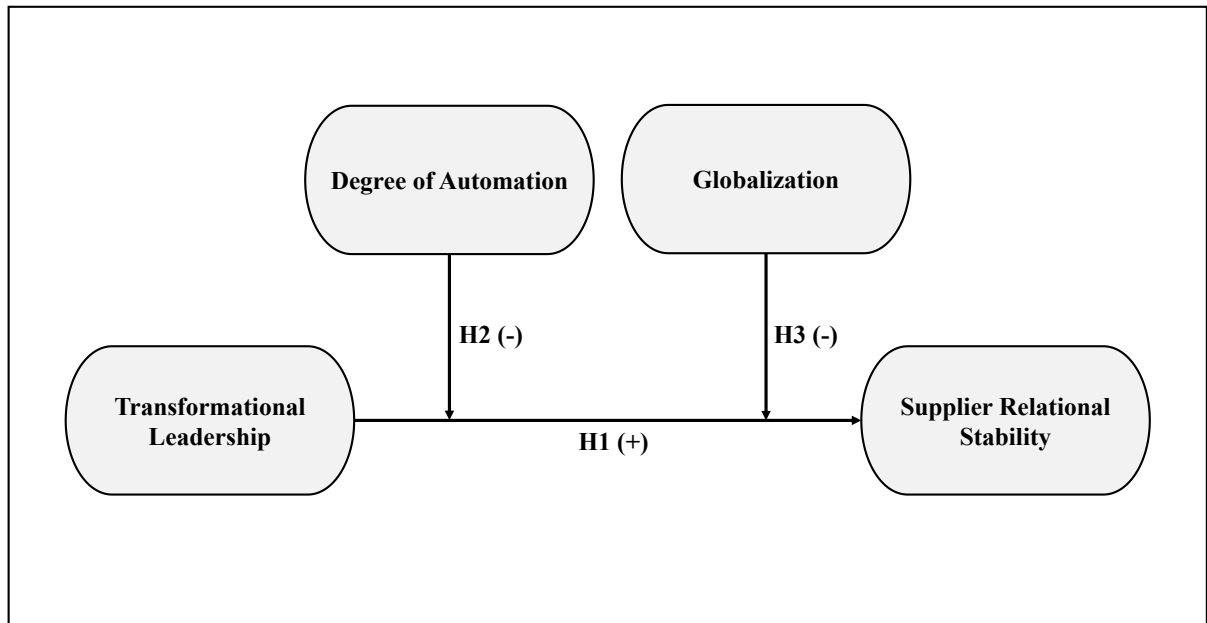


Figure F-1. Research model

F.3 Methods

F.3.1 Sampling and Data Description

As is common in management survey research (e.g., Salojärvi et al., 2010; Doluca et al., 2018), the Amadeus database served as our data pool for the participants of our survey. We directed the online survey to German Mittelstand firms. For this, we used the firms' industry affiliation, number of employees and contact details from the Amadeus database. We defined German Mittelstand firms as having a maximum of 3,000 employees (Becker et al., 2008).

We carried out a manual search for the email addresses of the top managers of the sample firms. During the search, we concentrated on top managers such as Chief Executive Officers (CEOs), since, similar to Bowman and Ambrosini (1997) and Zahra (1991), they have a broad overview of many of the firm's activities. We excluded firms that belong to the financial sector from our data pool. Our sample contained 1118 Mittelstand firms.

For our survey, we mostly used established constructs from the English-language literature (Yang et al., 2008; Salojärvi et al., 2010). Since our survey target was German Mittelstand firms, we translated the constructs into German. We also carried out five pretests with scientists

and five pretests with practitioners to ensure that the structure and comprehensibility of the survey was suitable (Hunt et al., 1982; Reynolds & Diamantopoulos, 1998). To avoid possible translation errors, a research colleague not involved in our survey translated the survey back into English (cf. Brislin, 1970). Our final German-language version of the survey contained slight adjustments based on this procedure.

Invitations to the survey were sent out in early July 2020. The target of the invitations was the top manager of the firm. To increase the response rate, we incentivized participants (see Edwards et al., 2002) by providing a detailed research report and donating EUR 10 to charity. Participants could choose to receive both incentives or only one.

Altogether, 156 partially or fully completed survey questionnaires were received, resulting in a response rate of 14%, which is similar to those of recent studies (e.g., Chithambo et al., 2021; Bhatia, 2021; Gunarathne et al., 2021; Salo et al., 2020; Ljungkvist & Andersén, 2021; Todaro et al., 2021; Bonner et al., 2021). To attempt to increase the response rate, we also approached firms located close to our university. Bartholomew and Smith (2006) found that higher response rates can be achieved when the geographical proximity between the survey authors and addressees is close. Nevertheless, according to Pielsticker and Hiebl (2020) and Mellahi and Harris (2016), response rates in business and management research have decreased significantly in recent years, especially from CEOs (Cycyota & Harrison, 2006). Our final sample contained 121 cases, as we had to exclude 35 cases due to a lack of information.

To counteract non-response bias, we carried out a non-response analysis (van der Stede et al., 2005). Non-response bias may significantly influence our study (van Loon, 2003) because, according to Halbesleben and Whitman (2013), conclusions drawn based on the data may not represent the actual population, making generalization impossible. Consequently, we compared early with late respondents (non-respondents were similar to late respondents) as well as the mean values between late and early respondents (Armstrong & Overton, 1977; Kähkönen et al.,

2018). We then carried out a normal distribution test in the form of a Shapiro–Wilk test and Kolmogorov–Smirnov test. The results showed that no variable was normally distributed, excluding *Transformational Leadership* (Shapiro–Wilk test was not significant, thus greater than .05, see Field, 2018). Thus, we used the T-test for *Transformational Leadership* and non-parametric Mann–Whitney U-test for all the other variables except for the dichotomous variables *Industry*, *Firm Size* and *Family Business*, for which we used the Chi-square test. The results in Table F-1 show no significant differences in the variables (i.e., no indication of non-response bias).

Based on Podsakoff, MacKenzie, Lee et al. (2003), we carried out Harman’s one-factor test to check the problem of common method variance. If only one factor explains a large part of the covariance between the variables or a single factor is extracted, this would indicate common method variance (Podsakoff, MacKenzie, Lee et al., 2003; Podsakoff & Organ, 1986). Our results showed that the highest value of Harman’s one-factor test was 17.868%; hence, the probability of common method variance appeared to be low.

In our study, we used a single respondent approach, which is widely used in management research. Many empirical studies based on the single respondent approach (e.g., Avlonitis & Gounaris, 1997; Ogbonna & Harris, 2000) have been conducted (Bowman & Ambrosini, 1997). According to Flynn et al. (2018), this approach has been criticized for showing common method bias. However, Montabon et al. (2018) pointed out that this survey design can ensure large sample sizes; further, according to Avlonitis and Gounaris (1997), it can allow researchers to choose participants who know about the research topic. Since we surveyed top management team members in our study, we decided to collect the data using the single respondent approach. We also took the specific measures suggested by Podsakoff, MacKenzie, Lee et al. (2003) to contain and avoid the risk of common method bias. For instance, in the sequence of the questionnaire, we introduced a delay between the independent and dependent variables, ensured

the anonymity of respondents and improved our construct items. We also carried out pretests and mainly used established items from the international research literature to allow us to ask our questions concisely, precisely and simply (i.e., respondents were not confronted with complicated syntax).

Variable	Early Respondents	Late Respondents	p value
	Mean	Mean	
Firm Size 100–249	.20	.33	.204
Firm Size 250–499	.20	.23	.785
Firm Size >499	.53	.40	.262
Manufacturing	.60	.75	.152
Retail	.10	.03	.166
Tenure Position	10.40	8.50	.375
Family Business	.63	.78	.143
Stakeholder Interaction	4.27	4.63	.243
Automation	10.05	9.93	.761
Globalization	3.89	4.03	.881
Transformational Leadership	5.78	5.84	.567
Supplier Relational Stability	6.29	6.16	.379

Table F-1. Comparison of late respondents with early respondents

F.3.2 Variable Measurement

As noted above, we used only established constructs from the literature, which were only slightly adapted to suit the current empirical setting. The majority of the variables were multi-item constructs measured using Likert scales. We performed confirmatory factor analyses (CFA) to check how well the measured variables represented the number of constructs (Hair et al., 2019), interpreting only factor loadings $> .4$ (see Field, 2018). We also calculated the average variance extracted AVE (the AVE should not be less than $.5$; see Hair et al., 2019) and composite reliability (CR) (a value of at least $.6$ is acceptable; see Henseler et al., 2009; Schloderer et al., 2009) as part of the construct and reliability analyses (see Table F-2). We further checked collinearity problems by calculating the variance inflation factors (VIFs), especially for the formative constructs. As shown in Table F-2, this confirmed that several individual items could be loaded onto one factor.

Globalization (First-order construct reflectively measured)		
CR = .894	AVE = .589	Factor loading (CFA)
Many of our most important competitors' headquarters are abroad.		.646
Most of our main competitors have distribution channels in Asia and Europe.		.782
Cross-border flow of goods and capital normally happens in our industry without problems.		.632
Within the last ten years, trade with foreign countries has increased enormously.		.895
Within the last ten years, competition with overseas firms has increased enormously.		.782
Within the last ten years, we came to the conclusion in our firm that international sales are an important source for additional revenue.		.832
Stakeholder Interaction (First-order construct reflectively measured)		
CR = .883	AVE = .716	Factor loadings (CFA)
We involve our suppliers closely in the cooperation in development projects.		.841
We communicate intensively with our suppliers.		.873
We emphasize the firm's overall strategy through close cooperation and dialogue with our suppliers.		.824
Supplier Relational Stability (First-order construct reflectively measured)		
CR = .868	AVE = .623	Factor loadings (CFA)
The relationship between our firm and your suppliers is ...		
Unstable – stable		.809
Short-term – long-term		.810
Unsecure – secure		.768
Unsteady – steady		.769
Transformational Leadership (Second-order construct formatively measured)		
Innovation (Formative weight (path coefficient) = .128***; VIF = 1.210) (First-order constructs reflectively measured) (CR = .668; AVE = .501)		Factor loadings (CFA)
I communicate the meaning and background of upcoming tasks and goals.		.717
I show new ways of understanding tasks and goals.		.699
Team spirit (Formative weight (path coefficient) = .225***; VIF = 1.395) (First-order constructs reflectively measured) (CR = .792; AVE = .564)		
I ensure that team members work well together.		.753
I ensure that employees see themselves as team members rather than individuals.		.872
I appeal to the sense of community or togetherness.		.605
Performance development (Formative weight (path coefficient) = .327***; VIF = 1.450) (First-order constructs reflectively measured) (CR = .852; AVE = .595)		
I demand justified best performance from employees.		.798
I explain why top performance is required.		.893
I communicate transparently and comprehensibly that high performance is important.		.765
I communicate my confidence in the ability of the respective employee when defining performance goals.		.602
Individuality focus (Formative weight (path coefficient) = .222***; VIF = 1.299) (First-order constructs reflectively measured) (CR = .823; AVE = .621)		
I know how my employees are doing personally.		.906
I know my employees' individual interests and personal goals.		.883
I support my employees in their professional performance and development.		.512
Vision (Formative weight (path coefficient) = .330***; VIF = 1.601) (First-order constructs reflectively measured) (CR = .826; AVE = .558)		

I inspire through a vision of the future.	.764
I communicate a clear and attractive vision of the future for my team.	.971
I enthusiastically communicate my vision of long-term opportunities, tasks and goals.	.717
I make my employees understand the meaning and value of their work.	.439
To set an example of something to somebody (in the way one lives) (Formative weight (path coefficient) = .237***; VIF= 1.441)	
<i>(First-order constructs reflectively measured) (CR = .753; AVE = .506)</i>	
I exemplify what is important to me.	.721
I am aware of my role as a role model.	.791
I am myself a good example of how members of my organization (or firm) should behave.	.611

Note. AVE = average variance extracted; CR = composite reliability; VIF = variance inflation factor; CFA = confirmatory factor analysis.

* $p < .10$; ** $p < .05$; *** $p < .01$.

Table F-2. Construct validity of Globalization, Stakeholder Interaction, Relational Stability Supplier and Transformational Leadership

F.3.2.1 Dependent Variable

Supplier Relational Stability, as the dependent variable, was measured based on the scale presented by Johnson et al. (2004). Following Johnson et al. (2004), we also used this construct to measure the stability of the relationship between suppliers and the firm on a seven-point Likert scale. Evidence for disseminating this construct has been provided by Yang et al. (2008) and Yang (2013). As shown in Table F-2, the final multi-item construct was grounded on four items, whose mean values were calculated; finally, the variable was a metric scale.

Further, we performed CFA (see Table F-2) as well as calculated a summary measure of the convergence between the items representing the reflectively measured construct using the AVE. We also calculated the CR value as a measure of the reliability and internal consistency of the measured items. All the items showed adequate reliability (see Table F-2).

F.3.2.2 Moderator Variables

Our measurement of *Degree of Automation* was based on the construct of Brownell and Merchant (1990) and scaled metrically. Based initially on Inkson et al. (1970), the measurement was further developed by Brownell and Merchant (1990) to determine a firm's process automation. The measurement consists of three dimensions:

- The evaluation of *Degree of Automation* on a six-point scale (from “one” to “six”) of most of the production equipment of the respondent’s firm,
- The evaluation of *Degree of Automation* on a six-point scale (from “one” to “six”) of the most automated equipment used in the respondent’s firm and
- The evaluation of *Degree of Automation* on a three-point scale (from “one” to “three”) of the quality control of the final product.

We adapted the third dimension above to our empirical setting. Moreover, to address different business sectors, we extended the quality control of products to the quality control of services and goods. *Degree of Automation* was calculated by summing the three-part construct as an index. We found that the higher the index, the higher was the firm’s *Degree of Automation*.

We measured *Globalization*, our second moderator variable, using the multi-item construct proposed by Knight (2000) based on six dimensions. Responses were provided on a seven-point Likert scale (from “completely disagree” to “completely agree”). Respondents were asked to indicate the extent to which the statements about globalization applied to their firm.

Finally, we again performed CFA (see Table F-2) as well as computed the AVE and CR values. All the items showed adequate reliability. The variables were metrically scaled and calculated using the mean values of the items concerned.

F.3.2.3 Independent Variable

We used *Transformational Leadership* as the independent variable, measured following Rowold and Poethke (2017). Initially, the construct contained 24 items, four items for each subscale: innovation, team spirit, performance development, focus on individuality, vision and setting an example to somebody (e.g., in the way one lives). We translated the items initially written in German into English. The behavioral patterns of *Transformational Leadership* can influence and change employees’ attitudes toward considering the firm’s goals over and their own (Rowold & Poethke, 2017). In line with MacKenzie et al. (2005), Podsakoff, MacKenzie,

Podsakoff et al. (2003) and Tyssen et al. (2014), we operationalized *Transformational Leadership* as a second-order construct, with the first-order factors measured reflectively and second-order factors measured formatively. We slightly adapted certain items to suit our empirical setting and ensured the formulation was gender-neutral. Participants were asked to express their behavior toward their employees in the work context to indicate the extent to which they agreed with the item statements. We used a seven-point Likert scale from “completely disagree” to “completely agree.”

As before, we conducted CFA for the first-order constructs reflectively measured (all 24 items) (interpreting only factor loadings $> .4$; see Field, 2018), excluding one item. In line with Hair et al. (2017), we analyzed the impact of removing this item on the AVE. We continued to exclude reflective items (four items) until we reached the recommended AVE threshold of .5 (Hair et al., 2019). Regarding collinearity problems, following Hair et al. (2019), we conducted bootstrapping to determine the significance of the formative weights (path coefficients) in addition to the VIF to address multicollinearity problems (see Table F-2). We adopted the repeated indicator approach by reusing the indicators of the first-order constructs for the second-order construct (van Riel et al., 2017; Braumann et al., 2020). The results showed that no VIF value was above three, indicating no multicollinearity problems and that all the formative weights were significant (Hair et al., 2019). To make the factor loadings applicable for the regression analyses, we calculated the mean of the items of each subscale as well as the mean of the subscales. *Transformational Leadership* was metrically scaled.

F.3.2.4 Control Variables

Family Business. We measured *Family Business* following Steiger et al. (2015), who stated that the use of self-assessment is a common method for operationalizing family firms; hence, we used this measurement as a dichotomous variable in our survey. If the firm under consideration was a family firm, according to the respondent, we coded the variable as one and zero otherwise.

Firm Size. In business research, *Firm Size* is often operationalized as the number of employees (e.g., Arocena et al., 2021; Tsai & Liao, 2017; Wolf, 2013; Simpson & Samson, 2010; Li & Vanhaverbeke, 2009). *Firm Size* can influence the way firms relate to their stakeholders such as suppliers (Darnall et al., 2010), as small firms generally access a greater variety of resources than large firms (Dean et al., 1998); hence, different levels of resources and management may impact supply chain process management (Field & Meile, 2008). In this vein, we also operationalized *Firm Size* using the number of employees. Following Speckbacher and Wentges (2012), we divided the firms in our sample into the following three dichotomous variables: First, we coded the variable as “1” if the firm has more than 99 and less than 250 employees (*Firm Size 100 – 249*, N = 33). Second, we coded the variable as “1” if the firm has more than 249 and less than 500 employees (*Firm Size 250 – 499*, N = 28). Consequently, we coded the variable as “1” if the firm has more than 499 employees (*Firm Size > 499*, N = 51). Firms with less than 100 employees served as the reference category (N = 9).

Industry. The operationalization of industry affiliation is a common method in business research (e.g., Hoejmose et al., 2012; Hörisch et al., 2015). Since *Industry* has been shown to impact a firm’s stakeholder relations (Griffin & Koerber, 2006), we controlled for this variable. Our questionnaire originally asked respondents to select from four industries (service, retail, manufacturing and other). However, in the statistical analysis, we used only two dichotomous variables: First, we coded as “1” if the firm belongs to the category retail (N = 9). Second, we coded as “1” if the firm belongs to the category manufacturing (N = 83). *Industry* as a variable can be regarded as nominally scaled.

Tenure Position. Following Haas and Speckbacher (2017), *Tenure Position* was a metric variable that counted the number of years the respondent has spent in their current position. CEO tenure has a significant impact on a firm’s operations (Shen & Cannella, 2002), particularly influencing the strength of firm-stakeholder relations (Luo et al., 2014). Hence, we

controlled for *Tenure Position*.

Stakeholder Interaction. We operationalized this variable using the construct proposed by Foss et al. (2011). According to Foss et al. (2011), the strength of the interaction with customers, as stakeholders of the firm, is a critical factor affecting innovation performance. Increased interaction through communication and engagement may lead to a more stable and transparent working relationship between the firm and its stakeholders (e.g., Mishra et al., 2014). Initially, Foss et al. (2011) used the construct to measure customer interaction. We slightly adapted this construct to our empirical setting and asked participants to state the extent of their interaction with the firm’s suppliers on three items, namely, project level, communication and strategy. We used a seven-point Likert scale ranging from “not at all” to “to a very large extent.” We also performed CFA (see Table F-2). To calculate a summary measure of the convergence between the items representing the reflectively measured construct, we computed the AVE. Furthermore, we calculated the CR value, which showed that all the items had adequate reliability results. *Stakeholder Interaction* was metrically scaled and calculated as the mean value.

F.4 Data Analysis and Results

F.4.1 Results of the Descriptive and Correlation Analyses

Variable	N	Mean	Min	Max	Median	SD
Firm Size 100–249	121	.27	.00	1.00	.00	.45
Firm Size 250–499	121	.23	.00	1.00	.00	.42
Firm Size >499	121	.42	.00	1.00	.00	.50
Manufacturing	121	.69	.00	1.00	1.00	.47
Retail	121	.07	.00	1.00	.00	.26
Tenure Position	121	9.26	1.00	40.00	7.00	8.35
Family Business	121	.75	.00	1.00	1.00	.43
Stakeholder Interaction	121	4.46	1.00	7.00	4.67	1.35
Automation	121	10.08	3.00	15.00	10.00	3.53
Globalization	121	4.01	1.00	6.83	4.50	1.79
Transformational Leadership	121	5.83	4.53	6.81	5.89	.47
Supplier Relational Stability	121	6.24	3.00	7.00	6.25	.72

Note. N = total number of cases; SD = standard deviation.

Table F-3. Descriptive statistics

Table F-3 shows the results of the descriptive analysis (e.g., *Firm Size*, *Automation*, *Globalization*), showing, for instance, the sample size (N), mean, and median. Table F-4 provides the correlation matrix (including the dependent and independent variables). We applied the *Pearson* correlation coefficient for the correlations between the metric variables; for the correlations between the metric and dichotomous variables, we calculated the *point-biserial* correlation coefficient. Finally, the correlations between the dichotomous variables were calculated using *Phi* values (see Field, 2018 for more information). Significant correlations ($p < .10$) are marked in bold in Table F-4. All the correlation values are below the threshold of .7, which, according to Dormann et al. (2013), indicates no multicollinearity problems for our variables.

Variable	N	1	2	3	4	5	6	7	8	9	10	11	12
1 Firm Size 100–249	121	1											
2 Firm Size 250–499	121	-.336	1										
3 Firm Size >499	121	-.523	-.468	1									
4 Manufacturing	121	-.065	-.051	.037	1								
5 Retail	121	.039	-.006	.013	-.419	1							
6 Tenure Position	121	.059	-.203	.078	-.031	.238	1						
7 Family Business	121	.137	-.275	.025	.271	.090	.225	1					
8 Stakeholder Interaction	121	.106	-.019	-.098	.118	-.027	.135	.135	1				
9 Automation	121	.059	-.124	.080	.487	-.186	.068	.226	.018	1			
10 Globalization	121	.002	.076	-.047	.665	-.202	-.021	.138	.108	.453	1		
11 Transformational Leadership	121	-.102	-.066	.219	.048	.006	-.015	-.013	.322	.102	.164	1	
12 Supplier Relational Stability	121	.076	-.186	.037	.056	.068	.226	.242	.193	.071	.121	.283	1

Note. N = total number of cases; *Pearson* correlation coefficients are used for the correlations between the metric variables; *Phi* values are used for the correlations between the dichotomous variables; *Point-biserial* correlation coefficients are used for the correlations between the metric and dichotomous variables (for further information, see Field, 2018). Correlations significant at $p < .10$ are marked in bold.

Table F-4. Correlation matrix

F.4.2 Multiple Regression Analyses

We tested our hypotheses using two hierarchical regression analyses (see Table F-5 and Table F-6). We carried out six model calculations (three for each regression analysis). Therefore, we considered successively increasing variables in our regression analyses. First, we considered only the control variables; second, the control variables plus the main effect variables; and finally, the interaction effect variables. Regarding multicollinearity, we calculated the VIF to check that the threshold of 10 was not exceeded (Dormann et al., 2013; Hair et al., 2019). Our maximum VIF value is 4.239. Thus, no multicollinearity problems appear in our sample. Following Cronbach (1987) and Hair et al. (2019), we calculated the grand mean centering of the variables contained in the interaction effect, namely, *Automation*, *Transformational Leadership* and *Globalization*. We also calculated the predictive validity of the individual models. Model 3 (Table F-5) has a R^2 value of .238 and Model 3 (Table F-6) has a R^2 value of .229. All six models are significant (see the F statistics). Following Field (2018), a ratio of 10:1 (i.e., 10 observations to one independent variable) is reasonable, allowing a maximum of 12 independent variables per regression analysis (the minimum ratio of observations to variables is 5:1, but a ratio of 15:1 is preferred; see Hair et al., 2019). Thus, we ran two separate regression analyses (e.g., Chen & Hou, 2016; Land et al., 2012) with 11 independent variables in each (ratio of 10:1).

The results of the regression analyses in Model 2 (see Table F-5) indicate that *Tenure Position* ($b = .162, p < .10$) is significantly positively related to *Supplier Relational Stability*. In addition, *Family Business* ($b = .164, p < .10$) has a significantly positive correlation with *Supplier Relational Stability*. *Transformational Leadership* is positively related to *Supplier Relational Stability* ($b = .293, p < .01$), which confirms *H1*. The results in Model 3 show further changes in the significant relationships beyond Model 2. On the one hand, *Tenure Position* ($b = .183, p < .05$) and *Transformational Leadership* ($b = .213, p < .05$) have a significantly positive

relationship with *Supplier Relational Stability*, confirming *H1*. On the other hand, Model 3 shows the significant negative correlation of the interaction effect (*Transformational Leadership * Degree of Automation*) on *Supplier Relational Stability* ($b = -.229, p < .05$), which supports *H2*. The results in Model 2 (see Table F-6) indicate that *Tenure Position* ($b = .159, p < .10$) is significantly positively correlated with *Supplier Relational Stability*. In addition, *Family Business* ($b = .167, p < .10$) is positively related to *Supplier Relational Stability* as well as *Transformational Leadership* ($b = .273, p < .01$), which supports *H1*. The results in Model 3 (Table F-6) show further changes in the significant relationships beyond Model 2 (Table F-6). On the one hand, *Tenure Position* ($b = .188, p < .05$), *Family Business* ($b = .175, p < .10$) and *Transformational Leadership* ($b = .223, p < .05$) have significantly positive relationships with *Supplier Relational Stability*, confirming *H1*. On the other hand, Model 3 (Table F-6) shows the significant negative correlation of the interaction effect (*Transformational Leadership * Globalization*) on *Supplier Relational Stability* ($b = -.178, p < .10$), which supports *H3*.

<i>Dependent Variable</i>	<i>Supplier Relational Stability</i>											
	Model 1				Model 2				Model 3			
<i>Independent Variables</i>	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF
Constant		16.170	.000			4.215	.000			4.901	.000	
<i>Control variables</i>												
<i>Firm Size 100–249</i>	-.076	-.460	.647	3.487	-.107	-.658	.512	3.592	-.124	-.782	.436	3.599
<i>Firm Size 250–499</i>	-.181	-1.095	.276	3.476	-.218	-1.355	.178	3.521	-.226	-1.438	.153	3.523
<i>Firm Size >499</i>	-.088	-.500	.618	3.983	-.197	-1.121	.265	4.226	-.174	-1.008	.316	4.239
<i>Manufacturing</i>	.004	.040	.968	1.400	-.002	-.014	.989	1.716	.007	.064	.949	1.717
<i>Retail</i>	.030	.296	.768	1.352	.017	.174	.862	1.356	.003	.030	.976	1.360
<i>Tenure Position</i>	.140	1.473	.143	1.160	.162	1.748	.083*	1.175	.183	2.009	.047**	1.184
<i>Family Business</i>	.149	1.479	.142	1.296	.164	1.670	.098*	1.311	.152	1.590	.115	1.314
<i>Stakeholder Interaction</i>	.150	1.650	.102	1.057	.043	.454	.651	1.232	.083	.885	.378	1.268
<i>Main effects added</i>												
<i>Transformational Leadership</i>					.293	3.072	.003***	1.239	.213	2.171	.032**	1.380
<i>Automation</i>					-.009	-.090	.929	1.402	-.041	-.408	.684	1.424
<i>Interaction effects added</i>												
<i>Transformational Leadership * Automation</i>									-.229	-2.532	.013**	1.174
R²			.124				.193				.238	
Adjusted R²			.061				.120				.161	
F			1.976*				2.636***				3.097***	
N			121				121				121	

Note. VIF = variance inflation factor; R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases; Stand. β = standardized regression coefficient β .

* $p < .10$; ** $p < .05$; *** $p < .01$.

Table F-5. Hierarchical regression analysis concerning Automation

<i>Dependent Variable</i>	<i>Supplier Relational Stability</i>											
	Model 1				Model 2				Model 3			
<i>Independent Variables</i>	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF	Stand. β	t value	p value	VIF
Constant		16.170	.000			4.324	.000			4.728	.000	
<i>Control variables</i>												
<i>Firm Size 100–249</i>	-.076	-.460	.647	3.487	-.135	-.836	.405	3.583	-.127	-.796	.428	3.585
<i>Firm Size 250–499</i>	-.181	-1.095	.276	3.476	-.249	-1.539	.127	3.606	-.230	-1.441	.153	3.618
<i>Firm Size >499</i>	-.088	-.500	.618	3.983	-.212	-1.219	.225	4.181	-.180	-1.045	.298	4.218
<i>Manufacturing</i>	.004	.040	.968	1.400	-.100	-.746	.457	2.465	-.121	-.911	.364	2.480
<i>Retail</i>	.030	.296	.768	1.352	.006	.057	.955	1.372	-.010	-.102	.919	1.380
<i>Tenure Position</i>	.140	1.473	.143	1.160	.159	1.727	.087*	1.167	.188	2.041	.044**	1.197
<i>Family Business</i>	.149	1.479	.142	1.296	.167	1.719	.088*	1.301	.175	1.826	.071*	1.303
<i>Stakeholder Interaction</i>	.150	1.650	.102	1.057	.048	.508	.613	1.221	.069	.736	.463	1.237
<i>Main effects added</i>												
<i>Transformational Leadership</i>					.273	2.839	.005***	1.270	.223	2.270	.025**	1.360
<i>Globalization</i>					.129	1.069	.287	1.990	.119	.998	.320	1.994
<i>Interaction effects added</i>												
<i>Transformational Leadership * Globalization</i>									-.178	-1.980	.050*	1.140
R²		.124				.202				.229		
Adjusted R²		.061				.129				.152		
F		1.976*				2.777***				2.948***		
N		121				121				121		

Note. VIF = variance inflation factor; R² = coefficient of determination; adjusted R² = adjusted coefficient of determination; F = F ratio; N = total number of cases; Stand. β = standardized regression coefficient β .

* $p < .10$; ** $p < .05$; *** $p < .01$.

Table F-6. Hierarchical regression analysis concerning Globalization

Figure F-2 and Figure F-3 help us better interpret the interaction effect. We conducted a simple slope analysis based on Aiken and West (1991) (see Figure F-2 and Figure F-3) and computed the T-test for the simple slopes to check whether the simple regression line differs from zero (Aiken & West, 1991; Dawson & Richter, 2006). Figure F-2 shows that the solid black line, representing a lower *Degree of Automation* (mean *Degree of Automation* – 1 SD, low), has a significant positive slope ($t = 3.933, p < .01$), which confirms *H2*, while the dashed line, representing a higher *Degree of Automation* (mean value of *Degree of Automation* + 1 SD, high), has only a slightly positive, but insignificant slope ($t = .160, p > .1$). This illustrates that *Degree of Automation* affects the relationship between *Transformational Leadership* and *Supplier Relational Stability*. Figure F-3 presents the moderating role of *Globalization* in the relationship between *Transformational Leadership* and *Supplier Relational Stability*. The solid black line, representing firms little affected by *Globalization* (mean *Globalization* – 1 SD, low), has a significant positive slope ($t = 3.487, p < .01$), which confirms *H3*, while the dashed line, representing firms highly affected by *Globalization* (mean value of *Globalization* + 1 SD, high), has only a slightly positive, but insignificant slope ($t = .376, p > .1$). This illustrates that *Globalization* affects the relationship between *Transformational Leadership* and *Supplier Relational Stability*.

In summary, on the one hand, *Transformational Leadership*'s positive effect in securing and strengthening *Supplier Relational Stability* is more pronounced in firms with lower *Degree of Automation* than in firms with higher *Degree of Automation* (i.e., *H2* is confirmed). On the other hand, *Transformational Leadership*'s positive effect in securing and strengthening *Supplier Relational Stability* is more pronounced in firms that are less affected by *Globalization* than in firms highly affected by *Globalization* (i.e., *H3* is confirmed).

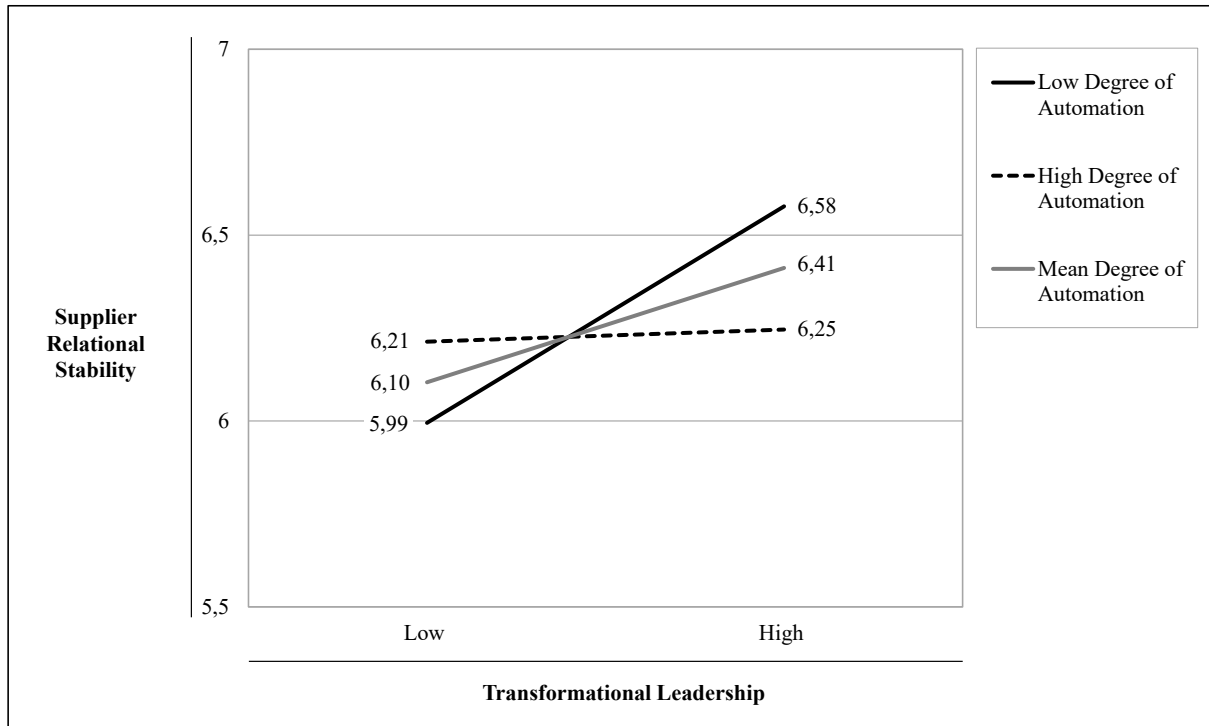


Figure F-2. Interaction between Degree of Automation and Transformational Leadership

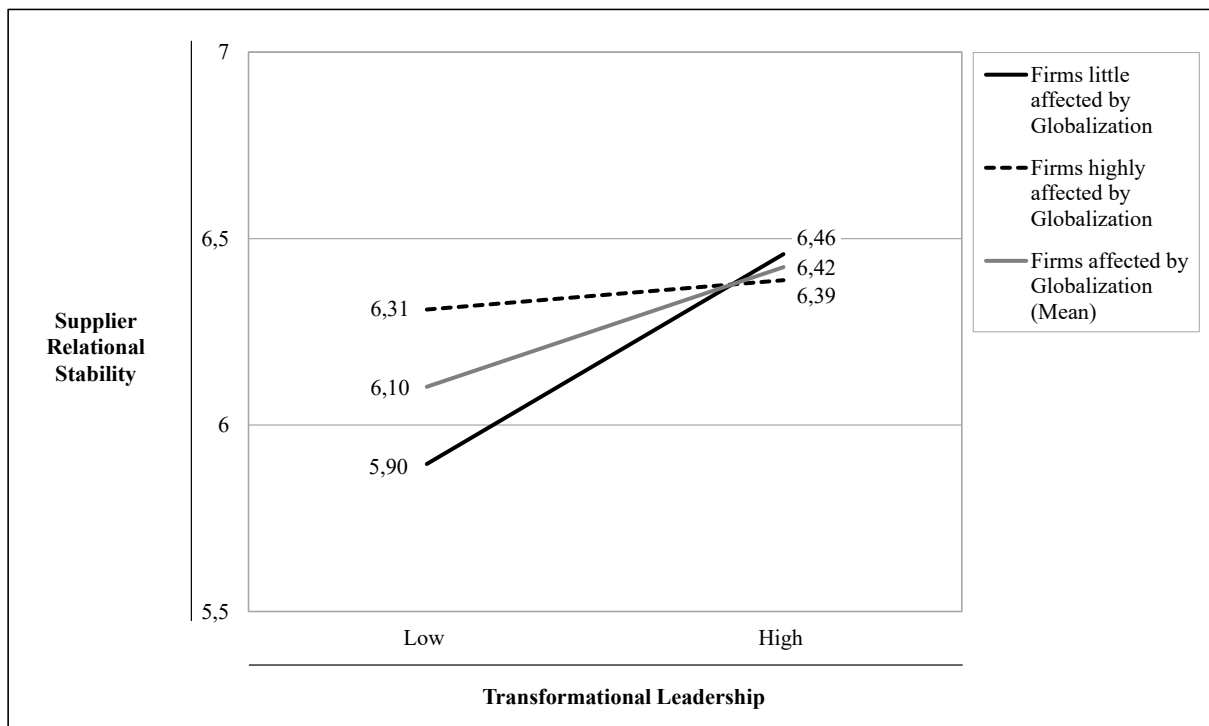


Figure F-3. Interaction between Globalization and Transformational Leadership

F.5 Discussion, Conclusions and Limitations

Considering the growing reliance of contemporary businesses on automation and globalization,

we investigated whether earlier findings of the positive effects of transformational leadership on stakeholder relations still hold today (Hult et al., 2000, 2007). Based on a survey of German Mittelstand firms, while we confirmed this relationship, we also found that it does not hold universally. That is, our results suggest that transformational leadership's positive effect on the stability of supplier relations is more pronounced in firms with a lower degree of automation and that are less affected by globalization. In line with the theory presented in Section F.2, these results indicate that with increasing levels of automation and globalization, the relationship between buyer and supplier firms is no longer as intense, resulting in an apparent weakening of the positive effect of transformational leadership. Put differently, we found evidence that the impact of transformational leaders on supplier relational stability is limited, particularly in firms already highly automated and severely affected by globalization. In such firms, the added value of transformational leadership on positive stakeholder-related outcomes seems limited, which is in contrast to earlier findings in the literature (see Burawat, 2019; Hult et al., 2000).

Our study thus complements the emerging literature on transformational leadership's effects on supplier relationships in four distinct ways. First, our results are the first to confirm the positive relationship between transformational leadership and supplier relational stability for the German Mittelstand. On the one hand, we confirm existing findings in the literature, particularly the results of studies of relationship commitment by Camarero Izquierdo et al. (2015), Hult et al. (2000) and Hult et al. (2007)¹⁹. On the other hand, we replicate these existing results in a different cultural context, that of the German Mittelstand.

Second, our findings indicate that compared with Hult et al. (2000), transformational leadership's positive effect is less evident under the contemporary trends of increasing automation and globalization. In this environment, the personal ties between buyer and supplier no longer seem as intense, with our results suggesting that the positive effect of transformational

¹⁹ Hult et al. (2007) interpreted transformational leadership as a moderator in the relationship between the buying firm and supply chain performance. Similar to our view of transformational leadership, this view also interprets this leadership style as positive for supplier relations.

leadership is no longer as relevant for highly automated business models and those geared toward the global marketplace. Hence, our results suggest that transformational leadership is less beneficial for expanding already high levels of automation and globalization, especially given that highly automated and globally active firms rely less on personal contact and close communication with stakeholders, two strengths typically associated with transformational leaders (Burawat, 2019; Hult et al., 2000). Thus, our results respond to the call by Hult et al. (2000), who suggested further investigating the role of transformational leadership in firms affected by international sourcing activities. An open question that arises from our results is which other leadership styles – if not transformational leadership – may be useful for highly automated and globally active firms to maintain or expand their relational stability with suppliers.

Third, our results challenge the views expressed in the literature that transformational leadership is the preferred leadership style in global firms (Ghasabeh et al., 2015). Ghasabeh et al. (2015) proposed extending future research by measuring the potential impact of transformational leadership theory on the success of local firms that operate and compete in the global market. Our results imply that the effectiveness of transformational leadership in globalized markets, at least in terms of its effect on stakeholder relations, is a context-specific strategy. That is, the positive effect of transformational leadership on stakeholder relations seems to be more effective when the focal firm is relatively unaffected by globalization.

Fourth, we supplement the study by Bass (2000) of the use of transformational leadership in connection with automation. Bass (2000) theorized that introducing new automated technologies should go hand in hand with learning and adaptation opportunities for the firm and its leaders. With its properties such as inspiration and intellectual stimulation, Bass (2000) suggested that transformational leadership helps design and optimize automated technology together with affected stakeholders. However, our results imply that these positive effects of

transformational leadership have limits and may be less apparent under today's trends (i.e., increasing automation) as well as that transformational leadership is less likely to expand already high degrees of automation.

In terms of practical implications, our results imply that supplier relational stability depends on how Mittelstand firms are affected by globalization, the degree of automation, and how their managers expand and apply transformational leadership. From our results, firms with a low degree of automation and little affected by globalization can take away that transformational leadership (still) seems to benefit the stability of their supplier relations. This argument, however, no longer seems to be valid for highly automated and globally active firms.

We acknowledge the following limitations of our study. First, our data mainly relate to the situation in the German Mittelstand, particularly those firms located close to our university, to increase the response rate (see Section F.3). Second, according to Podsakoff, MacKenzie, Lee et al. (2003), a second limitation could be the data collection period. Respondents' answers strongly depend on their mood, especially how they see themselves and the world around them (Podsakoff, MacKenzie, Lee et al., 2003). Since our data were collected during the Covid-19 pandemic (Rapaccini et al., 2020; Alalwan et al., 2021; Epler & Leach, 2021), our respondents' mood and thereby their answers may have differed from situations before or after this crisis.

References Section F

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G Discussion and Conclusion

G.1 Summary and Contributions

Stakeholder theory suggests that firms can be viewed as a group of stakeholders (Aguilera & Jackson, 2003). The central tenet of stakeholder theory is that the firm has to strategically manage these stakeholder relations based on their interests and needs (Freeman et al., 2010; Philips, 2005) to create the optimal value (Freeman et al., 2007; Hillman & Keim, 2001). Besides having a lack of managerial skills and limited resources (Audretsch & Elston, 1997; De Massis et al., 2018; Pissarides, 1999), Mittelstand firms are facing new challenges related to increasing globalization and digitalization, which may affect their business infrastructure as well as the market environments of several stakeholders (Knight, 2000; Strina et al., 2021). Hence, as outlined in Section A.1, building on the interviews with top managers in Mittelstand firms and the theory-driven systematic literature review in Paper 1, this dissertation had the overall aim to analyze four different current challenges (Papers 2 to 5) facing Mittelstand firms to understand how relations with such stakeholders as suppliers, customers and employees can be maintained under increasing digitalization and globalization as well as selected aspects such as automation and innovation.

To summarize, the findings indicate that various stakeholders are affected by increasing digitalization and globalization. However, the extent of the impact is context-dependent and thus influenced by certain factors (i.e., the extent to which the trend toward digitalization and globalization is impacting). Hence, the results indicate that such context-dependent traits include, for instance, the level of a firm's ambidexterity, whether it is a family or non-family firm, which leadership style is being used or the extent to which the firm is already affected by globalization. The results suggest that more globalized Mittelstand firms and non-family Mittelstand firms are more resilient to pandemic crises if they heavily digitalized their business model before the crisis. Also, transformational leadership seems more advantageous for

expanding low levels of automation and globalization. Alongside this, highly ambidextrous firms appear more susceptible to efforts to increase automation, leading to lower relational employee stability. Hence, these results suggest that Mittelstand firms are affected differently by the challenges posed by increasing digitalization and globalization as well as deal with these challenges differently depending on their situations. These context-dependent findings are addressed in more detail by the eight research questions derived from the overarching dissertation research goal. The following subsections summarize the results of the research questions.

G.1.1 Do Higher Levels of Digitalization Increase Entrepreneurial Firms' Resilience to Pandemic Crises?

The findings of Paper 2 indicate that a universal effect of digitalization on crisis resilience cannot be confirmed. Instead, the results suggest that the impact depends on how entrepreneurial firms are affected by globalization and influenced by the family. These moderating effects are discussed in more detail in the following subsection.

G.1.2 How Do Mittelstand Firms' Characteristics (Firms' Level of Globalization, Family Firm Status, Firm Size, Industry Affiliation, Strategy and Past Performance) Impact the Digitalization–Crisis Resilience Relationship?

The results of Paper 2 concerning research question 2 indicate that contextual characteristics such as family firm status and firm's level of globalization affect the relationship between digitalization and crisis resilience. The results suggest that globalized firms and non-family firms are more resilient to a pandemic crisis if they have highly digitalized their business model before the crisis. Against the background of the decline in face-to-face contact throughout the COVID-19 crisis (e.g., Lewnard & Lo, 2020), the increased use of digital technologies appears to reduce the adverse effects of social distancing for more globalized firms and non-family firms. Higher levels of digitalization seem to help these firms maintain cross-cultural interaction, allowing them to continue to transfer knowledge and technology as well as maintain cross-cultural commerce (Nørfelt et al., 2020). As most countries have experienced a severe

economic downturn due to the COVID-19 pandemic (e.g., Fernandes, 2020), the findings suggest that the extent to which globalized and non-family firms are affected by such a crisis can be reduced by a higher level of digitalization. The results contribute to the literature on organizational resilience (Hillmann, 2021; Hillmann & Guenther, 2021; Linnenluecke, 2017; Williams et al., 2017), which has found that organizational resilience is context-dependent, but has overlooked what makes firms resilient during health crises. As such pandemic crises have become more frequent over the past century (Kraus et al., 2020), these findings extend the understanding of the development of resilience to this vital type of crisis, thereby going beyond existing conceptual work (Beninger & Francis, 2021) and qualitative evidence (Fath et al., 2021) on resilience. Hence, the results confirm the context-dependency of organizational resilience (Linnenluecke, 2017), as digitalization does not universally improve resilience to pandemic crises but especially in non-family firms and firms more affected by globalization.

G.1.3 Is Mittelstand Firms' Management Control Effectiveness Positively Related to Organizational Ambidexterity?

The aim here was to understand the relevance of effective management control systems for achieving beneficial firm-level outcomes such as organizational ambidexterity. Such effects have previously been proven for individual control systems (e.g., Bedford, 2015; Ylinen & Gullkvist, 2014). The results of Paper 3 suggest a direct effect of management control effectiveness on organizational ambidexterity. Hence, the findings contribute to the literature on the effectiveness of management controls (Bedford et al., 2016) by suggesting that effective control systems favor high levels of organizational ambidexterity.

G.1.4 Is the Relationship Suggested in Research Question 3 Affected by Different Stakeholder Groups' (Customers, Supplier and Employees) Relational Dynamism?

Like previous management control studies, the findings suggest that management control systems may not directly affect firm-level outcomes and only in some instances of environmental uncertainty or environmental dynamism (e.g., Bisbe & Malagueño, 2012;

Braumann et al., 2020; Demartini & Otley, 2020; Gul & Chia, 1994; Henri & Wouters, 2020; Merchant, 1990; Otley & Pierce, 1995). The findings of Paper 3 expand this strand of the literature by showing that the effectiveness of not only individual control systems but also a firm's overall management control package seems to depend on environmental dynamism. Including insights from stakeholder theory clarifies that environmental dynamism can have effects not only one-dimensionally but in different directions. Hence, the results suggest that splitting the dynamisms into three specific stakeholder groups (suppliers, customers and employees) may better explain the situations in which effective management control systems are the most and least useful. Such effective control systems seem the most beneficial when employee relational dynamism is high and customer relational dynamism is low.

G.1.5 Does the Increasing Degree of Automation in Mittelstand Firms Lead to a Decrease in Employee Relational Stability?

The findings of Paper 4 indicate that a universal direct effect of automation on employee relational stability cannot be confirmed. Instead, the results suggest that a higher degree of automation in firms with high ambidexterity leads to lower employee relational stability. This moderating effect is discussed in more detail in the following subsection.

G.1.6 Is the Relationship Described in Research Question 5 Moderated by Organizational Ambidexterity?

The results of Paper 4 indicate that a higher degree of automation in highly ambidextrous firms leads to less stable relations among employees. It can be theorized that employees in highly ambidextrous firms may be accustomed to balancing exploitation and exploration. When this balance is disrupted by an increasing focus on automation and therefore exploitation, employees may become disappointed and employee relational stability may suffer. These results add to the limited literature on the shortcomings of ambidexterity (e.g., Birkinshaw & Gupta, 2013; Luger et al., 2018; Montealegre et al., 2019; Rothaermel & Alexandre, 2009). The literature on ambidexterity has overwhelmingly emphasized the benefits of a balance between exploitation and exploration at the firm level (e.g., Raisch & Birkinshaw, 2008; Raisch et al., 2009). The

findings also add to research suggesting that ambidexterity can be challenging to maintain over long periods (cf. O'Reilly & Tushman, 2013). The results further complement the increasing research on the consequences of automation for employees. In particular, Wright and Schultz (2018) called for more research into the role of unwritten norms in the association between automation and its influence on employees. The findings suggest that organizational ambidexterity can be viewed as a norm. It can be theorized if threatened by greater reliance on automation, hence on exploitation, the norm may be considered to be violated. This can explain the negative influence of automation on employee relational stability in highly ambidextrous firms. The results thus empirically confirm the predictions by Wright and Schultz (2018) on the harmful effects of automation on stakeholder relationships. However, the findings only apply to highly ambidextrous firms. Hence, the propositions by Wright and Schultz (2018) may not be universally valid and may be moderated by organizational ambidexterity.

G.1.7 Is Mittelstand Firms' Transformational Leadership Positively Related to Supplier Relational Stability?

The findings of Paper 5 indicate that a direct effect of transformational leadership on supplier relational stability can be confirmed. The results complement the literature by validating the positive association between transformational leadership and supplier relational stability for German Mittelstand firms. They also concur with the results of studies of relationship commitment by Camarero Izquierdo et al. (2015) and Hult et al. (2000, 2007). Also, these current findings from the literature are replicated in the cultural context of the German Mittelstand. The direct effect of transformational leadership on supplier relational stability does not apply universally but rather seems to be moderated by globalization and automation. These effects are discussed in more detail in the following subsection.

G.1.8 Is the Relationship Between a Mittelstand Firm's Transformational Leadership and Supplier Relational Stability Affected by the Buyer Firm's Automation and Globalization Level?

Compared with the findings presented by Hult et al. (2000), the results of Paper 5 indicate that

the positive direct effect of transformational leadership on supplier relational stability is less pronounced under the current trend of growing globalization and automation. In the increasingly globalized and automated environment, the personal bond between supplier and buyer no longer seems as intense. The findings indicate that the positive effect of transformational leadership is no longer so relevant for highly automated and global market-oriented firms. Hence, transformational leadership seems less advantageous for expanding the already high degrees of automation and globalization. The results thus follow the call by Hult et al. (2000), who suggested further investigating the role of transformational leadership in firms affected by international sourcing activities. Which different leadership styles could be helpful in highly automated and globally active firms to expand or maintain their supplier relational stability remains open. The findings also challenge the view that transformational leadership is the preferred leadership style in globally active firms (Ghasabeh et al., 2015). Ghasabeh et al. (2015) proposed expanding future research by measuring the potential influence of transformational leadership theory on the success of local firms operating in globalized markets. The findings indicate that the effectiveness of transformational leadership in globalized markets, at least in terms of its impact on stakeholder relationships, is a context-specific strategy. That is, the positive effect of transformational leadership on stakeholder relationships appears to be more effective when the focused firm is relatively unaffected by globalization. The results also complement the findings by Bass (2000) on the use of transformational leadership in the context of automation. Bass (2000) proposed that the adoption of new automated technologies should be accompanied by opportunities for learning and adaptation for the firm and its managers. Further, Bass (2000) suggested that transformational leadership, with its qualities such as intellectual stimulation and inspiration, helps optimize and design automated technologies with the stakeholders involved. However, the findings of the present research indicate that this positive effect of transformational

leadership has limitations under contemporary trends. This means that this effect is less evident for firms featuring higher degrees of automation.

G.2 Practical Implications

The results of the present dissertation can stimulate changes to corporate practice. As the main practical implication, the review findings of Paper 1 indicate that Mittelstand firms' stakeholder relationships add the most value if the stakeholders are satisfied or their interests are considered extensively based on excellent communication. This is often possible by increasing personal and social interaction (e.g., based on trust and shared values) with stakeholders. Consequently, it seems advantageous for Mittelstand firms to engage in collaborative practices with all stakeholders, including suppliers, customers and employees. However, these long-term stakeholder relations are compromised by increasing digitalization and globalization as well as the associated aspects of innovation and business automation. Consequently, it can be assumed that long-term stakeholder relations are at risk. The tensions between the realization of efficiency gains through the business automation and innovation of business processes and management of long-term stakeholder relations are to be expected. Hence, the stability of these long-term stakeholder relations may suffer. Therefore, this dissertation empirically examined how long-term stakeholder relationships with suppliers, customers and employees can be maintained under increasing digitalization and globalization as well as selected aspects such as automation and innovation.

The dissertation's findings imply that digitalization's protection against pandemic crises depends on the extent to which Mittelstand firms are affected by globalization and the strength of the influence of the controlling family. Mittelstand firms' resilience to pandemic crises seems to increase when they are controlled by non-family shareholders or operate in the global market and invest in the Mittelstand firm's digital technologies. The dissertation's findings imply for non-family firms that a higher degree of digitalization is associated with higher crisis resilience.

A possible reason for this could be family firms' long-term orientation and built-in crisis resilience, which makes digitalization seem less critical. By contrast, non-globally active Mittelstand firms seem to benefit less from digitalization in creating resilience to pandemic crises, perhaps because local anchoring and the mutual support from the local community are decreasing due to digitalization.

Also, to remain competitive in an increasingly globalized and digitalized market, Wright and Schultz (2018) suggested that firms have to constantly improve their efficiency by adopting concepts such as automation. The dissertation's findings imply that highly ambidextrous Mittelstand firms should carefully examine the impact of an increasing degree of automation on their employee relationships. By contrast, the effect of the rising degree of automation on employee relational stability does not appear to be a significant problem for less ambidextrous Mittelstand firms.

In terms of practical implications for leadership, the top management's leadership behavior in Mittelstand firms also seems to be crucial for maintaining long-term stakeholder relationships. The dissertation's findings imply that supplier relational stability depends on the extent to which Mittelstand firms are globally active as well as their degree of automation and how their managers expand and apply transformational leadership. Also, the dissertation's findings indicate that Mittelstand firms less affected by globalization and with a low degree of automation, transformational leadership (still) seems to encourage stable supplier relationships. However, the dissertations's findings indicate that this relationship does not apply to globally active and automated Mittelstand firms.

G.3 Limitations and Further Research Avenues

The following limitations should be acknowledged. To draw causal inferences, a cross-sectional design can be used to show that two variables are correlated at a specific point in time (van der Stede, 2014). The application of a cross-sectional design is common in business

research (Rindfleisch et al., 2008; Spector, 2019), as it offers a time-efficient and inexpensive way to collect initial data and identify associations (Spector, 2019). Hence, in the present dissertation, a cross-sectional design is used to test the hypotheses in a broad sample of firms. However, the theory suggests that causal relationships rarely occur simultaneously, meaning that data should be collected at two points in time in the same firm to capture prospective relationships (e.g., a longitudinal study design should be adopted) (van der Stede, 2014). Hence, examining the determined associations in a longitudinal study is recommended in further research.

As a further limitation, the data were collected during the COVID-19 pandemic crisis (e.g., Alalwan et al., 2021; Rapaccini et al., 2020), and the mood of respondents (i.e., how they see themselves and the world around them) and thus their answers could have differed from before or after the crisis (Podsakoff et al., 2003). Therefore, the findings could be reconstructed by collecting data after the COVID-19 pandemic crisis.

Also, the data from the second survey were used to replicate the findings from the data from the first survey in the U.S. According to Bonett (2021), a study may be considered as a comparable follow-up study if the samples are drawn from a population assumed to be similar to the population used in the initial study. However, this criterion was not fully met. The second survey was not aimed at CEOs but rather targeted finance and accounting staff, who often have insights into the operationalization of a firm's strategic goals and how it is performing relative to its peers (Merchant & van der Stede, 2017). This helps mitigate this limitation, but it cannot be ruled out that the answers given by CEOs would have changed marginally.

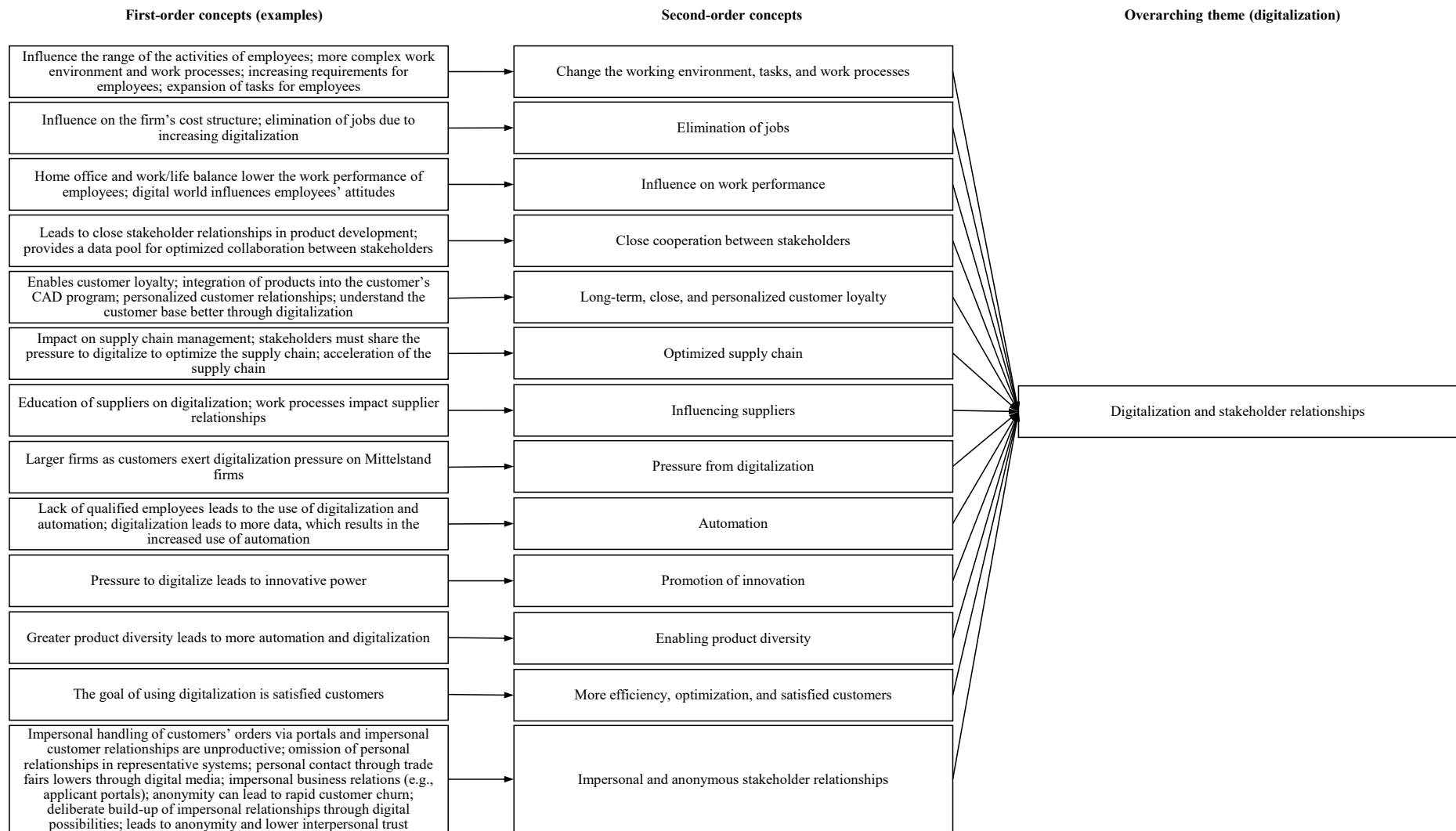
Finally, the dissertation focuses primarily on stakeholders such as employees, suppliers and customers, especially as discussed in quantitative research studies (Papers 2 to 5). Hence, conclusions can only be drawn for a proportion of all potential stakeholder groups. Studying other stakeholder groups such as the media and government would provide additional insights

into how these relations with the firm are changing under growing globalization and digitalization.

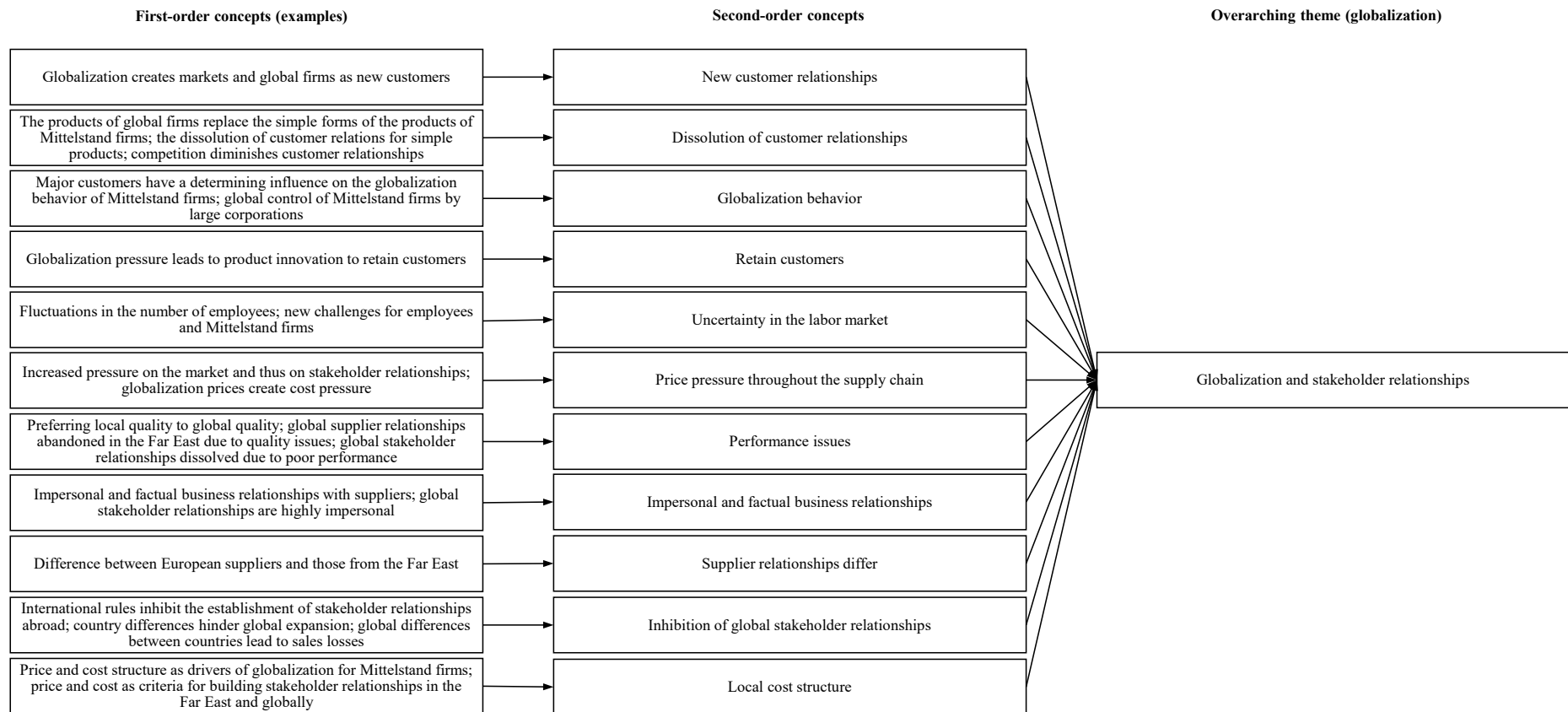
Appendix Dissertation

Distribution	Topic	Guiding question
Introductory questions	Position and activity	Can you briefly describe your position in the firm and the activities you perform?
	Digitalization	Digitalization is a hot topic in the public sphere. To what extent, why and how has digitalization found its way into your firm?
	Globalization	Globalization has also long been a highly discussed topic in the public domain. To what extent, why and how has globalization found its way into your firm?
	Stakeholders	<i>After a brief presentation of the theoretical foundations of stakeholder theory:</i> What is the significance of the various stakeholder groups for your firm? Why? <i>If a multigenerational firm:</i> How important are long-term stakeholder relationships for the firm's long-term survival?
Main questions	Changes in long-term stakeholder relationships (digitalization)	Do you feel that increasing digitalization is changing how you interact with your firm's stakeholders? How does this change manifest? Why?
	Changes in long-term stakeholder relationships (globalization)	Do you feel that increasing globalization is changing how you interact with your firm's stakeholders? How does this change manifest? Why?
	Maintain long-term stakeholder relationships (digitalization)	Has the development of digitalization already been found to have impaired or dissolved long-term stakeholder relationships? How do you counteract this development or what actions do you take to maintain these stakeholder relationships, if necessary?
	Maintain long-term stakeholder relationships (globalization)	Has the development of globalization already been found to have impaired or dissolved long-term stakeholder relationships? How do you counteract this development or what actions do you take to maintain these stakeholder relationships, if necessary?
	Impact of changed stakeholder relationships (digitalization)	How have the stakeholder relationships that have already changed due to digitalization affected your firm? Can you assess or identify the consequences for the regional environment (city, community, population, etc.)?
	Impact of changed stakeholder relationships (globalization)	How have the stakeholder relationships that have already changed due to globalization affected your firm? Can you assess or identify the consequences for the regional environment (city, community, population, etc.)?
Concluding question	Expectations of stakeholders	What do you expect from the stakeholder groups involved in your corporate environment considering increasing digitalization and globalization regarding the long-term firm's wealth?

Appendix Dissertation Table A 1. Interview guide for the expert interview



Appendix Dissertation Figure A 1. Interview codings concerning digitalization and stakeholder relationships



Appendix Dissertation Figure A 2. Interview codings concerning globalization and stakeholder relationships

-
1. How would you describe your gender?
- Female
 - Male
 - Diverse
-
2. Which description is best suited to depict your position in the firm?
- Chair of the Board/CEO
 - Managing Director/CEO
 - Member of the Board, but not CEO
 - Managing Director, but not CEO
 - Other:
-
3. What is your highest level of education?
- Uneducated
 - Elementary school
 - Secondary school
 - A-levels
 - University degree
 - PhD
 - Other:
-
4. Are you a member of a family or the family that owns your firm?
- Yes
 - No
-
5. Would you consider your firm as a family business?
- Yes
 - No
-
6. What is your year of birth?
-
7. For how many years have you worked for your firm?
-
8. For how many years have you worked in your current function at your firm?
-
9. Do you hold a degree in a business-related field (including interdisciplinary fields of study related to business, such as business engineering)?
- Yes
 - No
-
10. Does the current CEO belong to a family or the family that owns the firm?
- Yes
 - No
-
11. Please indicate the shares of equity of your firm that the following parties hold.
- From yourself
 - Family members (without yourself)
 - Non-family members (without yourself)
-
12. Does your firm have a supervisory board?
- Yes
 - No
-
13. Has your firm established an advisory board?
- Yes
 - No
-
14. Has your firm established a Board of Family Members or a Shareholders Committee?
- Yes
 - No
-
15. Please indicate the number of seats held by the following parties in the supervisory board.
- Family members
 - Non-family members
-
16. Please indicate the number of seats held by the following parties in the advisory board.
- Family members
 - Non-family members
-
17. Please indicate the number of seats in the top management team hold by the following parties.
- Family members
 - Non-family members
-
18. How many generations of the owner family are the shares in the share capital distributed among?
- One generation
 - Two generations
 - Three and more generations
-

-
19. Which generation of family ownership in the firm do you belong to?
- 1st (Founder)
 - 2nd
 - 3rd
 - 4th
 - 5th generation or older
-
20. Which generation of family ownership in the firm does the current CEO belong to?
- 1st (Founder)
 - 2nd
 - 3rd
 - 4th
 - 5th generation or older
-
21. How many additional generations of family members are — apart from you — actively involved in the firm?
- One older family generation
 - One younger family generation
 - No family generation
-
22. How many additional generations of family members are — apart from the current CEO — actively involved in the firm?
- One older family generation
 - One younger family generation
 - No family generation
-
23. How many generations of the owner family are active in the firm?
- No generation
 - One generation
 - Two generations
 - Three or more generations
-
24. Please indicate how the management of your firm is organized. (From 1 = “no family member”, 2 = “one family member” to 7 = “multiple family members”)
-
25. Please indicate to what degree you agree or disagree with the following statements. (From 1 = “completely disagree” to 7 = “completely agree”)
- There is much conflict of ideas in our family firm.
 - We often have disagreements within our family firm about the tasks we are working on.
 - We often have conflicting opinions about the projects we are working on in our family firm.
 - We often have disagreements within our family firm about the future strategy.
 - We often have disagreements about who should do what in our family firm.
 - There is much conflict in our family firm about task responsibilities.
 - We often disagree about resource allocation in our family firm.
 - There is much relationship conflict in our family firm.
 - People often get angry while working in our family firm.
 - There is much emotional conflict in our family firm.
 - There is much personal animosity among family members in our firm.
 - There is much conflict of ideas in our family firm concerning digitalization.
 - We often have disagreements within our family firm about the tasks we are working on regarding digitalization.
 - We often have conflicting opinions about the digitalization projects we are working on in our family firm.
 - We often have disagreements within our family firm about the future digitalization strategy.
-
26. Please indicate the intensity of the conflicts mentioned above between the following groups. (from 1 = “very little” to 7 = “very strong”)
- The older family generation and the middle family generation?
 - The older family generation and the younger family generation?
 - The middle family generation and the younger family generation?
 - The older family generation and non-family managers?
 - The middle family generation and non-family managers?
 - The younger family generation and non-family managers?
 - You and non-family managers?
 - The family CEO and non-family managers?
 - The members of the owner family and non-family managers?
 - The members of the owner family
-

-
- k. Non-family managers?
-
27. Please indicate to what degree you and the member of the family that owns the firm agree or disagree with the following statements. (From 1 = “completely disagree” to 7 = “completely agree”)
- We generally try to fulfill each other’s wishes.
 - Whenever possible, we try not to commit to something and try to keep conflicts to ourselves.
 - We usually avoid public discussions about differences.
 - We try to steer a middle course to avoid reaching an impasse.
 - We use our influence to push through our ideas.
 - We use our authority to ensure decisions are made in our favor.
 - Usually, we come to an accommodation.
 - We share precise information to solve problems together.
 - Usually, we encourage steering a middle course to get out of a deadlock situation.
 - We follow the “to give and to take”-principle to ensure that compromises can be found.
 - We try to disclose all our concerns to ensure that problems can be solved in the best way possible.
 - We try to fulfill each other’s expectations.
 - We sometimes compete to get our will.
 - We try to avoid disagreements to prevent negative feelings.
 - We try to work together to gain a mutual understanding of a problem.
-
28. The relationship between your firm and your suppliers is:
- From 1 = “unstable” to 7 = “stable”
 - From 1 = “short-term” to 7 = “long-term”
 - From 1 = “insecure” to 7 = “secure”
 - From 1 = “unsteady” to 7 = “steady”
-
29. The relationship between your firm and your customers is:
- From 1 = “unstable” to 7 = “stable”
 - From 1 = “short-term” to 7 = “long-term”
 - From 1 = “insecure” to 7 = “secure”
 - From 1 = “unsteady” to 7 = “steady”
-
30. The relationship between your firm and your employees is:
- From 1 = “unstable” to 7 = “stable”
 - From 1 = “short-term” to 7 = “long-term”
 - From 1 = “insecure” to 7 = “secure”
 - From 1 = “unsteady” to 7 = “steady”
-
31. Please make a statement about the degree of interaction of your firm. (From 1 = “not at all” to 7 = to “a very high degree”)
- We involve our customers closely in the cooperation in developing projects.
 - We communicate intensively with our customers.
 - We emphasize the firm’s overall strategy through close collaboration and dialogue with our customers.
-
32. Please make a statement about the degree of interaction of your firm. (From 1 = “not at all” to 7 = to “a very high degree”)
- We involve our suppliers closely in the cooperation in developing projects.
 - We communicate intensively with our suppliers.
 - We emphasize the firm’s overall strategy through close collaboration and dialogue with our suppliers.
-
33. Please indicate to what degree the following statements about your firm’s employees are accurate. (From 1 = “very inaccurate” to 7 = “very accurate”)
- Employees talk up their organization to their friends as a great organization to work for.
 - Employees feel very little loyalty to their organization.
-
34. Please provide the total number of firms or organizations you hold a mandate in the supervisory board.
- Your firm
 - Other organizations
-
35. Is your compensation — including your salary, bonus, and other benefits — usually the highest among all firm employees?
- Yes
 - No
-
36. Please name all functional departments in which you have worked in your current firm.
- Administration (accounting, management accounting, facility management)
-

-
- b. HR (recruiting, training, employee development)
 - c. Research and development
 - d. Procurement
 - e. Purchasing logistics
 - f. Production and operations
 - g. Outbound logistics
 - h. Marketing and sales
 - i. Customer service
-
37. Please name the number of employees (full-time equivalent) who are currently employed at your firm.
- a. 1 – 49
 - b. 50 – 99
 - c. 100 – 249
 - d. 250 – 499
 - e. more than 499
-
38. Which industry would you primarily assign your firm to?
- a. Manufacturing
 - b. Trading
 - c. Services
 - d. Other industry
-
39. Which of the following categories best describes most of the equipment that is being used in your firm?
- a. Hand tools and manual machines
 - b. Powered machines and tools (e.g., by electric motors)
 - c. Single-cycle automatic machines and self-feeding machines (concept: unloading, loading, starting by the operator)
 - d. Automatics that repeat cycles (concept: automatic unloading and loading, no feedback)
 - e. Self-measuring and adjusting by feedback (e.g., NC machines)
 - f. Computer-controlled machines (e.g., CNC machines with sensors that provide data to computers to optimize the process using algorithms)
-
40. Which of the following categories best describes the equipment with the highest degree of automation that is being used in your firm?
- a. Hand tools and manual machines
 - b. Powered machines and tools (e.g., by electric motors)
 - c. Single-cycle automatic machines and self-feeding machines (concept: unloading, loading, starting by the operator)
 - d. Automatics that repeat cycles (concept: automatic unloading and loading, no feedback)
 - e. Self-measuring and adjusting by feedback (e.g., NC machines)
 - f. Computer-controlled machines (e.g., CNC machines with sensors that provide data to computers to optimize the process using algorithms)
-
41. Which of the following categories best describes how you perform the quality control of your finished products?
- a. Personal control only. No measurement instruments for automatized quality controls are used.
 - b. Semi-automatized control measurement. Some aspects of the output are automatically measured.
 - c. Completely automatized control measurement. Control measurements are performed automatically for the entire output to ensure a comparison with exact specifications.
-
42. Which of the following categories best describes how you perform the quality control of your trade products?
- a. Personal control only. No measurement instruments for automatized quality controls are used.
 - b. Semi-automatized control measurement. Some aspects of the output are automatically measured.
 - c. Completely automatized control measurement. Control measurements are performed automatically for the entire output to ensure a comparison with exact specifications.
-
43. Which of the following categories best describes how you perform the quality control of your services?
- a. Personal control only. No measurement instruments for automatized quality controls are used.
-

-
- b. Semi-automatized control measurement. Some aspects of the output are automatically measured.
 - c. Completely automatized control measurement. Control measurements are performed automatically for the entire output to ensure a comparison with exact specifications.
-
44. Which of the following categories best describes how you perform the quality control of your finished products or trade products or services?
- a. Personal control only. No measurement instruments for automatized quality controls are used.
 - b. Semi-automatized control measurement. Some aspects of the output are automatically measured.
 - c. Completely automatized control measurement. Control measurements are performed automatically for the entire output to ensure a comparison with exact specifications.
-
45. We define automation as the transfer of firm process functions, particularly process control and regulation, from humans to artificial systems.
Please indicate the current degree (in percent from 0 - 100) of automation in your firm.
-
46. Please indicate to what degree the following statements apply to your firm. Does your firm use unique IT systems/applications to support the procurement to... (1 = "yes for (almost) all our suppliers"; 2 = "yes, for some of our suppliers"; 3 = "yes, for one supplier"; 4 = "no").
- a. Ordering goods or services online?
 - b. Make online payments for ordered products or services?
 - c. Receive electronic invoices?
 - d. Finding suppliers in the market?
 - e. Inviting suppliers to quote prices or submit proposals?
 - f. Running online auctions?
 - g. Collaborating with suppliers to forecast your firm's demand?
 - h. Collaborating with suppliers to design new products and services?
 - i. Managing capacity or inventories of suppliers?
-
47. Please indicate to what degree the following statements apply to your firm. Does your firm use unique IT systems/applications to support the sales department to... (1 = "yes for (almost) all our customers"; 2 = "yes, for some of our customers"; 3 = "yes, for one customer"; 4 = "no").
- a. Receiving online orders?
 - b. Enabling payments online for ordered products or services?
 - c. Sending electronic invoices?
 - d. Sending offers?
 - e. Answering calls after proposals or tenders
 - f. Launching sale auctions, for example, on B2B or B2C marketplaces?
 - g. Collaborating with customers to forecast their demand?
 - h. Collaborating with customers to design new products or services?
 - i. Managing capacity or inventories of customers?
-
48. How strongly do the following groups act as drivers of digitalization in your firm? (From 1 = "very little" to 7 = "very high")
- a. Older family generation
 - b. Middle family generation
 - c. Younger family generation
 - d. Non-family managers
 - e. An owner who belongs to the family (in case there is no younger or older family generation)
 - f. Non-family owners
-
49. The following statements describe your behavior towards your employees in the working context. Please indicate how strongly you agree with the statements. (From 1 = "completely disagree" to 7 = "completely agree")
- a. I communicate the meaning and background of upcoming tasks and goals.
 - b. I show new ways to understand tasks and goals.
 - c. I encourage my employees to question their approaches and ways of thinking
 - d. I listen to new ideas for solving challenges.
 - e. I ensure that team members work well together.
 - f. I ensure that employees see themselves as team members rather than individuals.
 - g. I appeal to the sense of community or togetherness.
 - h. I make employees support goals and tasks together.
-

-
50. The following statements describe your behavior towards your employees in the working context. Please indicate how strongly you agree with the statements. (From 1 = “completely disagree” to 7 = “completely agree”)
- I demand justified best performance from employees.
 - I explain why the top performance is required.
 - I communicate in a transparent and comprehensible manner that a high level of performance is essential.
 - I communicate my confidence in the ability of the respective employee when defining performance goals.
 - I know how my employees are doing personally.
 - I know my employees’ individual interests and personal goals.
 - I support my employees with their professional performance and development.
 - I show my appreciation for my employees.
-
51. The following statements describe your behavior towards your employees in the working context. Please indicate how strongly you agree with the statements. (From 1 = “completely disagree” to 7 = “completely agree”)
- I inspire through a vision of the future.
 - I communicate a clear and attractive vision of the future of my team.
 - I enthusiastically communicate my vision of long-term opportunities, tasks, and goals.
 - I make my employees understand the meaning and value of their work.
 - I exemplify what is important to me.
 - I am aware of my role as a role model.
 - I am a trustworthy role model as an executive.
 - I am myself a good example of how members of my organization (or firm) should behave.
-
52. The following statements describe your behavior towards your employees in the working context. Please indicate how strongly you agree with the statements. (From 1 = “completely disagree” to 7 = “completely agree”)
- I define goals and tasks together with my employees.
 - I make it clear what my employees can expect as a reward or acknowledgment when working successfully.
 - When my employees show performance below average, I give them nuanced feedback to ensure that they can improve themselves.
 - I regularly check whether my employees have reached the agreed-upon performance goals.
 - I pay close attention to mistakes and deviations from the norm.
 - I focus on possible mistakes.
 - I act on established procedures.
 - I track rules and regulations actively.
-
53. We define digitalization in a corporate context as the utilization of digital technologies that complement and enrich current services and products and enable new business models. Please evaluate to what degree (percent) your business model has been digitalized before the COVID-19 crisis.
-
54. Please evaluate to what degree (percent) your business model is currently digitalized.
-
55. To what extent is your firm impacted by the current COVID-19 crisis? (From 1 = “not at all” to 7 = “very strongly”)
-
56. Please indicate to what degree you would agree or disagree with the following statements about the impact of the COVID-19 crisis on your firm. (From 1 = “not at all” to 7 = “very strongly”)
- Was there a decline in orders?
 - Was there a decline in your turnover?
 - Have customers increasingly failed to pay?
 - Has the availability of capital decreased?
 - Have the suppliers been increasingly unable to deliver goods or services?
-
57. Please indicate to what degree the following statements about your firm are accurate. (From 1 = “completely disagree” to 7 = “completely agree”)
- Many of our most important competitors’ headquarters are abroad.
 - Most of our main competitors have distribution channels in Asia and Europe.
 - Cross-border flow of goods and capital normally happens typically in our industry without problems.
 - Within the last ten years, trade with foreign countries has increased enormously.
 - Within the last ten years, competition with overseas firms has increased enormously.
-

-
- f. Within the last ten years, we came to the conclusion in our firm that international sales are an important source of additional revenue.
-
58. Please indicate to what extent you agree or disagree with the following statements about your firm's direction. (From 1 = "completely disagree" to 7 = "completely agree")
- Our firm is an organization that is looking for new technological ideas by thinking "out of the box".
 - Our firm is an organization whose success is based on the ability to explore new technologies.
 - Our firm is an organization that develops products and services being innovative for the firm.
 - Our firm is an organization that is looking for creative ways to satisfy the customers' needs.
 - Our firm is an organization that aggressively ventures into new market segments.
 - Our firm is an organization that is actively targeting new customer groups.
 - Our firm is an organization that is committed to improving quality and reducing costs.
 - Our firm is an organization that continuously improves the reliability of products and services.
 - Our firm is an organization that steadily increases its degree of automation of the work processes.
 - Our firm is an organization that continuously examines the satisfaction of its existing clients.
 - Our firm is an organization which continuously improves its existing range to satisfy present customers.
 - Our firm is an organization that penetrates the existing client base more and more.
-
59. Please read the following descriptions of the two firms. Neither of the two firm types is "good" or "bad" per se.
- Firm A
- Firm A occupies a niche in its market by offering a relatively stable range of products/services.
 - In general, firm A has no leading position in market development related to new products/services.
 - Firm A tends to ignore changes that do not directly affect the present field of activity and focuses on delivering the best performance in its field instead.
- Firm B
- Firm B makes changes (especially supplements) to its products/services quite frequently.
 - Firm B is consistently seeking to pioneer in new fields of the market activity even though not all efforts are successful in the end.
 - Firm B responds quickly to early signals of market demands and market opportunities.
- Looking at industry competitors as a reference and your firm, what type describes your firm best now?
- Firm A
 - Firm B
-
60. How would you rate your firm's performance in the last three years compared to your competitors regarding the following performance indicators? (From 1 = "lower than competitors" to 7 = "higher than competitors")
- Sales growth
 - Growth in market shares
 - Growth in the number of employees
 - Increase in profitability
 - Return on equity
 - Return on assets
 - Profit margin on sales
 - Ability to fund growth from profits
-
61. What is the current weighting of the following priorities at your firm? (From 1 = "very low" to 7 = "very high")
- Efficiency enhancement
 - Being innovative
 - Adaptation to changing business requirements
 - Coordination of the work between the firm's subunits
 - Alignment of employees' activities with the corporate objectives
-
62. We consider the management accounting system as the combination of steering systems and processes used at your firm (e.g., planning, accounting, evaluation/incentive systems, structure, management processes, HR processes, corporate culture, and guidelines).
What is the contribution of your management accounting system for reaching the following priorities
-

now? (From 1 = “very low” to 7 = “very high”)

- a. Efficiency enhancement
- b. Being innovative
- c. Adaptation to changing business requirements
- d. Coordination of the work between the firm’s subunits
- e. Alignment of employees’ activities with the corporate objectives

63. Please indicate to what extent does the management accounting department or the management accounting responsible person perform the following tasks... (From 1 = “not at all” to 7 = “entirely”)

- a. Support of the target setting (e.g., by quantifying corporate objectives).
- b. Provision of strategic, relevant information/analyses (e.g., internal factors or continuous monitoring of competition, market, and customers).
- c. Administration/coordination of the strategy process.
- d. Assessment of the management’s proposals (e.g., related to feasibility, targets, and assumptions).

64. Please indicate to what extent the following statements apply to your firm. The management accounting department or the management accounting responsible person... (From 1 = “not at all” to 7 = “entirely”)

- a. Advises the management proactively by providing recommendations concerning the strategic development of the firm.
- b. Is influential in strategic matters.
- c. Participates in decisions in the choice of the strategy.

65. Please evaluate the relevance of the following criteria for IT systems and applications in management accounting (independently from the current situation within your firm). (From 1 = “very low” to 7 = “very high”)

- a. Quick access and computing time
- b. Usability
- c. Automation and standardization
- d. Flexibility/Customization
- e. Complete integration of the IT systems
- f. Data quality

66. Please evaluate the current status quo of your firm’s IT systems and applications in management accounting regarding the following criteria. (From 1 = “very low” to 7 = “very high”)

- a. Quick access and computing time
- b. Usability
- c. Automation and standardization
- d. Flexibility/Customization
- e. Complete integration of the IT systems
- f. Data quality

67. Please indicate to what extent you agree or disagree with the following statements. (From 1 = “completely disagree” to 7 = “completely agree”)

- a. I often make innovative proposals to improve our business.
- b. I often generate new ideas by observing the environment.
- c. I often generate new ideas by observing how people interact with our products and services.
- d. I often generate new ideas by observing our customers.
- e. I boldly move forward with a promising approach when others are more careful.
- f. I devote my time to others helping them to find ways to improve our products and services.

68. To what extent do the following statements apply to your current position in your firm? (From 1 = “never” to 7 = “always”)

- a. I have to work fast.
- b. I have too much work to do.
- c. I have to work extra to finish a task.
- d. I work under time pressure.
- e. I can do my job comfortably.
- f. I have to deal with backlog at work.
- g. I have problems with the pace of work.
- h. I have problems with the workload.

Appendix Dissertation Table A 2. Survey questionnaire

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