



**TECHNISCHE UNIVERSITÄT MÜNCHEN**

Fakultät für Wirtschaftswissenschaften

Lehrstuhl für Strategie und Organisation

**Essays on the Impact of Digital Transformation on Employees,  
Applicants, and Organizations**

**Nicholas Andreas Folger**

Vollständiger Abdruck der von der Fakultät für Wirtschaftswissenschaften der Technischen Universität München zur Erlangung des akademischen Grades eines Doktors der Wirtschaftswissenschaften (Dr. rer. pol.) genehmigten Dissertation.

Vorsitzende: Prof. Dr. Nicola Breugst

Prüfende der Dissertation: 1. Prof. Dr. Isabell M. Welp

2. Prof. Dr. Jutta Stumpf-Wollersheim

3. Prof. Dr. Alwine Mohnen

Die Dissertation wurde am 25.11.2020 bei der Technischen Universität München eingereicht und durch die Fakultät für Wirtschaftswissenschaften am 15.06.2021 angenommen.

## **Acknowledgments**

Throughout the journey of this dissertation, I had exceptional interactions with many individuals, who did not only support me in developing this academic piece but also contributed to my personal development. Unfortunately, it is not possible to personally thank all of these people, so I will only give credit to those individuals, whose impact was particularly strong.

First, I want to thank my academic supervisor and co-author Prof. Dr. Isabell M. Welpe, for providing me with funding throughout the whole process of this thesis by hiring me as a research associate at her chair for strategy and organization (CSO), for co-authoring two of the three essays and for her continuous support and encouragement. In the same vein, I would like to thank my mentor and co-author Prof. Dr. Jutta Stumpf-Wollersheim who, together with Prof. Dr. Isabell M. Welpe, encouraged me to write this dissertation. Besides co-authoring all three essays, she was always available to provide valuable tips and tricks on academic writing as well as personal development. Thank you both for your untiring support.

Second, I would like to thank my remaining co-author Prof. Dr. Prisca Brosi who invested a considerable amount of her time to be an academic sparring partner and to improve parts of this dissertation by co-authoring two essays. She was also a pleasant roommate for one and a half years at the CSO.

Third, I would like to thank my fellow PhD-colleagues at the CSO and at the TUM School of Management as well as the research assistants and students who supported me in this dissertation journey. I want to personally mention Christoph Höllig and Marvin Schuth who have not only been invaluable for academic and personal discourses but also became good friends over the years. Moreover, I want to personally thank my other roommates at the CSO, Franziska Poszler and Kai Uhlemann for fruitful daily discussions. I also want to thank Eva Pongracz and Petra Langhanki who helped me with many administrative tasks. I remember Stefan Fischer, whose thoughtfulness and sense of humor are missed deeply.

Fourth, additional credits go out to the student assistants Aikaterini Intzevidou, Philipp Schockenhoff, and Salman Rahman who assisted me in my daily work at the CSO. I also want to thank the former Bachelor's and Master's students (Christina Angele, Madeleine Grande, Florian Mahecic, Tamara Smak, Tamaris Stürzenhofecker, Ann Sophie Wild, and Yaoliang Yuan) who assisted me in the collection of parts of the data used in this dissertation (please note: the research questions in the students' theses were different from those investigated in this dissertation thesis).

Fifth, I would like to thank Prof. Dr. Alwine Mohnen for being the third examiner, and Prof. Dr. Nicola Breugst for being the chair of the examination board of this dissertation.

Finally, I want to express my deepest gratitude to my loved ones: my parents Elfi and Herbert, and my sister Jessika (plus family), whose support and trust cannot be expressed in words; all my close friends who know how to make life a pleasure; and of course my better half Sophie, whose understanding, patience, support, and love are invaluable for me.

## **Abstract**

Digitalization is a megatrend that not only leads to societal changes but also transforms organizational models, processes, and structures. In recent years, this development has aroused the interest of management researchers, who are particularly interested in investigating the effects of digital transformation on organizations and the ways how organizations can successfully shape the digital transformation process. While most of the research on digital transformation has focused on the role of decision-makers and thus on a strategic perspective on this topic, our understanding of the effects of digital transformation on stakeholder groups, such as employees, applicants, or members of the general public, is limited. Nonetheless, the perceptions and judgments of these stakeholder groups have a significant influence on whether organizations can successfully manage digital transformation processes. Hence, the goal of this dissertation is to increase this understanding with three empirical essays that examine the perceptions and judgments of these stakeholder groups in the context of digital transformation and to investigate the impacts on employees, applicants, and organizations as a whole. Thereby, the dissertation draws on three different concepts and theories from the management literature: *(individual) ambidexterity*, *applicant reactions*, and *social judgments of organizations*.

Essay I builds on the theory of individual ambidexterity since employees' simultaneous pursuit of exploitative and explorative activities can have positive effects on the longevity of companies, especially in times of substantial changes due to digital transformation. A three-wave study among German employees shows that perceived technological turbulence in the environment of an organization has a positive influence on the ambidextrous behavior of employees and that this relationship can be intensified, if organizations show a high degree of formalization.

Essay II examines how applicants react to digital methods in the personnel selection process and how this ultimately affects organizations. The results of a prospective vignette experiment show that digital selection methods can have both positive and negative effects on employer attractiveness. More specifically, digital selection methods are perceived as more innovative, but at the same time as less fair than more traditional non-digital selection methods in the application and screening stage as well as in the interview stage. While the positive effect is replicated in a retrospective field study, this latter study finds that applicants perceive digital selection methods no longer as significantly less fair than more traditional, non-digital selection methods, after they have participated in the selection process.

By drawing on the theory of social judgments of organizations, Essay III presents three online experiments to show that the public generally perceives established companies as less warm but more competent than start-ups. The higher perception of competence is advantageous in the context of a radical technological innovation since members of the general public expect established companies to be more successful in pursuing this type of innovation due to these competence perceptions. However, if the public receives information about a fatal error connected to the radical technological innovation, this advantage of established companies over start-ups is lost.

In addition to the individual contributions of the three essays to different streams of the management research literature as well as managerial practice, this dissertation also advances the general understanding of the concept of digital transformation. Overall, the results show that digital transformation has an impact on a variety of actors inside and outside an organization; this impact in turn can have positive but also negative effects on different transformational endeavors of organizations. Based on the individual and overall findings, this dissertation derives implications for management research as well as practice and outlines recommendations for future research.

## Deutsche Kurzfassung (German Abstract)

Die Digitalisierung ist ein Megatrend, der neben gesellschaftlichen Veränderungen auch insbesondere zu Transformationen bestehender Organisationsmodelle, -prozesse und -strukturen führt. Diese Entwicklung weckte auch das Interesse von Managementforschern in den letzten Jahren, wobei insbesondere der Frage nachgegangen wird, welche Auswirkungen die digitale Transformation auf Organisationen hat und wie diese den damit verbundenen Wandlungsprozess erfolgreich gestalten können. Während der Großteil der bisherigen Forschung zur digitalen Transformation sich mit der Rolle der Entscheidungsträger beschäftigt und somit eine strategische Perspektive des Themas eingenommen hat, ist unser Verständnis über den Einfluss der digitalen Transformation auf andere Interessengruppen, wie Mitarbeiter, Bewerber, oder die Öffentlichkeit beschränkt. Dabei haben die Wahrnehmungen und Beurteilungen dieser Interessengruppen einen wesentlichen Einfluss darauf, ob Organisationen digitale Wandlungsprozesse erfolgreich gestalten können. Das Ziel der Dissertation ist es, dieses Verständnis zu erhöhen, indem mittels drei empirischer Beiträge, die Wahrnehmungen und Urteile dieser Interessengruppen sowie deren Auswirkungen auf Mitarbeiter, Bewerber und die Organisation als Ganzes im Kontext der digitalen Transformation untersucht werden. Dabei wird im Rahmen der Dissertation auf drei verschiedene Konzepte bzw. Theorien aus der Managementliteratur zurückgegriffen: *(Individual) Ambidexterity*, *Applicant Reactions* und *Social Judgments of Organizations*.

Essay I greift die Thematik der individuellen Ambidextrie auf, da das simultane Verfolgen von exploitativen und explorativen Tätigkeiten durch Mitarbeiter, insbesondere in Zeiten starker Veränderungen aufgrund digitaler Transformation, positive Auswirkungen auf die Langlebigkeit von Unternehmen haben kann. Eine Drei-Wellen-Studie unter deutschen Arbeitnehmern zeigt hierbei, dass wahrgenommene technologische Turbulenzen im Umfeld der Organisation einen positiven Einfluss auf das ambidextere Verhalten von Mitarbeitern haben und

dass dieser Zusammenhang noch verstärkt werden kann, wenn Organisationen einen hohen Grad an Formalisierung aufweisen.

Essay II untersucht, wie Bewerber auf digitale Methoden im Personalauswahlprozess reagieren und welche Auswirkungen dies letztlich auf Organisationen hat. Dabei zeigen die Ergebnisse eines prospektiven Vignettenexperiments, dass digitale Auswahlmethoden sowohl positive als auch negative Effekte auf die Arbeitgeberattraktivität haben können. Konkreter gesagt, werden digitale Auswahlmethoden in der Bewerbungs- und Screeningphase sowie in der Interviewphase als innovativer, aber gleichzeitig auch als weniger fair als traditionellere, wenig digitalisierte Auswahlmethoden wahrgenommen. Während der positive Effekt auch in einer retrospektiven Feldstudie repliziert wird, werden digitale Auswahlmethoden von Bewerbern nach der Teilnahme an Bewerbungsprozessen nicht mehr als signifikant unfairer als traditionellere, wenig digitalisierte Auswahlmethoden wahrgenommen.

Essay III greift auf die Social Judgments of Organizations Theorie zurück. Dabei wird anhand von drei Online Experimenten gezeigt, dass die Öffentlichkeit etablierte Unternehmen generell als weniger warmherzig, dafür als kompetenter als Start-Ups wahrnimmt. Die höhere Kompetenzwahrnehmung ist in Bezug auf radikale technologische Innovationen vorteilhaft, da die Öffentlichkeit dadurch auch von einer höheren Erfolgswahrscheinlichkeit für etablierte Unternehmen ausgeht. Wenn die Öffentlichkeit allerdings von einem fatalen Fehler im Zusammenhang mit der radikalen technologischen Innovation erfährt, geht dieser Vorteil gegenüber Start-Ups verloren.

Neben den individuellen Beiträgen, die die drei Essays zu verschiedenen Literaturströmen der Managementforschung sowie zur Praxis leisten, treibt diese Dissertation auch das Verständnis über die digitale Transformation voran. Insgesamt zeigen die Ergebnisse, dass sich die digitale Transformation auf eine Vielzahl von Akteuren innerhalb sowie außerhalb von Organisationen auswirkt, was wiederum zu positiven oder negativen Effekten auf unterschiedliche

Transformationsunternehmungen der Organisationen führen kann. Basierend auf den individuellen sowie übergreifenden Erkenntnissen leitet diese Dissertation Implikationen für die Managementforschung sowie -praxis ab und skizziert Empfehlungen für zukünftige Forschung.



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## List of Abbreviations

3D	three dimensional
$\alpha$	alpha
adj.	adjusted
AG	Aktiengesellschaft
AVE	average variance extracted
$\beta$	beta, standardized regression coefficient
$b$	unstandardized regression coefficient
BC	bias-corrected
CFI	comparative fit index
CI	confidence interval
COVID-19	corona virus disease 2019
CV	curriculum vitae
$\Delta$	delta (change)
DAX	Deutscher Aktienindex
DNA	deoxyribonucleic acid
EC	established company
e.g.	exempli gratia
et al.	et alii
EUR	Euro
$F$	F-ratio
FORM	formalization
GmbH	Gesellschaft mit beschränkter Haftung
IAA	Internationale Automobil-Ausstellung
i.e.	id est

## List of Abbreviations

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IT	information technology
Ltd.	Limited
<i>M</i>	mean
<i>Mdn</i>	median
<i>n</i>	number of participants in experimental group
<i>N</i>	number of participants in sample
<i>p</i>	p value
p.	page
PhD	philosophiae doctor
<i>r</i>	correlation coefficient
$R^2$	R squared (coefficient of determination)
RMSEA	root mean square error of approximation
RQ	research question
<i>SD</i>	standard deviation
<i>s.e./SE</i>	standard error
SU	start-up
<i>t</i>	t-statistic
T	time
TLI	Tucker Lewis index
TT	technology turbulence
TUM	Technical University of Munich
US	United States
VIF	variance inflation factor
vs.	versus
$\chi^2$	chi-squared statistic

# 1 Introduction<sup>1</sup>

This thesis contributes to a better understanding of digital transformation and its impact on employees, applicants, and organizations overall. More specifically, the analyses in this thesis aim to increase our understanding of how various stakeholder groups (i.e., applicants, employees, and members of the general public) react to, perceive and judge organizations' engagements in digital transformation efforts and how these reactions, perceptions, and judgments affect organizations.

## 1.1 Motivation

Since the commercialization of the internet in 1990, the pace of technological breakthroughs has accelerated, which has led to the digital disruption of entire industries (Karimi & Walter, 2015). While companies in the telecommunications sector as well as the publishing and consumer goods industry were the first in need to adapt their business models to the changes brought about by digital technologies, now, organizations in traditional industries such as banking, healthcare, and industrial production are increasingly feeling the pressure to change their existing businesses (Filotto, Caratelli, & Fornezza, 2020; Hermes, Riasanow, Clemons, Böhm, & Krcmar, 2020; Moschella, 2015; Verhoef et al., 2021; Weill & Woerner, 2015). This organizational change due to digital technologies is subsumed under the term “digital transformation”, which can be defined as “*a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies*” (Vial, 2019, p. 121). In other words, the digital transformation process is an organizational adaptation to technological changes in the environment of an organization that leads to procedural or structural changes as well as changes in the value creation

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<sup>1</sup> This section is partly based on Folger, Brosi, & Stumpf-Wollersheim (under review); Folger, Brosi, Stumpf-Wollersheim, & Welpe (under review); and Folger, Stumpf-Wollersheim, & Welpe (2020).



paths of an organization, which should positively impact an organization's operational efficiency and performance (Vial, 2019).

Failing to adapt their businesses in light of the rapid changes due to digital technologies can put organizations at risk of declining performance and eventually threaten their long-term survival (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Karimi & Walter, 2015; Westerman, Bonnet, & McAfee, 2014). Indeed, only 16% of the companies listed on the Fortune 500 in 1990, the year when the internet was commercialized, remained on that list in 2019. Similarly, only 39 companies of the Fortune Global 100 company list in 1990 remained on that list in 2019. While the development in the Fortune Global 100 is partly the result of the increasing market power of Chinese companies, the fact that nine of the companies that entered the list after 1990 are built on digital business models (e.g., Apple, Alphabet, Amazon, and Microsoft), shows that incumbent players need to adapt to the increasing digitalization of the business world.<sup>2</sup>

Yet, as in the case of any other organizational change process, the success of the digital transformation efforts of organizations is dependent on the support of all the actors that are directly or indirectly affected by the changes (Matt, Hess, & Benlian, 2015). While early digital transformation research has mainly focused on the role of executives and leaders who formulate or adapt strategies to cope with digital changes (e.g., Benlian & Haffke, 2016; Matt et al., 2015), research that looks into the impact of digital change processes on employees, applicants, and the organization as a whole is scarce.

By means of three empirical essays, this thesis addresses this gap. All three essays have in common that they deal with the topic of digital transformation. Yet, this topic is examined from different lenses. The first essay addresses digital transformation from an employee's per-

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<sup>2</sup> The numbers are the author's own calculations based on the official Fortune 500 and Fortune Global 100 lists published by Fortune Magazine in the years 1990 and 2019.

spective by investigating the relationship between technological turbulence and the ambidextrous behavior of employees (i.e., individual ambidexterity), as well as formalization as a potential factor that organizations can use to foster this behavior. The second essay examines applicant reactions to digital personnel selection methods and the impact on an organization's attractiveness as a potential employer. The third and final essay investigates firm stereotypes and social judgments of members of the general public and the impacts on established companies (and start-ups) that pursue a radical technological innovation. The following subsection outlines the relevance of studying these three lenses for digital transformation research and states the respective research questions.

## **1.2 Relevance and Research Questions**

### **1.2.1 Digital Transformation and Individual Ambidexterity**

Digital transformation changes the design of employees' work (Barley, 2015; Colbert, Yee, & George, 2016; Schwarzmüller, Brosi, Duman, & Welpe, 2018) and therefore requires adaptations within the workforce. Due to the increasing incorporation of digital technologies in most work processes, an increasing number of employees need to build new digital skills to cope with these developments (Driver & Gillespie, 1992; Hess, Matt, Benlian, & Wiesböck, 2016) and simultaneously take care of their routine work. For instance, in their investigation of a digital transformation process of a German sports and lifestyle apparel company, Yeow, Soh, and Hansen (2018) found that employees with no information technology (IT) background were responsible for digitalization projects. Thus, the employees had to explore new IT knowledge and, at the same time, exploit their existing knowledge of business processes.

This behavior of employees to simultaneously engage in exploring new opportunities and exploiting existing capabilities in their work roles is termed individual ambidexterity (Kauppila & Tempelaar, 2016; Mom, van den Bosch, & Volberda, 2007). Exploitative work

tasks relate to efficiency or refinement, and explorative work tasks relate to experimentation or innovation (March, 1991).

Even though individual ambidexterity has been linked to positive effects on individual performance (e.g., Kobarg, Wollersheim, Welpe, & Spörrle, 2017; Mom, Fourné, & Jansen, 2015) and organizational performance (Junni, Sarala, Taras, & Tarba, 2013; Mom, Chang, Cholakova, & Jansen, 2019; O'Reilly & Tushman, 2013), our understanding of antecedents of individual ambidexterity is still limited. Specifically, we lack knowledge of the direct effects of perceived environmental pressures, such as technological turbulence, on the ambidextrous behavior of employees as well as of the interaction effects of these environmental forces with organization-specific antecedents, such as formalization.

Addressing this research gap is important for at least two reasons. First, it is generally acknowledged that technological turbulence is a threat to the performance of existing organizations (Boyne & Meier, 2009; Pavlou & El Sawy, 2010). Knowing if employees directly respond with increased ambidexterity when they perceive their organization's environment to be technologically turbulent not only increases our understanding of the antecedents of individual ambidexterity but also helps us to determine whether managers should actively draw their employees' attention to technological turbulence in the environment to address the threat of decreasing performance. Second, due to the complexity of the individual ambidexterity construct, it is necessary to examine interaction effects of environmental and organizational antecedents (Raisch & Birkinshaw, 2008). Investigating such interaction effects can help us understand what organizations can do to increase employees' ambidextrous behavior in technological turbulent environments. Hence, the first goal of this thesis is to address the following research questions:

*RQ 1: Do employees respond with ambidextrous behavior when they perceive high technological turbulence in their organization's environment? How do organizational factors, such as formalization, moderate the relationship between perceived technological turbulence and employees' ambidextrous behavior?*

### **1.2.2 Applicant Reactions to Digital Transformation in Personnel Selection**

In the recruitment and selection process, digital technologies allow organizations to reach a larger pool of global talent for the future workforce, and at the same time, the technologies help save organizations time and financial resources (McCarthy et al., 2017). However, even though companies might be able to reach a larger pool of applicants, digitalization and globalization also increase the competition for top talent, often referred to as “the war for talent” (Beechler & Woodward, 2009). To cope with the challenge of attracting and hiring the best employees (Kuhn, 2015), companies can use the personnel selection process to send signals to applicants that may influence their attraction to the company (Bangerter, Roulin, & König, 2012). By using digital technologies in the personnel selection process, a company sends specific signals to applicants, which might influence applicant reactions and, as a result, increase or decrease their perception of the company’s attractiveness as an employer (Chapman, Uggerslev, & Webster, 2003; McCarthy et al., 2017).

While early recruitment and selection research mainly focused on the perspective of recruiters and organizations (Steiner & Gilliland, 2001), in the early 1990s, researchers started to investigate the applicants’ side of the personnel selection process and found that applicants’ perceptions of selection methods and processes influence important personnel selection outcomes such as employer attractiveness, applicants’ job acceptance intentions and intentions to recommend an employer to others (Hausknecht, Day, & Thomas, 2004). These findings had a tremendous impact on human resource research and practice. Researchers and recruiters alike started to investigate how organizations should structure the personnel selection process to attract and win the best talent (McCarthy et al., 2017).

Even though our understanding of applicants' perceptions has increased remarkably over the last thirty years, research needs to keep up with the fast pace of technological changes in the personnel selection process (Anderson, 2003; McCarthy et al., 2017). Addressing this research need is important for at least three reasons. First, digital technologies change the design

of personnel selection methods and the entire process of personnel selection. For instance, social network profiles replace the traditional *curricula vitae*, assessment tests can be taken online instead of at one of the facilities of the organization, and digital interviews, increasingly assisted by artificial intelligence (Moran, 2018), are a progressively applied alternative to face-to-face interviews (Tippins, 2015). Increasing our understanding of applicants' perceptions of digital selection methods can help us give empirically-based advice to organizations on which digital selection methods might be beneficial to use and which should not be used to increase the perceived organizational attractiveness within the applicant pool. Second, we know that personnel selection methods are often applicants' very first point of contact with an organization (McCarthy et al., 2017), and are therefore interpreted as signals of overall organizational characteristics (Turban, 2001). Hence, investigating applicants' perceptions of digital selection methods helps us to see how applicants interpret these methods and whether digital selection methods have a positive or negative effect on applicants' perceived attractiveness of an employer. Third, in times of extensive use of social networks, online employer review platforms such as *Glassdoor* or *Kununu* have gained tremendous significance, as increasingly more potential applicants use these platforms to gather insights from employees and former applicants who share their experiences in relation to an employer (Van Hove, 2013). Consequently, when former applicants share their experiences about selection processes, the use of digital selection methods might not only influence the perceptions of those applicants who have participated in the selection process but might also affect the image and reputation of an organization, as well as application intentions among other potential applicants (Melián-González & Bulchand-Gidumal, 2016; Woods, Ahmed, Nikolaou, Costa, & Anderson, 2020).

In sum, while digital technologies in the personnel selection process allow organizations to efficiently process large numbers of applicants while saving both money and time, these

benefits can only be leveraged when organizations know how applicants react to digital selection methods and how to make use of positive reactions and avoid negative reactions. Hence, the second goal of this thesis is to answer the following research questions:

*RQ 2: How do applicants perceive digital selection methods in contrast to more traditional non-digital selection methods? Do applicants' employer attractiveness ratings differ between organizations that use digital selection methods and those that do not? What are mechanisms that might mediate the relationship between the degree of digitalization of personnel selection mechanisms and employer attractiveness perceptions?*

### **1.2.3 Social Judgments of Organizations in the Face of Digital Transformation**

From the change management and legitimacy literature, we know that in addition to the potential positive effects that an organizational change process such as digital transformation might have for an organization, it can also represent a threat to the legitimacy and as a result to the long-term performance of an organization (Bitektine & Haack, 2015; Dowling & Pfeffer, 1975). The legitimacy of an organization can be understood as the social judgments and perceptions of external actors such as the general public with respect to the social acceptability of the organization's activities (Bitektine, 2011; Rindova, Pollock, & Hayward, 2006). As members of the general public usually have only limited information about the background of an organization's decisions and activities, they use mental shortcuts (i.e., heuristics) such as firm stereotypes to make their judgments about the organization (Bitektine, 2011; Mishina, Block, & Mannor, 2012; Tversky & Kahneman, 1974). Generally, firm stereotypes do not change in stable environments; however, when organizations face technological changes and therefore are required to digitally transform, for example, by introducing radical technological innovations (Benner, 2010), external actors receive new information, which might change their judgments about an organization (Mishina et al., 2012).

While early social judgment research has focused on individuals or small groups, more recently, scholars have investigated social judgments of firms and organizations (Aaker, Vohs, & Mogilner, 2010; Bitektine, 2011). Even though the first empirical studies support the theory that external actors such as customers and the general public use stereotypes to assess how an organization should or should not behave (Aaker et al., 2010; Yang & Aggarwal, 2019), we lack an understanding of the role of firm stereotypes in the context of the digital transformation or digital disruption of whole industries when companies are required to engage in radical technological innovation (Ansari & Krop, 2012; Christensen, 1997). Specifically, we do not know whether stereotypes can be beneficial or harmful for established companies when they compete with disruptive start-ups in the context of radical technological innovations.

Filling this research gap is important for at least three reasons. First, radical technological innovation is distinct from existing activities, and its outcomes are uncertain and unpredictable (McDermott & O'Connor, 2002). Hence, evaluators can base their judgments about the success of specific firms in pursuing a radical technological innovation on limited information only, which makes evaluators prone to proxies such as stereotypes (Bitektine, 2011). Second, under conditions of incomplete information, evaluators in the public use stereotypes to assess the legitimacy and the reputation of an organization (Bitektine, 2011; Mishina et al., 2012), which, in turn, can impact the performance of the firm (Bitektine & Haack, 2015). Established companies need to be aware of these stereotypes to avoid potential threats to their existing legitimacy and reputation. Third, increasing our knowledge of how members of the general public form social judgments about organizations in the context of radical technological innovations can help established companies make more informed decisions about how to pursue such innovations while avoiding potential negative effects on the companies' legitimacy and reputation. Consequently, the third goal of this thesis is to answer the following research questions:

*RQ 3: Do people hold stereotypes of firms based on the fact that a company is an established company or a start-up? Are social judgments based on firm stereotypes beneficial or harmful for established companies when pursuing radical technological innovations? Are social judgments of firms stable or do they change when evaluators receive new (negative) information regarding a radical technological innovation?*

### **1.3 Theoretical Background**

Overall, this thesis covers three fields in management research that have drawn increasing attention from scholars and practitioners as part of the growing spread of digitalization within businesses and society: ambidexterity, applicant reactions, and social judgments of organizations. While this thesis investigates the reactions, perceptions, and judgments of three stakeholder groups (i.e., employees, applicants, and members of the general public) in the context of digital transformation and the respective impacts on employees, applicants, and organizations, the underlying conceptual frameworks are drawn from organizational management theories, human resource management theories, and organizational behavior theories. The following sections provide an overview of the conceptual and theoretical basis of the three empirical essays in this thesis.

#### **1.3.1 Ambidexterity**

The concept of ambidexterity was first mentioned in management research by Duncan (1976) who used the term organizational ambidexterity to refer to the capacity of organizations to build separate structures for initiating and executing innovation. Later, scholars picked up on Duncan's research by extending the scope of the concept from innovation management to organizational management. These researchers suggested that organizational ambidexterity can be conceptualized as the simultaneous engagement in exploitative activities to secure the profits



of the business of today and explorative activities to adapt to changes and to secure long-term relevance (Levinthal & March, 1993; March, 1991).

The simultaneous pursuance of exploitation and exploration is considered a necessity for organizations seeking to respond to dynamic environments with ever-changing market demands and technologies (Tushman & O'Reilly, 1996). While a focus on exploitation benefits short-term performance, it can result in an organization being unable to quickly react to environmental changes (Ahuja & Morris Lampert, 2001), as seen in the failures of Kodak and Polaroid (O'Reilly & Tushman, 2013). Conversely, organizations that put too much effort into exploration may be able to easily adapt to environmental changes due to their continuously renewing knowledge base, yet they might get caught in an endless cycle of renewal, which leads to inefficiencies, resource waste, and declines in short-term performance (Volberda & Lewin, 2003).

Even though scholars generally agree that ambidexterity is an organizational requirement for long-term survival and performance (Junni et al., 2013; O'Reilly & Tushman, 2013), in his landmark article, March (1991) mentions two main reasons why achieving the right balance between exploitation and exploration is a challenging and difficult endeavor for many organizations. First, organizations have a natural bias towards exploitative activities because in contrast to explorative activities, the outcomes are predictable and therefore the returns are rather certain. Second, explorative and exploitative activities require capabilities that are fundamentally different, as exploration is directed towards innovation and experimentation, while exploitation aims to increase an organization's efficiency (March, 1991; O'Reilly & Tushman, 2013; Raisch & Birkinshaw, 2008). Acknowledging these two main barriers, researchers have increasingly investigated how organizations can become ambidextrous and which factors might promote ambidexterity (Raisch & Birkinshaw, 2008).

Early ambidexterity research argued that due to the fundamental differences between exploitation and exploration, organizations need to make a trade-off between exploration and

exploitation (Burns & Stalker, 1961). Hence, for twenty years, the dominant logic on how organizations can achieve ambidexterity was that they need to sequentially switch between explorative and exploitative activities over time (Duncan, 1976; Tushman & Romanelli, 1985).

Yet, with the increasing maturation of the field, researchers suggested that the sequential approach is not feasible in fast-changing, dynamic environments (Tushman & O'Reilly, 1996). Hence, organizational research shifted from a trade-off thinking to a paradoxical way of thinking (Eisenhardt, 2000; Lewis, 2000) that proposes a simultaneous pursuit of exploitation and exploration through a structural separation of two different units (i.e., an exploitation unit and an exploration unit) linked by a common strategy and set of values (O'Reilly & Tushman, 2013).

While both the sequential and the simultaneous strategies are focused at the organizational level, Gibson and Birkinshaw (2004) suggest that ambidexterity can also be achieved at an individual level when organizations provide contexts that “*enable and encourage individuals to make their own judgments about how to divide their time between conflicting demands for alignment and adaptability*”<sup>3</sup> (p. 211). The authors’ approach acknowledges that in the majority of organizations, most employees face at least some kind of dilemma regarding how to divide their time between exploitative tasks that benefit the organization today and explorative tasks that might benefit the organization in the future (Birkinshaw & Gupta, 2013). While decision-makers in organizations might face this dilemma more frequently, research suggests that employees at lower hierarchy levels also increasingly have to balance exploitative and explorative tasks (Birkinshaw & Gupta, 2013). For instance, Yu, Patterson, and Ruyter (2013) found that frontline workers in customer service need to make judgments about how to divide their work time and attention between achieving sales targets (exploitation) and improving service quality (exploration). Conversely, knowledge workers, such as researchers, who are generally expected

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<sup>3</sup> Ambidexterity research generally converges around the duality of exploitation and exploration. Yet, different terminologies are used in the ambidexterity literature (Birkinshaw & Gupta, 2013). In this context, alignment means exploitation and adaptability means exploration.

to engage in explorative tasks directed towards finding innovative solutions and new opportunities, are also required to fulfill exploitative tasks, such as administrative work or documentation (Kobarg et al., 2017).

Since Gibson and Birkinshaw's seminal paper in 2004, research on ambidexterity at the individual level has gained momentum. In particular, the question of how employees can build the paradoxical capability of ambidexterity (March, 1991), has attracted the attention of researchers (Mom et al., 2015). Empirical studies have found that in addition to an organizational context characterized by a high degree of stretch, discipline, support, and trust (Gibson & Birkinshaw, 2004), individual predispositions such as locomotion orientation, intrinsic motivation, role integration, self-efficacy, and the ability to handle work stress can increase employees' ambidextrous behavior (Jasmand, Blazevic, & Ruyter, 2012; Kauppila & Tempelaar, 2016; Mom et al., 2019; Zhang, Feng, & van Horne, 2018). Moreover, a specific type of leadership, namely, paradoxical leadership, which combines intense management support with high performance expectations, has a positive effect on ambidexterity at the individual level (Kauppila & Tempelaar, 2016).

Despite these advancements, research on the antecedents of individual ambidexterity is still in its infancy. In particular, our understanding of the influence of environmental contexts on individual ambidexterity and the ways how organizations can help their employees become ambidextrous under the pressures of specific environmental conditions (e.g., technological turbulence) remains unclear.

### **1.3.2 Applicant Reactions**

Applicant reactions research is considered a field in human resource management science that focuses on the perceptions and responses of applicants to selection methods and processes (McCarthy et al., 2017). The research field emerged in the late 1980s and early 1990s when scholars argued that the personnel selection process is important not only for organizations to select their employees but also for applicants to decide if they would like to work for

an organization (Ryan & Ployhart, 2000). To obtain a better understanding of applicants' perceptions, reactions, and decisions to work for an organization, rather than focusing on one independent theory, scholars have drawn on several theoretical lenses over the years (McCarthy et al., 2017).

In 1993, Gilliland proposed his “*model of applicants' reactions to employment selection systems*” (p. 700), which, to this day, is considered the seminal framework for applicant reaction research (McCarthy et al., 2017). Drawing on organizational justice theory, Gilliland suggested that perceptions of the fairness of selection methods and processes might influence various reactions during the selection process (e.g., job acceptance decisions, application recommendations, organizational attractiveness) and after the selection process (e.g., performance, job satisfaction).

In addition to empirically testing Gilliland's theoretical framework (for an overview, see Hausknecht et al., 2004; Uggerslev, Fassina, & Kraichy, 2012), scholars expanded the theoretical lenses in the late 1990s and 2000s to advance the research field (McCarthy et al., 2017). In their recent review, McCarthy et al. (2017) identify nine theoretical perspectives, researchers have drawn on to increase our knowledge of applicant reactions to personnel selection methods: expectations theory (e.g., Sanchez, Truxillo, & Bauer, 2000), fairness heuristic theory (e.g., Gamliel & Peer, 2009), attribution theory (e.g., Ployhart, Ehrhart, & Hayes, 2005), decision-making theory (e.g., Anderson, Born, & Cunningham-Snell, 2001), institution theory (e.g., König, Klehe, Berchtold, & Kleinmann, 2010), psychological contract theory (e.g., Anderson, 2011), image theory (e.g., Ryan, Sacco, McFarland, & Kriska, 2000), theories of trust (e.g., Klotz, da Motta Veiga, Buckley, & Gavin, 2013), and signaling theory (e.g., Wilhelmy, Kleinmann, Melchers, & Lievens, 2018).

In particular, signaling theory has drawn increasing interest from applicant reaction researchers in recent years due to the efforts of many organizations to digitally transform their personnel selection methods and processes by incorporating digital technologies (Tippins,

2015). According to signaling theory (Spence, 1973), applicants form perceptions of an organization based on the information or signals that they receive during a selection process (Bangerter et al., 2012; McCarthy et al., 2017; Rynes, Bretz, & Gerhart, 1991). Hence, by using digital technologies in their personnel selection processes, organizations can send specific signals that might be interpreted as indicators of general organizational characteristics, for example, being innovative, sophisticated, or less formal (Anderson, 2003; McCarthy et al., 2017). However, digital technologies might also signal unintended information to applicants. For instance, applicants might have the impression that their privacy has been invaded (e.g., through social-network screening or video interviews that occur from applicants' homes) and therefore they might perceive a selection process as less fair (Bauer et al., 2006) and an organization as less attractive (Stoughton, Thompson, & Meade, 2015).

Given the potential positive as well as negative effects of digital technologies on applicants' perceptions and reactions, there is a need for more research that investigates which perceptions or signaling mechanisms might increase or decrease applicants' attraction to an organization that uses digital technologies in the personnel selection process.

### **1.3.3 Social Judgments of Organizations**

The theory of social judgments of organizations is a rather young theory in organizational management research that extends our understanding of organizational legitimacy by integrating the evaluator's perspective, which is based on social judgments under conditions of uncertainty and bounded rationality (Bitektine, 2011). Organizational legitimacy can be defined as *"a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions"* (Suchman, 1995, p. 574) and is considered essential for an organization's success, growth, and survival (Zimmerman & Zeitz, 2002). While most of the research so far has focused on how organizations can establish and maintain organizational legitimacy (e.g., Rao, 1994;

Suchman, 1995; Suddaby & Greenwood, 2005), Bitektine (2011) argues that this approach underestimates the role of external actors and their cognitive processes, their information-gathering procedures and their social interactions, which are essential for organizational legitimacy and might even have the potential to compromise an organization's efforts to build and maintain legitimacy.

When considering external actors, social judgments, defined as “*an evaluator's decision or opinion about the social properties of an organization*” (Bitektine, 2011, p. 152), lead to organizations being perceived as legitimate or not (Zimmerman & Zeitz, 2002). In general, external actors, such as members of the general public, need to make their social judgments based on incomplete information about an organization (Cyert & March, 1963; March & Simon, 1958). The literature suggests two different types of analytical processes that evaluators use to make their social judgments about the legitimacy of an organization under conditions of uncertainty: cognitive legitimacy and sociopolitical legitimacy (Aldrich & Fiol, 1994). In a cognitive legitimacy judgment, evaluators use the visible characteristics of an organization (e.g., age, size, profit model) to try to classify the organization as a member of a group of already known and legitimate organizations with similar characteristics (Barron, 1998). Hence, the theory of social judgments of organizations proposes that if an organization can be assigned to such a group, evaluators expect this organization to behave like the organizations in that group and therefore perceive it as legitimate (Bitektine, 2011). In a sociopolitical legitimacy judgment, evaluators' legitimacy assessments are contingent on the compatibility of an organization's form, actions, and outcomes with prevalent social norms (Bitektine, 2011; Dowling & Pfeffer, 1975).

Due to evaluators' incomplete information, both legitimacy judgment procedures can be prone to different heuristics and biases (Bitektine, 2011; Tversky & Kahneman, 1974). Hence, the psychology and organizational behavior literature suggests that evaluators use proxies, such as stereotypes, to make their judgments about the social properties of an organization (Aaker et al., 2010). Specifically, there are two universal stereotype dimensions that people use

when evaluating other individuals (Judd, James-Hawkins, Yzerbyt, & Kashima, 2005), which are also used when people evaluate groups or organizations: warmth and competence (Aaker et al., 2010; Fiske, Cuddy, & Glick, 2007; Malone, Fiske, & Runnette, 2013). While warmth refers to an emotional and social orientation that considers the needs and thoughts of others, competence refers to a decisive orientation aimed at carrying out objectives efficiently and effectively (Bakan, 1966; Cuddy, Fiske, & Glick, 2008; Yang & Aggarwal, 2019).

Empirical research has already shown that these two stereotype dimensions are used by evaluators to differentiate between different types of organizations, such as nonprofit and for-profit organizations (Aaker et al., 2010), or small and large organizations (Yang & Aggarwal, 2019). Yet, these studies assumed stable environments. The questions of how evaluators form their judgments about different types of organizations that react to unstable environments, for instance by pursuing radical technological innovations when facing digital transformation, how uncertainty about the outcomes affects the evaluators' judgments, and how those judgments might change when new information emerges remain unanswered (Bitektine, 2011; Mishina et al., 2012).

### **1.4 Research Methods, Data Sources, and Analytical Procedures**

All essays in this dissertation take a quantitative empirical approach. This approach is suitable, as the overall goal of all studies is to test hypotheses, which are developed based on existing concepts and theories (i.e., a deductive approach; Weathington, Cunningham, & Pittenger, 2012).

*Essay I.* The design of the study in Essay I (Chapter 2) is a three-wave online-survey of 739 German employees. This design is suitable for testing research questions that focus on the antecedents of individual ambidexterity for two reasons. First, this design allows for temporal separation of the independent (i.e., antecedents) and dependent (i.e., individual ambidexterity)

variables (Kauppila & Tempelaar, 2016), which makes tests of the impact of the proposed antecedents on individual ambidexterity at later points in time feasible. Additionally, temporal separation mitigates common method bias, which, if not addressed adequately, can be a problem in self-report surveys (Podsakoff, MacKenzie, & Podsakoff, 2012). Second, individual ambidexterity is generally known to be a dynamic rather than a stable trait (Raisch, Birkinshaw, Probst, & Tushman, 2009; Rosing & Zacher, 2017). The collection of data at several points in time accounts for this dynamism.

The primary survey data were collected between October and December 2018 with a gap of three weeks between each consecutive wave. Participants were full-time employees in Germany who were addressed by the German panel provider *Consumerfieldwork GmbH*, which specializes in online surveys for research purposes. The measures for all variables had already been used and validated in other contexts in prior empirical research. The original measures were in English and were translated into German using back-and-forth translation (Brislin, 1970).

Due to the nature of the research model with one dependent variable, several control variables, a moderator variable, and an independent variable, regression analyses were used to test the hypotheses. This analytical procedure conforms with other multi-wave studies on individual ambidexterity (e.g., Tempelaar & Rosenkranz, 2019).

**Essay II.** The second essay comprises two studies. While the first study is based on a prospective experimental vignette survey among potential applicants, the second study is based on a retrospective cross-sectional online survey among actual applicants.

The experimental vignette study allows for causal inferences, and therefore, the design is especially suitable for answering the research questions on applicants' perceptions of digital selection methods in contrast to traditional selection methods with a low degree of digitalization. Adding a follow-up field study has two main benefits. First, by combining both studies, scholars can interpret the results with more confidence, as this approach mitigates concerns about the



generalizability of the study findings to the broader population (in the case of experimental vignette studies) as well as about constrained control over extraneous variables (in the case of field studies; Anderson, Lindsay, & Bushman, 1999; Bauer et al., 2006). Second, while participants in the experimental vignette study were confronted with a fictitious setting before taking part in a personnel selection process, the field study enhances realism as it looked at the perceptions of actual applicants who had already participated in the personnel selection processes of real organizations.

Both studies were administered online, and participants were approached via social media, personal contacts, and the student network at the TUM School of Management. Before designing the vignette for the first study, non-digital personnel selection methods<sup>4</sup> used in previous empirical studies were matched with similar digital methods that are already used by organizations in practice. Afterwards, a prestudy was conducted to determine, for each selection stage (i.e., application & screening stage, assessment stage, interview stage), pairs of digital and non-digital selection methods that showed large effect sizes. Based on the effect sizes, one pair for each selection stage was chosen as an independent variable for the experimental vignette study. In the field study, all of the identified digital and non-digital selection methods were included in the survey, and participants were asked if they had experienced one or more of these methods in their last personnel selection process. The scales for the identical dependent variables (and mediator variables) in both studies were adapted from previous empirical research and therefore have already been validated. Participants in both studies could choose between an English and a German version of the survey. To ensure adequate translation of the scales, back-and-forth translation (Brislin, 1970) was applied.

For the analyses of the research model with several mediator variables and one dependent variable, mediation analyses based on the *PROCESS* macro for *SPSS* were applied (Hayes,

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<sup>4</sup> Non-digital personnel selection methods also include rather traditional methods with a very low degree of digitalization (e.g., upload of a written CV to a company's online career portal).

2018) in both studies. Following Preacher and Hayes (2008), to test for the significance of indirect effects, the bootstrapping method was used.

**Essay III.** The third essay in this thesis comprises three online experiments. Participants are members of the broad general public. Experimental designs are suitable for making causal inferences about differences in participants' judgments, in this case, social judgments of different firm types (i.e., established companies versus start-ups); indeed, such designs have already been used in previous research on social judgments of firms (e.g., Aaker et al., 2010; Yang & Aggarwal, 2019).

The first experiment was a between-subjects two-level single-factor design with a manipulation on the type of organization (i.e., established company versus start-up). Following the instruction to think about either established companies (group 1) or start-ups (group 2) in general, participants were provided with several traits and were asked to indicate the degree to which they believed that the traits represented typical characteristics of their respective type of organization. The traits comprised filler traits (Aaker et al., 2010) as well as the dependent variables of interest, all adapted from existing and validated scales and presented in English. To analyze the differences between the two groups, independent *t*-tests were conducted.

In the next two studies in Essay III, participants had to make judgments about the different firm types in specific contexts. Experimental vignette studies with a manipulated scenario description and a follow-up survey (Aguinis & Bradley, 2014) were applied. Both experimental vignette studies were single-level with two factors (i.e., established companies versus start-ups). The vignettes were fictitious news articles, which were followed by a survey including scales for the mediator and dependent variables as well as a manipulation check and questions on demographics. Items in the survey were in English and adapted from previous empirical research. Hence, the measures had already been validated in other contexts. As in the case of the experimental vignette study in the second essay, in addition to independent *t*-tests, mediation analyses with the application of the bootstrapping method were used to analyze the data.

## 1.5 Main Results and Contributions to the Literature

*Essay I.* Essay I sets out to investigate the direct effect of perceived technological turbulence on individual ambidexterity and the potential moderating effect of an organization's formalization on this relationship. The findings show that employees directly react to increasing perceptions of technological turbulence with higher degrees of individual ambidexterity. Additionally, the results suggest that this effect, at least in the short term, can be strengthened when organizations have high degrees of formalization in the form of written rules, procedures, and instructions.

Hence, Essay I contributes to the growing field of individual ambidexterity in the organizational management theory literature in at least three ways. First, it answers calls from scholars to provide empirical evidence for the effects of turbulent environments on individual ambidexterity (Good & Michel, 2013; Smith, Binns, & Tushman, 2010). Second, it responds to scholars asking for more research on interactions between antecedents of individual ambidexterity (Junni, Sarala, Tarba, Liu, & Cooper, 2015; Raisch & Birkinshaw, 2008). Third, by testing the research model on a sample that comprises employees at all hierarchical levels, the essay contributes to the literature that has so far focused mainly on (senior) managers (Kauppila & Tempelaar, 2016).

*Essay II.* Essay II investigates how applicants perceive digital methods in the personnel selection process. More specifically, the essay builds a conceptual framework based on signaling theory (Spence, 1973) and drawing on two different theoretical lenses (instrumental-symbolic-framework and justice theory) to suggest that innovativeness and procedural justice are signaling mechanisms that explain differences in the effect of the use of digital versus non-digital selection methods on applicants' attraction to the potential employer. The findings demonstrate that potential applicants perceive the digital methods used throughout the personnel selection process, except in the assessment stage, as more innovative; this perception, in

turn, positively influences their attraction to the organization. This effect remains stable for actual applicants who were surveyed after participating in a personnel selection process. In contrast, the use of digital methods was interpreted as a negative signal of procedural justice in applicants' evaluation of the organization (again, except for in the assessment stage) in the experimental vignette study. Yet, the findings of the field study suggest that this mechanism seems not to influence the attraction of applicants to an organization in retrospect.

This essay contributes to the applicant reactions literature in human resource management research in three ways. First, it helps to increase the understanding of the impact of digital technologies in personnel selection processes on applicant reactions and thereby addresses recent calls from scholars for research to keep up with technological developments in the business world (McCarthy et al., 2017; Ryan & Ployhart, 2014). Second, by applying signaling theory and incorporating the instrumental-symbolic-framework, it expands the theoretical lens of the applicant reactions literature, which has mainly focused on organizational justice theory (Gilliland, 1993; McCarthy et al., 2017). Third, the essay answers recent calls to investigate mechanisms that link the application of digital selection methods and applicant perceptions of an employer's attractiveness (Harold, Holtz, Griepentrog, Brewer, & Marsh, 2016).

*Essay III.* The goal of Essay III is to investigate whether social judgments of people in the general public about established companies and start-ups are based on firm stereotypes and to determine whether these firm stereotypes might be beneficial or harmful for established companies that are pursuing radical technological innovation. The findings suggest that people generally perceive established companies as less warm but more competent than start-ups. In the context-specific assessment of a radical technological innovation, individuals do not differentiate firms on the warmth dimension but do so on the competence dimension, attributing higher competence to established companies, which in turn has a positive effect on participants' expectations that established companies will be successful in pursuing the radical technological innovation. Yet, when participants receive a new cue about a fatal error connected to the radical

technological innovation, their warmth and competence perceptions as well as success expectations do not differ for established companies and start-ups.

The essay contributes in at least three distinct ways to the social judgments of organizations and firm stereotypes literature as well as the literature on the role of incumbent firms in the context of radical technological innovations. First, this essay contains the first empirical studies on the role of social judgments of external actors in the context of radical technological innovations by testing whether firm stereotypes are beneficial or harmful for established companies in this context. Second, the essay helps to improve our understanding of social judgments of firms and firm stereotypes in general as well as in the context of radical technological innovations. Third, the essay empirically tests whether social judgments are context-specific and if they are prone to change in light of new information (Mishina et al., 2012).

***Overall Contributions.*** While the three essays in this dissertation individually contribute to specific research streams in the management literature, the dissertation as a whole makes two important contributions to advance our understanding of the concept of digital transformation in management science and practice.

First, this dissertation sheds light on the underexplored nature and implications of digital transformation (Vial, 2019). The findings show that digitalization can affect various aspects of an organization (e.g., work tasks, personnel selection, innovation); therefore, the results suggest that digital transformation should not be viewed as only an overall organizational process, as its positive and potential negative effects might appear at a more granular level.

Second, the essays of this dissertation suggest that organizations should consider internal (e.g., employees) as well as external (e.g., applicants, members of the general public) stakeholders when making digital transformation decisions. While digital transformation efforts are essential in almost all businesses to increase the chances of long-term survival, the findings suggest that stakeholder perceptions can have a significant influence on the success of such digital transformation efforts.

## 1.6 Thesis Structure and Summary of the Three Empirical Essays

After this introductory chapter, Chapters 2 through 4 contain the three essays that address the research questions presented in section 1.2. Chapter 5 adds an overall discussion of the findings, contributions, and implications for practice and points out limitations and directions for future research. Table 1.1 provides a summary of the three empirical essays.

*Table 1.1: Summary of the Essays*

	<b>Individual Ambidexterity as a Response to Perceived Technological Turbulence – The Moderating Role of Formalization (Chapter 2)</b>	<b>Applicant Reactions to Digital Selection Methods: A Signaling Perspective on Innovativeness and Procedural Justice (Chapter 3)</b>	<b>Incumbent’s Curse Revisited: Are Firm Stereotypes Beneficial or Harmful for Established Companies Pursuing Radical Technological Innovations? (Chapter 4)</b>
<b>Research Goals</b>	<ol style="list-style-type: none"> <li>1) Test the relationship between perceived technological turbulence and individual ambidexterity</li> <li>2) Investigate the moderating effect of formalization as an organizational factor</li> </ol>	<ol style="list-style-type: none"> <li>1) Test applicant reactions to digital personnel selection methods in comparison to their reactions to traditional non-digital methods</li> <li>2) Investigate the signaling mechanisms of innovativeness and procedural justice on employer attractiveness</li> </ol>	<ol style="list-style-type: none"> <li>1) Test whether members of the general public use specific firm stereotypes (namely warmth and competence) to differentiate between established companies and start-ups</li> <li>2) Test whether firm stereotypes influence success expectations for established companies in contrast to those for start-ups in the context of a radical technological innovation and in the case of a fatal error</li> </ol>
<b>Theoretical Background</b>	(Individual) Ambidexterity	Applicant reactions	Social judgments of organizations
<b>Research Design</b>	Three-wave survey study	Online vignette experiment & field survey study	One online experiment and two online vignette experiments
<b>Analytical Approach</b>	Regression analyses	Mediation analyses	Independent <i>t</i> -tests and mediation analyses
<b>Main Findings</b>	<ul style="list-style-type: none"> <li>• Perceived technological turbulence has a positive effect on individual ambidexterity</li> <li>• Formalization can strengthen this positive relationship</li> </ul>	<ul style="list-style-type: none"> <li>• In prospect, digital selection methods in the application and screening stage and the interview stage have a positive effect via innovativeness and a negative effect via procedural justice on employer attractiveness</li> <li>• In retrospect, only the positive effect via innovativeness remains significant</li> </ul>	<ul style="list-style-type: none"> <li>• Established companies are generally perceived as less warm, but more competent than start-ups</li> <li>• Established companies are expected to be more successful in pursuing a radical technological innovation due to higher competence perceptions</li> <li>• In the case of a fatal error warmth and competence perceptions as well as judgments of expected success are not significantly different</li> </ul>
<b>Contributions to Literature</b>	Organizational management theory; individual ambidexterity literature	Human resource management literature; applicant reactions literature	Social judgments of organizations and firm stereotypes literature

## **2 Essay I: Individual Ambidexterity as a Response to Perceived Technological Turbulence – The Moderating Role of Formalization**

### **Abstract**

Today's turbulent environments, with fast and unpredictable technological changes, require employees to increasingly act ambidextrously, i.e., to simultaneously incorporate exploitative and explorative tasks in their work roles. To increase our understanding of how to foster individual ambidexterity in technologically turbulent environments, we draw on organizational management theories by arguing (1) that individuals directly react to perceived technological turbulence with increasing individual ambidexterity and (2) that organizations can strengthen this effect by providing employees with internal stability in these times of external changes through high degrees of formalization. Using data collected in a three-wave online survey of 739 German employees, our findings demonstrate that employees who perceive high degrees of technological turbulence in their organization's environment increase their ambidextrous behavior. In addition, we show that formalization in the form of written rules, procedures, and instructions positively moderates this relationship such that employees' ambidextrous behavior is highest when both perceptions of technological turbulence and formalization are high. We conclude by discussing the implications of these findings for the ambidexterity literature, for future research, and for managerial practice.

*Note: This chapter is based on a paper (under review) co-authored by Prisca Brosi and Jutta Stumpf-Wollersheim. Therefore, the plural instead of the singular is used throughout this chapter. Author contributions to this paper are summarized in Appendix D.*

**Current Status (see also Appendix A):**

Folger, N., Brosi, P., Stumpf-Wollersheim, J. (under review). Individual Ambidexterity as a Response to Perceived Technological Turbulence – The Moderating Role of Formalization. Manuscript submitted for publication at the European Management Journal.

**Conference presentations (of previous versions):**

Folger, N., Brosi, P., Stumpf-Wollersheim, J. (2020, March). Individual Ambidexterity as a Response to Technological Turbulence – The Moderating Role of Formalization. *82. Jahrestagung des Verbands der Hochschullehrer für Betriebswirtschaft e.V. (VHB)*, Virtual Conference hosted in Frankfurt/Main (Germany), 17-20 March 2020.



## 2.1 Introduction

In today's technologically turbulent business environments, it is increasingly important for individuals in organizations to act ambidextrously (Good & Michel, 2013; Mom et al., 2015; O'Reilly & Tushman, 2004). This means that employees need to simultaneously exploit existing capabilities (e.g., by performing work tasks relating to efficiency or refinement) and explore new opportunities (e.g., by performing work tasks relating to experimentation or innovation; March, 1991). While exploiting basic skills benefits organizations today, developing new skills helps organizations face future challenges (Birkinshaw & Gupta, 2013; Raisch et al., 2009), with the latter being particularly important for keeping pace in fast-changing environments (Camps, Oltra, Aldás-Manzano, Buenaventura-Vera, & Torres-Carballo, 2016). For example, even employees who are generally expected to perform exploitative work tasks, such as front-line workers, need to improve and adapt their work to changing external conditions such as changing customer needs due to technological advancements and thus have to perform explorative tasks as well. Similarly, knowledge workers, who are generally expected to perform explorative work activities, need to build on existing resources and knowledge to seek out new opportunities, which requires exploitation (Birkinshaw & Gupta, 2013). This individual ambidexterity has a positive impact on ambidexterity at higher organizational levels (Mom et al., 2019), which, in turn, positively affects an organization's competitiveness and innovativeness and increases its chances of long-term survival in the presence of unpredictable technological changes (Junni et al., 2013; O'Reilly & Tushman, 2013; Schnellbacher, Heidenreich, & Wald, 2019; Taylor & Helfat, 2009).

Given the importance of individual ambidexterity, research has started to examine how it can be fostered. Thus far, we know that employee-specific predispositions, such as locomotion orientation, intrinsic motivation, capacity for handling work stress, role integration, and self-efficacy, are positively associated with individual ambidexterity (Jasmand et al., 2012;

Kauppila & Tempelaar, 2016; Mom et al., 2019; Zhang et al., 2018). Furthermore, previous research shows that organization-specific factors, such as an organizational context that is characterized by a high degree of stretch, discipline, support, and trust, can enhance employees' ambidextrous behavior (Gibson & Birkinshaw, 2004). Yet, given that ambidexterity is an important response to changing environments (O'Reilly & Tushman, 2013), it is surprising that our understanding of the direct effects of environmental pressures, such as technological turbulence, on individual ambidexterity is still limited. Technologically turbulent environments create new opportunities and challenges (Hall & Rosson, 2006), which require individuals not only to cope with the new environment but also to align and adapt their work tasks effectively and flexibly (Camps et al., 2016; Ketkar & Sett, 2010).

To increase our understanding of how to foster individual ambidexterity in technologically turbulent environments, we draw on the organizational management theory literature in building a twofold conceptual model. First, we argue that the higher employees perceive technological turbulence (i.e., dynamism and unpredictability, Boyne & Meier, 2009) in the external environment of their organization, the more they act ambidextrously (Davis, Eisenhardt, & Bingham, 2009). Second, we claim that an employee's reaction to technologically turbulent environments with individual ambidexterity might be facilitated by formalization. Thus, we argue that formalization, defined as the extent to which written rules, procedures, and instructions describe particular tasks (Mom, van den Bosch, & Volberda, 2009; Pugh, Hickson, Hinings, & Turner, 1968), enables individuals in an organization to respond to external technological turbulence by acting more ambidextrously without devoting additional efforts to internal reforms (Adler & Borys, 1996; Fernandez & Rainey, 2006; Hannan & Freeman, 1977). The empirical examination of formalization as a facilitator is particularly important because research also theorizes that formalization may act as an inhibitor of this relationship (e.g., Baum & Wally, 2003; Burns & Stalker, 1961). While researchers who hold the view of formalization as an inhibitor have argued that technological turbulence might lead to a lower degree of worker

flexibility and adaptability (Baum & Wally, 2003; Burns & Stalker, 1961), researchers who hold the facilitating view have reasoned that formalization might have positive effects on employees facing technological turbulence as it reduces role ambiguities and might help them cope with changes more effectively (Perrow, 1986; Ramus, Vaccaro, & Brusoni, 2017; Stinchcombe, 1965).

Therefore, our study contributes to the ambidexterity literature in at least three ways. First, while previous research on antecedents of individual ambidexterity has focused mainly on employee-specific predispositions and organization-specific factors (Schnellbacher et al., 2019), we test the direct relationship between technological turbulence as an environmental antecedent and employees' ambidextrous behavior. We thereby answer the calls of scholars who have already theorized that turbulent contexts require employees to manage the exploitation-exploration dilemma (Good & Michel, 2013; Smith et al., 2010).

Second, we draw on the organizational structure literature (Burns & Stalker, 1961; Stinchcombe, 1965) to gain a more profound understanding of the effect of formalization on employees' ambidextrous behavior when they perceive their organization's environment to be technologically turbulent. With formalization being one determinant of organizational structure (Pugh et al., 1968), we respond to scholars who have called for more research that looks into interactions of different antecedents of individual ambidexterity (Junni et al., 2015; Raisch & Birkinshaw, 2008).

Third, we test whether employees at all hierarchical levels respond directly to technologically turbulent environments by dividing their resources between exploitative and explorative activities. We thereby contribute to conceptual research that states that every individual employee "*faces some version of the ambidexterity dilemma*" (Birkinshaw & Gupta, 2013, p. 294), because most empirical research on individual ambidexterity has so far focused exclusively on (senior) managers and their impact on organizational ambidexterity (Kauppila & Tempelaar, 2016).

We tested our model and hypotheses by applying a three-wave survey among German employees. While antecedents were measured in the first wave, employees' assessments of their ambidextrous behaviors were collected in all three waves. In this way, we were able to test for changes in individual ambidexterity, taking into account the dynamic component of ambidexterity rather than regarding the concept as static (Raisch et al., 2009).

## **2.2 Theoretical Background and Hypotheses Development**

Technologically turbulent environments are defined as dynamic environments in which the extent of technological change is unpredictable (Boyne & Meier, 2009; Milliken, 1987). Technological turbulence disrupts the technological status quo (Christensen, 1997), and employees are increasingly required to keep up to date with external changes (Tsai, Compeau, & Haggerty, 2007). In such an environment, organizations need to provide a context that helps employees react accordingly (Gibson & Birkinshaw, 2004).

### **2.2.1 Individual Ambidexterity as a Direct Response to Technological Turbulence**

Employees are assumed to have a natural tendency towards exploitative tasks in stable environments (Levinthal & March, 1993; March, 1991). Yet, in response to external changes, they face the challenge of being required to incorporate additional explorative tasks (Jansen, George, van den Bosch, & Volberda, 2008; March, 1991). Employees have to prepare for the potential changes caused by technological turbulence by accumulating new knowledge and competencies (Chen, Li, Chen, & Ou, 2018; Tsai et al., 2007). Neglecting to do so can have dramatic effects because technological changes can threaten existing competencies, which may become obsolete in the new setting (Danneels & Sethi, 2011; Hanvanich, 2006). However, at the same time, employees cannot neglect exploitative tasks, as such tasks secure the current viability of the whole organization and therefore employees' jobs (March, 1991). Consequently, employees face the dilemma of balancing two opposing types of tasks in their work roles (Tushman & O'Reilly, 1996).

While one could argue that this dilemma produces conflicting cognitive demands (Laureiro-Martínez, Brusoni, Canessa, & Zollo, 2015) that are very challenging for employees to reconcile (McGill, Slocum, & Lei, 1992; Miller & Friesen, 1986), we claim that employees actively take on this challenge when they perceive high degrees of technological turbulence in their organization's environment (Chen et al., 2018). With their own competencies being threatened, they have a strong individual incentive to engage in ambidexterity in response to turbulent environments. As in the case of stable environments, employees are required to act in the interest of the organization by securing the profits of the current business and to meet current demands, which means engaging in exploitative tasks (Laureiro-Martínez et al., 2015). At the same time, to cope with changing environments, employees face increasing pressure to actively engage in finding new solutions that might help their organization adapt to dynamic and unpredictable technological changes (Good & Michel, 2013). Indeed, previous research suggests that employees who perceive their organization's environment to be turbulent increasingly engage in corporate entrepreneurship (Zahra, 1991), which means that they might take the initiative in finding solutions for the organization to deal with technological turbulence in the environment, in addition to carrying out their routine tasks. Therefore, following Chen et al. (2018), who suggest that workers develop individual perceptions of the degree of technological turbulence in their organization's environment, we predict that employees who perceive technological turbulence in their organization's environment to be high directly react to it by increasingly engaging in the simultaneous pursuance of exploitative and explorative work tasks. Thus, we hypothesize the following:

*Hypothesis 1: Perceived technological turbulence is positively related to employees' individual ambidexterity.*

### **2.2.2 The Moderating Role of Formalization**

While ambidexterity at the individual level requires employees to make decisions on how to best divide their working time between exploitative and explorative work tasks (Birkinshaw & Gupta, 2013; Gibson & Birkinshaw, 2004), organizations and their decision-makers might strengthen the ambidextrous behavior of their employees by providing an enabling structural context (Gibson & Birkinshaw, 2004). With regard to formalization, research has intensively debated whether it enables or coerces employees in technologically turbulent environments (Adler & Borys, 1996; Jaillerat, 2010). As technologically turbulent environments require employees to explore and take advantage of new technological opportunities to help their organization survive in the long-term (Gordon, Stewart, Sweo, & Luker, 2000; Hannan & Freeman, 1984), some researchers have argued that formalization might be harmful in these cases because it might reduce flexibility and adaptability (Baum & Wally, 2003; Burns & Stalker, 1961). In this vein, contingency theory suggests that organizations need an organic structure with low formalization (Burns & Stalker, 1961) to help their employees flexibly adapt and cope with changing circumstances (Gordon et al., 2000).

Yet, more recently, scholars have suggested that written rules, instructions, and procedures might be beneficial for organizations and their employees in turbulent environments (Ramus, Vaccaro, & Brusoni, 2017; Sine, Mitsuhashi, & Kirsch, 2006). Supporters of this theoretical standpoint suggest that employees in organizations with low degrees of formalization might fall into the trap of focusing too much on adjusting their work to adapt to the changing requirements (i.e., exploring new capabilities) and consequently lose focus on other necessary actions (i.e., exploiting existing capabilities; Hannan & Freeman, 1977). Providing employees with formalized guidelines, policies and procedures may assist staff in understanding what is expected of them and enable workers to react directly to external technological turbulence without losing their focus on the ongoing core business (Adler & Borys, 1996; Boyne & Meier, 2009; Fernandez & Rainey, 2006). Indeed, prior research has shown that formalization can help employees

in turbulent environments by providing guidelines on how to adapt their work tasks within manageable boundaries (Perrow, 1986) and resolve unclear role ambiguities (Stinchcombe, 1965), which can positively affect their ambidextrous behavior. Damanpour (1991) even suggests that formalization can have positive effects on explorative tasks, especially when written procedures capture lessons from prior experience. Accordingly, we argue that high degrees of formalization help employees who perceive high technological turbulence in their organization's environment to become increasingly ambidextrous. Thus, we hypothesize the following:

*Hypothesis 2: Formalization strengthens the positive effect of perceived technological turbulence on employees' individual ambidexterity.*

## **2.3 Method**

### **2.3.1 Sample and Data Collection**

We collected online survey data from German employees in cooperation with the German panel company *Consumerfieldwork GmbH* ([www.consumerfieldwork.de](http://www.consumerfieldwork.de)). The panel provider specializes in online surveys for research purposes and ensures high data quality, for instance, by using established methods to identify careless responders (see Meade & Craig, 2012). Additionally, the panel provider ensured that all respondents were working full time. Respondents were asked to respond to three waves of separate online questionnaires with a time gap of three weeks between each wave. The data was collected in the months from October to December 2018. This multi-wave design has two advantages. First, the temporal separation of the independent (first wave) and dependent (second and third wave) variables reduces concerns about common method bias (Podsakoff et al., 2012). Second, collecting data on individual ambidexterity at several points in time accounts for the dynamic rather than stable nature of the construct (Raisch et al., 2009; Rosing & Zacher, 2017). After the exclusion of careless responders, 1,003 employees answered the first questionnaire (T1), which included the independent

variable, moderator variable, control variables, and demographic information. After respondents were matched according to an anonymized identification number, the sample of the second wave (T2) comprised 854 employees (85% response rate); the third wave (T3) generated 739 matched responses (74% response rate).

This final sample consisted of 362 women and 377 men. The mean age of respondents was 46.55 ( $SD = 10.89$ ), and their average work experience was 25.64 years ( $SD = 12.40$ ). The majority of respondents had completed an apprenticeship (53.31%), and 39.51% had a university degree. While respondents worked in a broad range of occupations, 34.10% indicated that they had management responsibility or a leadership role in their organization. Furthermore, the sample spanned a broad range of industries, with public administration and the service industry (both 11%) being indicated most frequently, followed by health and social work as well as manufacturing (both 10%).

To test for nonresponse bias, we examined potential differences in demographic characteristics (gender, age, work experience, hierarchical level, management responsibility) and research model variables (technological turbulence, formalization, individual ambidexterity) between T3 responders and nonresponders via independent  $t$ -tests and chi-squared tests ( $p < 0.05$ ;  $\alpha = 0.05$ ). The two groups differed only in age, which was significantly higher among T3 responders ( $M = 46.55$ ,  $SD = 10.89$ ) than among nonresponders ( $M = 44.28$ ,  $SD = 11.50$ ). As no other significant differences, especially concerning the research model variables, appeared, nonresponse bias may not be a problem.

### **2.3.2 Measures**

All materials were presented in German, using back-and-forth translation (Brislin, 1970). Unless otherwise indicated, items were measured on a 7-point Likert scale.

*Technological turbulence (T1).* We measured respondents' perceptions of technological turbulence in their organization's environment by adapting all four items from



Zhou and Wu (2010). A sample item is “Technologies in our industry are changing rapidly” (Cronbach’s  $\alpha = 0.81$ ).

*Formalization (T1)*. To capture the extent to which organizations use written rules, procedures, or regulations to define the work tasks and jobs of employees, we adapted a five-item scale from Schminke, Cropanzano, and Rupp (2002). A sample item is “My organization has a large number of written rules and policies” (Cronbach’s  $\alpha = 0.83$ ).

*Individual ambidexterity (T2 & T3)*. To assess the ambidextrous behavior of employees, we adapted the scale and procedures from Mom et al. (2009). The original scale comprises 14 items. Seven items address the extent to which respondents’ work involves work-related activities that can be characterized as exploitative, for example, “Activities of which a lot of experience has been accumulated by yourself” ( $1 = to a small extent, 7 = to a large extent$ ). Similarly, seven items address involvement in explorative activities (e.g., “Searching for new possibilities with respect to products/services, processes, or markets”). After performing an exploratory factor analysis of all 14 items combined, we had to exclude two items from the exploitation scale and one item from the exploration scale due to their low factor loadings (see Table 2.1). As a result, we included five items for exploitation and six items for exploration for further analyses. The Cronbach’s  $\alpha$  reliability scores are 0.87 (T2 & T3) for exploitation and 0.89 (T2)/0.90 (T3) for exploration. In line with other studies on individual ambidexterity (Kobarg et al., 2017; Mom et al., 2009; Tempelaar & Rosenkranz, 2019), we calculated the average for both scales and multiplied them to create a single measure of individual ambidexterity. Even though ambidexterity can be operationalized in other ways (e.g., by using the difference score or an additive function; Birkinshaw & Gupta, 2013), we decided to use the product term, because (1) it appears to be the predominant operationalization in individual ambidexterity research (Gibson & Birkinshaw, 2004; Kauppila & Tempelaar, 2016; Kobarg et al., 2017; Mom et al., 2009; Tempelaar & Rosenkranz, 2019) and (2) it captures our intended level of balance, which means

that employees are considered highly ambidextrous when they engage in high levels of exploitative and high levels of explorative work tasks (He & Wong, 2004; Rosing & Zacher, 2017).

Table 2.1: Exploratory Factor Analysis for Individual Ambidexterity

Items	T1		T2		T3	
	Factors		Factors		Factors	
<i>To what extent are activities part of your work, which can be characterized as follows</i>	1	2	1	2	1	2
<b>1 Exploitation</b>						
<i>Activities of which a lot of experience has been accumulated by yourself</i>	<b>0.84</b>	0.08	<b>0.86</b>	0.08	<b>0.83</b>	0.03
<i>Activities which you carry out as if they were routine</i>	<b>0.78</b>	-0.18	<b>0.77</b>	-0.10	<b>0.77</b>	-0.18
<i>Activities which serve existing (internal) customers with existing services/products<sup>a</sup></i>	0.49	0.42	0.46	0.39	0.48	0.42
<i>Activities of which it is clear to you how to conduct them</i>	<b>0.82</b>	-0.01	<b>0.84</b>	-0.04	<b>0.82</b>	-0.01
<i>Activities primarily focused on achieving short-term goals<sup>a</sup></i>	0.25	0.41	0.17	0.45	0.21	0.49
<i>Activities which you can properly conduct by using your present knowledge</i>	<b>0.84</b>	0.06	<b>0.83</b>	0.05	<b>0.85</b>	0.03
<i>Activities which clearly fit into existing company policy</i>	<b>0.75</b>	0.07	<b>0.72</b>	0.10	<b>0.76</b>	0.07
<b>2 Exploration</b>						
<i>Searching for new possibilities with respect to products/services, processes, or markets</i>	-0.01	<b>0.80</b>	0.04	<b>0.83</b>	-0.05	<b>0.85</b>
<i>Evaluating diverse options with respect to products/services, processes, or markets</i>	-0.05	<b>0.78</b>	-0.01	<b>0.83</b>	-0.05	<b>0.83</b>
<i>Focusing on strong renewal of products/services or processes</i>	0.02	<b>0.78</b>	0.02	<b>0.84</b>	-0.04	<b>0.86</b>
<i>Activities of which the associated yields or costs are currently unclear</i>	-0.11	<b>0.67</b>	-0.11	<b>0.72</b>	-0.11	<b>0.74</b>
<i>Activities requiring quite some adaptability of you<sup>a</sup></i>	0.40	0.52	0.36	0.58	0.30	0.53
<i>Activities requiring you to learn new skills or knowledge</i>	0.13	<b>0.69</b>	0.11	<b>0.70</b>	0.03	<b>0.72</b>
<i>Activities that are not (yet) clearly existing company policy</i>	-0.02	<b>0.77</b>	-0.09	<b>0.80</b>	-0.06	<b>0.81</b>

Notes: Items adapted from Mom et al. (2009); factor loadings of items included for further analyses are bolded.

<sup>a</sup> Items were excluded from further analyses due to low factor loadings.

*Control variables (TI).* To rule out other explanations that have theoretical and empirical relevance for individual ambidexterity, we included various control variables. First, we controlled for age and gender, since previous research has shown significant effects of these variables on the ambidextrous behavior of employees (Kauppila & Tempelaar, 2016; Mom et al., 2009). Second, we included work experience in years. While experience is positively related to expertise, creativity and openness to new tasks may decrease with the accumulation of work years and therefore might mitigate ambidextrous behaviors (Gibson & Birkinshaw, 2004; March, 1991). Third, we controlled for educational level, as higher levels of education are positively related to both cognitive abilities and knowledge creation capabilities (Smith, Collins, & Clark, 2005), which could positively affect individual ambidexterity. Fourth, the hierarchical level may influence employees' tendencies to act ambidextrously. A higher hierarchical level is typically associated with more responsibilities for employees, which puts more pressure on them to perform exploitative and explorative work tasks simultaneously (Floyd & Lane, 2000; Mom et al., 2009). To capture the hierarchical level of employees, we asked respondents to indicate how they would rate their hierarchical position in their organization on a range from 0% = bottom level to 100% = top level (Blickle, Witzki, & Schneider, 2009). Fifth, according to Kauppila and Tempelaar (2016) employees show higher degrees of ambidexterity when their managers make use of paradoxical leadership, a leadership style that combines intense management support with high performance expectations. To measure paradoxical leadership, we followed the approach of Kauppila and Tempelaar (2016). That is, we adapted five items for managerial support from Eisenberger, Huntington, Hutchison, and Sowa (1986; e.g., "My supervisor really cares about my well-being"; Cronbach's  $\alpha = 0.92$ ) and three items for high performance expectations from Podsakoff, MacKenzie, Moorman, and Fetter (1990; e.g., "My supervisor insists on only the best performance"; Cronbach's  $\alpha = 0.83$ ). Assuming that managerial support and performance expectations can be complementary (Kauppila & Tempelaar, 2016), we multiplied the averages of both scales to create a single, compound measure of paradoxical

leadership. Finally, we controlled for individual ambidexterity in T1 by applying the same operationalization as in T2 and T3. It can be assumed that individuals with high degrees of ambidexterity in T1 would also show high degrees of ambidexterity in T2 or T3. However, as Raisch et al. (2009) suggest, ambidexterity might be dynamic and thus change over time.

## 2.4 Analyses and Results

Table 2.2 shows the means, standard deviations, and correlations among all variables of this study. Before testing our proposed research model, we followed Aguinis and Vandenberg's (2014) suggestion and excluded age, work experience, and educational level for the analyses reported here, as these control variables are uncorrelated with the dependent variables (Becker, 2005). Their inclusion may reduce power or increase the possibility of type 1 errors, which suggest that there are effects when in reality there are none (Aguinis & Vandenberg, 2014). Yet, analyses that included these control variables revealed similar patterns.

Subsequently, we ran additional validity tests and robustness checks. First, we performed integrated exploratory factor analyses with all the retained items from our proposed research model. As expected, the analyses resulted in a four-factor structure in both times (T2 and T3), with loadings above 0.54 on all items and cross-loadings below 0.24.

Second, we observed that each construct's average variance extracted was higher than the correlations with other constructs in the model, suggesting that the constructs show discriminant validity (Fornell & Larcker, 1981).

Third, to provide further evidence of convergent and discriminant validity, we carried out a confirmatory factor analysis with all the retained items loading on the proposed factors. The confirmatory factor analysis yielded a good fit for both times (T2 & T3:  $\chi^2(164) = 436.94$ ,  $p < 0.001$ ; root mean square error of approximation (RMSEA) = 0.05; comparative fit index (CFI) = 0.96).

Fourth, we assessed the possibility of biased results due to common method variance. Initially, we mitigated common method bias through our research design in three ways (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003): a) we temporally separated the measurement of the independent variable and the dependent variable; b) we ensured participants' anonymity and asked them to indicate their answers honestly and sincerely; and c) we used only constructs that had already been used in previous research and which therefore had already been tested regarding unambiguity and low potential for item social desirability. In addition to these procedural remedies, we performed two statistical post-hoc tests to assess whether common method bias was still an issue: a) we employed Harman's one-factor test by performing an unrotated principal component analysis, which resulted in one factor explaining 20.94% of the total variance; and b) we performed confirmatory factor analyses and compared the model fit of our hypothesized data structure with four latent variables (T2 & T3:  $\chi^2(164) = 436.94$ ,  $p < 0.001$ ; RMSEA = 0.05; CFI = 0.96) to the fit of a model with one dominant latent factor that indicates common method bias (T2:  $\chi^2(170) = 4218.05$ ,  $p < 0.001$ , RMSEA = 0.18, CFI = 0.42; T3:  $\chi^2(170) = 4429.90$ ,  $p < 0.001$ ; RMSEA = 0.18; CFI = 0.41), with the fit of the former model being significantly better ( $p < 0.001$ ). Overall, these statistical remedies, combined with our research design, give us the confidence that our results are not likely to be biased by common method variance.

Fifth and last, we checked for multicollinearity by calculating the variance inflation factors (VIFs) for each of the regression equations. The maximum VIF is 1.37, which is well below the rule-of-thumb cutoff point of four (O'Brien, 2007), suggesting that multicollinearity is not an issue that might restrain further analyses.

Table 2.2: Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Individual ambidexterity (T1)	22.08	8.47	-									
2. Individual ambidexterity (T2)	22.55	9.01	0.59	-								
3. Individual ambidexterity (T3)	20.75	8.61	0.57	0.65	-							
4. Technological turbulence	3.98	1.39	0.34	0.35	0.30	-						
5. Formalization	4.24	1.51	0.18	0.24	0.17	0.29	-					
6. Age	46.55	10.89	0.05	0.06	0.04	-0.04	-0.04	-				
7. Gender	1.51	0.50	0.10	0.06	0.09	0.17	0.03	0.17	-			
8. Work experience	25.64	12.4	0.01	0.05	0.01	-0.06	-0.02	0.91	0.14	-		
9. Educational level	4.63	1.02	0.04	0.03	0.06	0.05	-0.01	-0.04	0.07	-0.20	-	
10. Hierarchical level	47.07	28.04	0.32	0.30	0.34	0.07	-0.12	0.10	0.10	0.04	0.16	-
11. Paradoxical leadership	23.45	11.44	0.35	0.33	0.22	0.20	0.22	0.01	0.03	-0.01	-0.01	0.17

Notes:  $N = 739$ ; gender is coded 1 = woman and 2 = man; educational level is coded 1 = no educational qualification, 2 = high school certificate, 3 = apprenticeship, 4 = bachelor's degree, 5 = master's degree and 6 = PhD; correlations with values of  $|r| \geq 0.10$  are significant at  $p < 0.01$  and correlations of  $|r| \geq 0.09$  are significant at  $p < 0.05$  (two-tailed).

We tested our hypotheses by running ordinary least square regressions with individual ambidexterity as the dependent variable in T2 (Table 2.3) and T3 (Table 2.4). For comparability reasons, the reported results for T2 and T3 are based on the same sample ( $N = 739$ ). Yet, we calculated all regressions with the larger sample ( $N = 854$ ) in T2, and the results remained stable, with only small variations in the coefficients.

In both cases, Model 1 includes control variables only. To test our main effect referring to Hypothesis 1, we included our independent variable, technology turbulence, in Model 2, which is a significant addition to Model 1 for both times (T2:  $\Delta F = 30.42$ ,  $p < 0.001$ ; T3:  $\Delta F = 16.94$ ,  $p < 0.001$ ). The results of Model 2 show that employees' perceptions of technological turbulence are positively related to their individual ambidexterity in T2 ( $\beta = 0.17$ ,  $p < 0.001$ ) as well as in T3 ( $\beta = 0.13$ ,  $p < 0.001$ ), supporting Hypothesis 1. Model 3 adds the direct effect of our moderator variable, formalization, which leads to a significant addition compared to Model 2 for both times (T2:  $\Delta F = 14.60$ ,  $p < 0.001$ ; T3:  $\Delta F = 6.78$ ,  $p < 0.01$ ).

To test Hypothesis 2, we included the interaction effect of technological turbulence and formalization, leading to a significant addition compared to Model 3 for T2 ( $\Delta F = 9.49$ ,  $p < 0.01$ ), but not for T3 ( $\Delta F = 2.41$ ,  $p > 0.05$ ). Consequently, Hypothesis 2, which states that formalization strengthens the positive effect of perceived technological turbulence on individual ambidexterity is supported in T2 ( $\beta = 0.09$ ,  $p < 0.01$ ), but not in T3 ( $\beta = 0.05$ ,  $p > 0.05$ ). Hence, the effect becomes weaker and nonsignificant over time.

Table 2.3: Results of Hierarchical Regression Analyses for Individual Ambidexterity in T2

Variable	Individual ambidexterity (T2)							
	Model 1		Model 2		Model 3		Model 4	
	b (s.e.)	$\beta$	b (s.e.)	$\beta$	b (s.e.)	$\beta$	b (s.e.)	$\beta$
Intercept	6.50 (1.09)		4.13 (1.15)		2.19 (1.25)		1.74 (1.25)	
Control variables								
Gender	-0.08 (0.53)	-0.01	-0.51 (0.52)	-0.03	-0.51 (0.52)	-0.03	-0.40 (0.52)	-0.02
Hierarchical level	0.04 (0.01)	0.11***	0.04 (0.01)	0.12***	0.05 (0.01)	0.14***	0.04 (0.01)	0.14***
Paradoxical leadership	0.11 (0.02)	0.14***	0.10 (0.02)	0.12***	0.08 (0.02)	0.10**	0.08 (0.02)	0.11**
Individual ambidexterity T1	0.54 (0.03)	0.51***	0.49 (0.04)	0.46***	0.47 (0.04)	0.44***	0.47 (0.04)	0.44***
Independent variable								
Technology turbulence (TT)			1.11 (0.20)	0.17***	0.92 (0.20)	0.14***	0.92 (0.20)	0.14***
Moderators								
Formalization (FORM)					0.70 (0.18)	0.12***	0.75 (0.18)	0.13***
TT $\times$ FORM							0.71 (0.23)	0.09**
<i>adj. R</i> <sup>2</sup>		0.38		0.40		0.41		0.42
<i>F</i>		112.09***		99.35***		86.76***		76.59***
$\Delta$ <i>adj. R</i> <sup>2</sup>		0.38		0.02		0.01		0.01
$\Delta F$		112.09***		30.42***		14.60***		9.49**

Notes:  $N = 739$ ; control variables, independent variable, and moderator variable are lagged by three weeks; unstandardized coefficients (with standard errors in parentheses) and standardized coefficients are reported; technology turbulence and formalization were z-standardized before the interaction term was built; s.e. = standard error; adj. = adjusted; T1 = time point after first wave; T2 = time point after second wave (lagged by three weeks).

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .



Table 2.4: Results of Hierarchical Regression Analyses for Individual Ambidexterity in T3

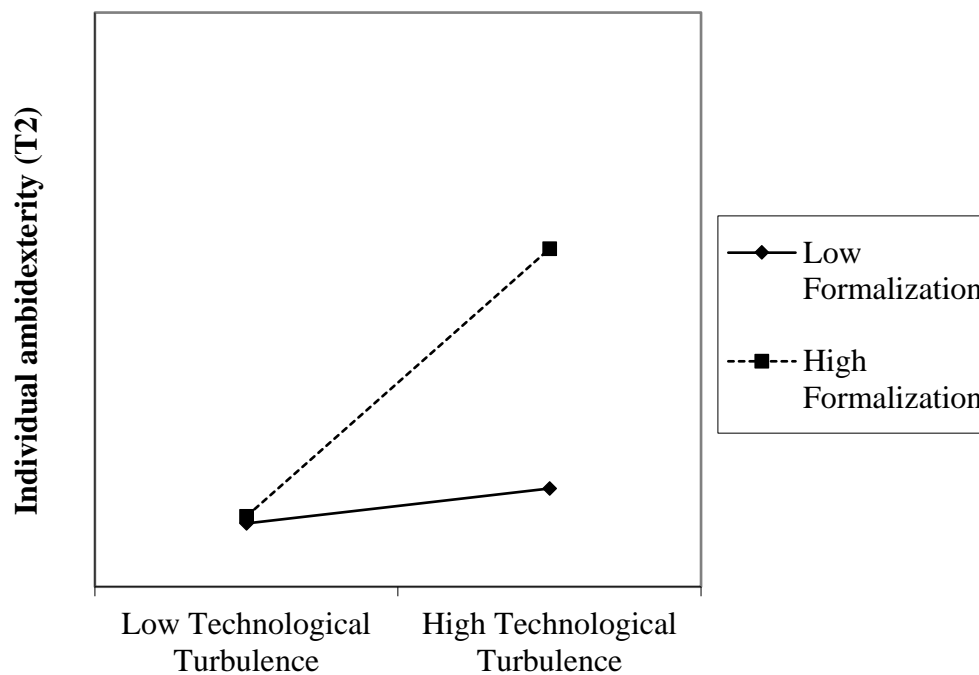
Variable	Individual ambidexterity (T3)							
	Model 1		Model 2		Model 3		Model 4	
	b (s.e.)	$\beta$	b (s.e.)	$\beta$	b (s.e.)	$\beta$	b (s.e.)	$\beta$
Intercept	6.09 (1.07)		4.35 (1.14)		3.03 (1.24)		2.81 (1.25)	
Control variables								
Gender	0.36 (0.52)	0.02	0.04 (0.52)	0.00	0.05 (0.51)	0.00	0.10 (0.52)	0.01
Hierarchical level	0.05 (0.01)	0.17***	0.05 (0.01)	0.18***	0.06 (0.01)	0.19***	0.06 (0.01)	0.19***
Paradoxical leadership	0.01 (0.02)	0.02	0.00 (0.02)	0.01	-0.01 (0.02)	-0.01	-0.01 (0.02)	-0.01
Individual ambidexterity T1	0.52 (0.03)	0.51***	0.47 (0.04)	0.47***	0.46 (0.04)	0.46***	0.46 (0.04)	0.46***
Independent variable								
Technology turbulence (TT)			0.81 (0.20)	0.13***	0.69 (0.20)	0.11**	0.69 (0.20)	0.11**
Moderators								
Formalization (FORM)					0.47 (0.18)	0.08**	0.50 (0.18)	0.09**
TT $\times$ FORM							0.36 (0.23)	0.05
<i>adj. R</i> <sup>2</sup>		0.35		0.36		0.37		0.37
<i>F</i>		99.07***		84.37***		71.99***		62.17***
$\Delta$ <i>adj. R</i> <sup>2</sup>		0.35		0.01		0.01		0.00
$\Delta F$		99.07***		16.94***		6.78**		2.41

Notes:  $N = 739$ ; control variables, independent variable, and moderator variable are lagged by six weeks; unstandardized coefficients (with standard errors in parentheses) and standardized coefficients are reported; technology turbulence and formalization were z-standardized before the interaction term was built; s.e. = standard error; adj. = adjusted; T1 = time point after first wave; T3 = time point after third wave (lagged by six weeks).

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Figure 2.1 depicts the significant interaction effect of perceived technological turbulence and formalization on individual ambidexterity in T2. The graphs show that employees react to perceived technological turbulence with higher degrees of individual ambidexterity in T2 when their organization's formalization is high, compared to when it is low.

*Figure 2.1: Interaction Effect of Technological Turbulence and Formalization on Individual Ambidexterity in T2*



*Note:* Low means one standard deviation below the mean, and high means one standard deviation above the mean.

## 2.5 Discussion

With this study, we aimed to investigate (1) whether employees directly react to perceived technological turbulence in their organization's environment by showing higher degrees of individual ambidexterity and (2) whether formalization moderates this relationship in a positive way. Our results show that employees do indeed react to technological turbulence in their organization's environment with increasingly ambidextrous behavior. Moreover, we find evidence that formalization strengthens this positive relationship in a short period but that this effect does not last over a longer period. Even though the direct effect sizes decrease over time as well, this result may suggest that in times of technological turbulence, higher degrees of

formalization help employees balance exploitative and explorative work tasks. After a while, however, it may be that employees can manage this ambidexterity challenge regardless of the degree of formalization in their organization.

One explanation for this phenomenon may be that in the short term, perceived technological turbulence induces feelings of stress and uncertainty in employees (Heckmann, Steger, & Dowling, 2016), which can be counterbalanced through the provision of written rules, procedures, and guidelines on how to perform routine work tasks (Adler & Borys, 1996). This enhances employees' efficiency and speed (Juillerat, 2010), and therefore, they can also devote some effort to explorative work tasks, which help them deal with immediate external challenges (Boyne & Meier, 2009). After a while, however, employees may adapt to the changing circumstances and learn how to balance exploitative and explorative work tasks. Hence, the enabling forces of formalization (Adler & Borys, 1996) might become less important over time.

### **2.5.1 Theoretical Contributions**

Our study contributes to the organizational management theory literature and specifically the ambidexterity literature in three distinct ways. First, our findings extend the current understanding of antecedents of individual ambidexterity by showing that employees' ambidextrous behavior is a direct reaction to perceived technological turbulence in their organization's environment. Thus, we provide empirical support for a phenomenon that has been suggested by various scholars (e.g., Good & Michel, 2013; Smith et al., 2010) but never empirically tested. Consequently, our research suggests that in addition to employee-specific predispositions and organizational-specific factors (Schnellbacher et al., 2019), perceptions of technological turbulence in the environment can increase employees' capability of balancing exploitative and explorative work tasks.

Second, we respond to calls that highlight the importance of investigating interaction effects among antecedents of individual ambidexterity by drawing on organizational management theories (Junni et al., 2015; Raisch & Birkinshaw, 2008). While previous research has

extensively debated whether formalization may be beneficial or harmful in turbulent environments (see Juillerat, 2010), our findings are in line with the enabling view of formalization (Adler & Borys, 1996), which suggests that formalization can strengthen the positive direct effect of perceived technological turbulence on individual ambidexterity, at least in a short term.

Third, previous research on the antecedents of individual ambidexterity has mainly concentrated on high-level employees, such as (senior) managers (e.g., Mom et al., 2009; Mom et al., 2015; Rogan & Mors, 2014). Our results extend this prevalent focus by showing that it is not only people at higher hierarchy levels who increase their ambidextrous behavior in technologically turbulent environments; rather, employees at all hierarchical levels increasingly balance exploitative and explorative work tasks. Hence, our findings give empirical support to the suggestion of Birkinshaw and Gupta (2013) that each level in an organization might face some kind of ambidexterity challenge when environments become unstable.

### **2.5.2 Limitations and Future Research**

Our study has some limitations that need to be considered in interpreting the results and that pave the way for further research. First, we focused on technological turbulence as an environmental antecedent to the ambidextrous behavior of employees. While scholars generally agree that technological turbulence puts pressure on organizations and their employees to adapt to the changing environment (e.g., De Vaan, 2014; Wilden & Gudergan, 2015) and increasing numbers of organizations have to deal with accelerating changes in various technologies (Chen et al., 2018), other external context factors might influence employees' individual ambidexterity. Ambidexterity research at the organizational level suggests that environmental dynamism, competitive intensity, or exogenous shocks can impact an organization's ambidexterity (see Lavie, Stettner, & Tushman, 2010; Raisch & Birkinshaw, 2008). It might be an interesting avenue for future research to investigate whether these factors also influence ambidexterity at the individual level.

Second, future research could also investigate the moderating influence of other organization-specific factors on the technology turbulence-individual ambidexterity relationship. For instance, previous research has shown that a culture of flexibility promotes explorative behavior, while a culture of control leads to more exploitative behavior (Khazanchi, Lewis, & Boyer, 2007). It might be interesting to examine which corporate culture facilitates employees' ambidextrous behavior in the face of technologically turbulent environments.

Third, we relied on employee self-reports when collecting our data. All measures in our study have been designed to be self-reported and have been used and validated in previous research (e.g., Mom et al., 2009). However, the self-reported measures might still be biased due to the subjective impressions of respondents. More objective insights might be gained by triangulating the data with reports from superiors or coworkers. Additionally, future research might benefit from investigating potential differences between perceived technological turbulence, operationalized via self-reported measures, and more objective measures of technological turbulence, such as expert ratings.

Fourth, while the operationalization of the individual ambidexterity construct as a product term of exploitation and exploration was useful in our case because we wanted to capture the degree of balance between exploitation and exploration (Rosing & Zacher, 2017), researchers have argued that exploitation and exploration can also be seen as two opposing ends of a continuum; therefore, ambidexterity could be measured on a continuous scale (Gupta, Smith, & Shalley, 2006; Kauppila & Tempelaar, 2016; Lavie et al., 2010). Hence, we encourage scholars to test our research model with this operationalization of individual ambidexterity.

Fifth, even though the employees in our sample work in a broad range of occupations and for organizations in various industries, they are all employed in Germany. Thus, the generalizability of our results to other countries and national cultures may be limited. Employees in other national and cultural settings might react differently to the perceived environmental pres-

sures of technological turbulence. Moreover, we know from previous research that formalization has different effects on workers depending on their nationality and cultural background (Agarwal, 1993). Hence, future research might benefit from replicating this study in other national and cultural settings.

### **2.5.3 Practical Implications**

Our research provides some valuable practical insights for organizations and their executing managers to increase their employees' engagement in ambidextrous behavior. First, managers should be aware of our finding that their workers increasingly balance exploitative and explorative work tasks when they perceive high technological turbulence in their organization's environment. While employees form their perceptions on the degree of technological turbulence based on the information that they can obtain (Chen et al., 2018), managers should be transparent and openly talk about the technological developments that happen outside of the organization and that may lead to changes inside.

Moreover, our findings show that decision-makers' efforts to develop written rules, procedures, and guidelines might pay off, at least for some time, as they can help employees effectively divide their time between exploitative and explorative work tasks when they perceive high degrees of technological turbulence. Even though our results suggest that formalization only has a significant impact on individual ambidexterity in a short time period of three weeks, rules and guidelines might enable workers to increasingly incorporate work tasks aimed at exploring new opportunities that might arise with technological changes into their daily routine work. As a result, this might increase their individual work performance (Schnellbacher et al., 2019; Zhang et al., 2018) and thereby secure their jobs because managing the ambidexterity challenge demonstrates that employees are capable of dealing with the external challenges in technologically turbulent environments.

### **3 Essay II: Applicant Reactions to Digital Selection Methods: A Signaling Perspective on Innovativeness and Procedural Justice**

#### **Abstract**

Research has shown that the use of digital technologies in the personnel selection process can have both positive and negative effects on applicants' attraction to an organization. We explain this contradiction in the signals of digital selection methods by specifying the underlying mechanisms. Drawing on signaling theory, we built a conceptual model that applies two different theoretical lenses (instrumental-symbolic-framework and justice theory) in suggesting that perceptions of innovativeness and procedural justice explain the relationship between an organization's use of digital selection methods and employer attractiveness perceptions. We tested our model by utilizing two studies, one experimental vignette study among potential applicants ( $N = 400$ ) and one retrospective field study among actual job applicants ( $N = 335$ ). Except for in the assessment stage in Study 1, in both studies, positive indirect effects indicated that applicants perceive digital selection methods as more innovative. While Study 1 also revealed negative indirect effects, with potential applicants further perceiving digital selection methods as less fair than less digitized methods in the application and screening stage as well as the interview stage, these effects were not significant for actual job applicants in Study 2. We discuss theoretical implications for the applicant reactions literature and offer recommendations for human resource managers to make use of positive signaling effects while reducing potential negative signaling effects linked to the use of digital selection methods.

*Note: This chapter is based on a paper (under review) co-authored by Prisca Brosi, Jutta Stumpf-Wollersheim, and Isabell M. Welp. Therefore, the plural instead of the singular is used throughout this chapter. Author contributions to this paper are summarized in Appendix D.*

**Current Status (see also Appendix B):**

Folger, N., Brosi, P., Stumpf-Wollersheim, J., Welpe, I. M. (under review). Applicant Reactions to Digital Selection Methods: A Signaling Perspective on Innovativeness and Procedural Justice. Manuscript submitted for publication at the Journal of Business and Psychology.

**Conference presentations (of previous versions):**

Folger, N., Stumpf-Wollersheim, J., Welpe, I. M. (2019, August). How Do Applicants React to Digital Selection Methods? An Investigation of Three Signaling Mechanisms. *2019 Academy of Management Annual Meeting*, Boston (USA), 9-13 August 2019.

Folger, N., Stumpf-Wollersheim, J., Welpe, I. M. (2018, August). New versus Traditional Recruitment and Selection Methods. *2018 Academy of Management Annual Meeting*, Chicago (USA), 10-14 August 2018.



### 3.1 Introduction

Digital selection methods play an increasingly important role in human resource departments around the world (Ryan et al., 2015; Stone, Lukaszewski, Stone-Romero, & Johnson, 2013; van Esch, Black, & Ferolie, 2019; Woods et al., 2020). Digital selection methods can be defined as personnel selection methods that are mediated by digital communication technologies (Woods et al., 2020) such as social media, mobile, the internet, analytics, cloud, or algorithmic decision making (Vial, 2019). Many organizations screen and evaluate applicants' social network profiles (e.g., *LinkedIn*) instead of asking them to send their CV or use web-based tests and video interviews instead of arranging on-site tests and face-to-face meetings (Tippins, 2015), and some early-adopting organizations have even started experimenting with chatbots to replace human interviewers (Moran, 2018). The introduction of digital technologies in personnel selection processes has the potential to help organizations select the best talent from increasingly large and global pools of applicants (Stone, Deadrick, Lukaszewski, & Johnson, 2015). In allowing the efficient processing of large numbers of applicants, digital technologies save both money and time for organizations as well as applicants (McCarthy et al., 2017; Stone et al., 2015).

Yet another, often unintended, effect of digital selection methods may be their influence on applicants' perceptions of organizations themselves (Ployhart, 2006; Stone et al., 2013) and as a result applicants' judgments of organizational attractiveness (Bauer, Truxillo, Paronto, Weekley, & Campion, 2004). From a signaling theory perspective (Bangerter et al., 2012; Connelly, Certo, Ireland, & Reutzel, 2011; Spence, 1973), digital technologies in selection processes can be assumed to send signals about an organization during the pre-entry phase. In support of this notion, digital technologies in selection processes have been shown to influence applicants' impressions and, as a result, their attraction to the organization as well as their

thoughts about the organization as a potential employer (Chapman, Uggerslev, Carroll, Piasentin, & Jones, 2005; McCarthy et al., 2017; Uggerslev et al., 2012). If applicants perceive these signals to be negative, they might lose interest in the organization and eventually self-select themselves out of the selection process (Hausknecht et al., 2004). In support of this notion, a study by *LinkedIn* shows that 83% of interviewed applicants changed their minds about an organization that they once liked when they gained negative impressions during the selection process (Gager, Sittig, & Batty, 2015).

To date, we know that the signals that are sent by digital technologies in personnel selection (Roulin & Bangerter, 2013; Straus, Miles, & Levesque, 2001) can have both positive and negative effects on applicants' attraction to an organization (Chapman et al., 2003; McCarthy et al., 2017). Yet, so far, our understanding of the mechanisms that link the use of digital technologies in the selection process with applicants' attraction to the organization is still limited (Breugh, 2013; McCarthy et al., 2017). Existing signaling models in personnel selection research have been criticized for lacking conceptual specificity and empirical evidence regarding the specific inferences that people draw from digital technologies (Breugh, 2008; Celani & Singh, 2011; Jones, Willness, & Madey, 2014). Understanding these inferences is particularly important for helping to explain why digital technologies simultaneously send both positive and negative signals.

Two theoretical perspectives offer indications of potential mechanisms. Regarding positive signals, 1) the instrumental-symbolic-framework posits innovativeness as one of the most important signaling mechanisms for increasing employer attractiveness (Lievens & Highhouse, 2003). Digital technologies constitute recent innovations (Parasuraman, 2000); this fact implies that the use of digital selection methods can deliver a positive signal about the innovativeness of the organization. In contrast, previous research on personnel selection indicates negative signals from the theoretical lens of 2) procedural justice (e.g., Gilliland, 1993; 1994). As digital technologies reduce personal interactions (McCarthy et al., 2017), are more standardized

(Chapman & Webster, 2001), and raise issues regarding privacy (e.g., Bauer et al., 2006), applicants may perceive selection processes that use digital technologies to be less procedurally fair.

In sum, drawing on signaling theory (Bangerter et al., 2012; Connelly et al., 2011; Spence, 1973), this research aims to clarify the effect of digital selection methods on applicants' perceptions of an organization's attractiveness as an employer by examining potentially positive effects via innovativeness and potentially negative effects via procedural justice. In doing so, we aim to contribute to the applicant reactions literature in three distinct ways. First, we address recurring calls to keep up with the technological changes in personnel selection practices (Anderson, 2003; McCarthy et al., 2017; Woods et al., 2020) by comparing applicants' preferences on selection methods that incorporate recent digital technologies with their preferences on traditional non-digital methods. Second, by applying signaling theory as a basis to explain the effects of digital selection methods on applicants, we expand the theoretical lens of the applicant reactions literature (McCarthy et al., 2017), which has mainly focused on Gilliland's (1993) organizational justice theory-based framework. Third, we also amend the lens of organizational justice theory (Gilliland, 1993) by addressing recent calls in research to examine the mechanisms that link the use of digital selection methods and applicants' attraction to organizations (Harold et al., 2016). In deriving mechanisms based on two different theoretical lenses—the perspectives of innovativeness and procedural justice—to explain both positive and negative signals, we specifically introduce the instrumental-symbolic-framework (Lievens & Highhouse, 2003) to extend research on applicant reactions to digital technologies in personnel selection methods.

In addition to these theoretical contributions, this research provides practitioners with a better understanding of the specific signals that they send by applying digital selection methods.

Understanding these signals can help human resource managers reduce potential negative effects arising from digital selection methods and make use of positive effects on employer attractiveness perceptions to attract and retain the most talented applicants.

We test our model by analyzing potential applicants in an experimental vignette study and real applicants in a field study to combine the advantages of experimental designs, with their enhanced control of the setting, and of field studies with their greater potential for generalizability (e.g., Anderson et al., 1999; Bauer et al., 2006; Ryan & Ployhart, 2000). In the case of the vignette experiment, we followed the suggestion of Uggerslev et al. (2012) to separately examine the different stages (i.e., application and screening stage, assessment stage, and interview stage) of the entire personnel selection process. We thereby aimed to examine whether the three proposed mechanisms are present in each of the three stages.

### **3.2 Theoretical Background and Hypotheses Development**

#### **3.2.1 A Signaling Perspective on Applicants' Perceptions of Digital Selection Methods**

Spence (1973) introduced signaling theory as a general framework to explain how two parties with imperfectly aligned interests and incomplete information cooperate with each other. The framework has been applied in various management disciplines, such as strategic management, entrepreneurship, organizational behavior (see Connelly et al., 2011), and human resource management (particularly in recruitment and selection; e.g., Jones et al., 2014; Roulin & Bangerter, 2013; Wilhelmy et al., 2018).

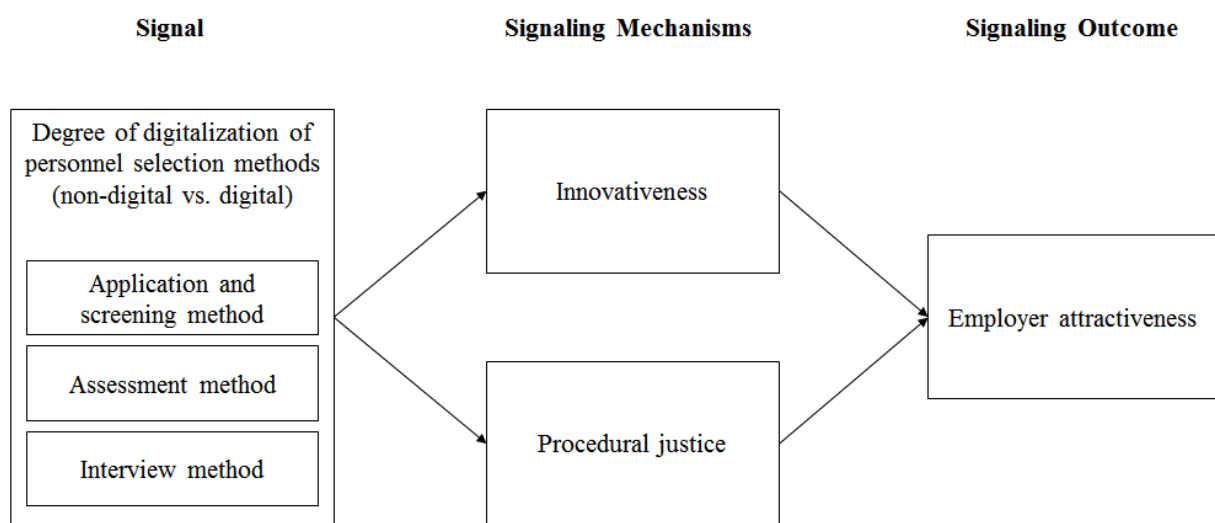
In the case of applicant reactions to selection processes, signaling theory suggests that applicants use the information that they receive about an organization as signals of organizational characteristics (Bangerter et al., 2012; Ehrhart & Ziegert, 2005; Ryan et al., 2000; Rynes et al., 1991). For example, Turban (2001) found that individuals use attributes of recruitment and selection activities, such as the design of or methods used in the selection process, as signals of overall organizational characteristics. Based on these signals, applicants, who typically have

little information about the recruiting organization (Rynes et al., 1991), form impressions of the organization as a potential employer (Celani & Singh, 2011; Suazo, Martínez, & Sandoval, 2009). These impressions or inferences are signaling mechanisms that directly influence signaling outcomes, i.e., job seekers' attitudes towards an organization and their choices (Cable & Turban, 2003; Jones et al., 2014; Rynes et al., 1991).

To determine the specific signaling mechanisms, i.e., how the signals of digital selection methods influence perceptions of employer attractiveness, we draw on research on employer image and procedural justice. Applying these two theoretical lenses, we propose innovativeness as a positive signaling mechanism and procedural justice as a negative signaling mechanism.

Figure 3.1 depicts the resulting theoretical model.

*Figure 3.1: Theoretical Model*



### 3.2.2 Innovativeness

Lievens and Highhouse (2003) introduced the instrumental-symbolic-framework, which posits that applicants form an image of an organization as an employer based on two types of information conveyed to them during recruitment and selection: instrumental characteristics (i.e., factual information such as payment; Wilhelmy et al., 2018) and symbolic meanings (i.e., intangible characteristics such as personality traits; Slaughter, Zickar, Highhouse, & Mohr, 2004; Wilhelmy et al., 2018). Researchers have shown that, even though instrumental

characteristics are important for potential applicants, symbolic meanings have a stronger influence on the employer image that applicants form about an organization (e.g., Lievens, 2007; Lievens & Highhouse, 2003).

One important symbolic value that applicants rely on when building an image of an employer is an organization's innovativeness (Lievens & Highhouse, 2003; Slaughter et al., 2004). Innovativeness is an organization's capability to continuously reinvent its organizational systems, products, and services through innovative efforts, and it is the key to organizational success and long-term survival (Moss, Neubaum, & Meyskens, 2015). Hence, by sending signals of being innovative, organizations can show applicants that they are well prepared for the future and are, therefore, an attractive employer.

From the marketing and service literature, we know that consumers perceive organizations that make use of new (digital) technologies in their business processes as more innovative, which has a positive effect on an organization's image (Parasuraman, 2000). In the context of selection, the use of digital technologies might likewise influence an employer image, as it signals that the organization keeps up with technological innovations and uses novel and exciting methods (Tippins, 2015). Particularly, as many applicants might not have experience with any digital selection methods from previous selection procedures, they might perceive such methods as new and innovative.

We therefore argue that by using digital selection methods, organizations can send signals regarding their innovativeness.

*Hypothesis 1: The use of digital selection methods has a positive effect on applicants' innovativeness perceptions.*

### **3.2.3 Procedural Justice**

Gilliland's (1993) original applicant reactions model, which is based on organizational justice theory, posits that procedural justice or fairness mediates the relationship between characteristics of the selection system, such as selection methods, and applicant reactions, such as

perceptions of employer attractiveness. The concept of procedural justice refers to the fairness of rules and procedures that are used by organizations in making personnel selection decisions (Hausknecht et al., 2004).

By applying selection methods that are mediated by digital technologies, organizations might increase the extent to which they are perceived as fair, because applicants may receive the impression that the organization wants to avoid potential recruiter bias in the selection system (Aguinis & Smith, 2007) and that the organization strives for a high degree of objectivity in selecting employees. Yet, research that has looked into applicants' procedural justice perceptions of technology-mediated selection methods shows that applicants perceive such procedures as less fair because they associate these procedures with the potential for privacy invasions (e.g., Bauer et al., 2006; Harris, Van Hove, & Lievens, 2003). Additionally, studies have found that even though digital selection procedures can be less intimidating (Potosky & Bobko, 2004), applicants might perceive digital selection procedures as less fair than non-digital selection procedures when there is the possibility of technical problems (e.g., network disruptions during web-based assessment tests or interviews; Harris et al., 2003). These findings are also consistent in the context of technology-mediated interviews (e.g., videoconferencing), which are perceived as less fair than face-to-face interviews (Bauer et al., 2004; Chapman et al., 2003). An explanation might be that applicants develop their impressions of digital selection methods, especially in the interview stage, giving them fewer opportunities to manage positive impressions and show their potential (Stone-Romero, Stone, & Hyatt, 2003). Furthermore, researchers have proposed that due to the higher personal interaction involved in non-digital methods, such methods might signal to applicants that the organization cares about them, whereas the application of digital methods might suggest that the organization is more interested in cutting costs and increasing efficiency (Stone et al., 2013).

In this vein, we expect that organizations send negative signals regarding the fairness of their selection procedures by applying digital methods in their selection process.

*Hypothesis 2: The use of digital selection methods has a negative effect on applicants' procedural justice perceptions.*

### **3.2.4 Linking Innovativeness and Procedural Justice Perceptions of Digital Selection**

#### **Methods with Employer Attractiveness**

The theoretical model of applicant reactions to selection processes posits that applicants' perceptions during the selection process have several predictors, such as procedural characteristics, which are in turn related to attitudes towards the organization (e.g., employer attractiveness; Gilliland, 1993; Hausknecht et al., 2004; McCarthy et al., 2017; Ryan & Ployhart, 2000). Specifically, previous research has shown that the impression of an organization that applicants form during the selection process is one of the strongest predictors of applicants' attraction to an organization (Chapman et al., 2005; Wehner, Giardini, & Kabst, 2015). Applicants who perceive a selection process as innovative might receive the impression that the respective organization not only is a pioneer in its market but also is characterized by a highly innovation-oriented culture, which might increase their attraction to the organization (Backhaus & Tikoo, 2004; Sommer, Heidenreich, & Handrich, 2017). Applicants who gain the impression that the selection methods are fair may form positive perceptions about the fairness of an organization in general, which might intensify their attraction to the organization (Bauer, Maertz, Dolen, & Campion, 1998; Macan, Avedon, Paese, & Smith, 1994).

Therefore, we expect indirect effects of the use of digital selection methods on employer attractiveness via perceptions of innovativeness and procedural justice perceptions.

*Hypothesis 3: The use of digital selection methods has a positive indirect effect on employer attractiveness via applicants' innovativeness perceptions.*

*Hypothesis 4: The use of digital selection methods has a negative indirect effect on employer attractiveness via applicants' perceptions of procedural justice.*



### 3.3 Study 1: Experimental Vignette Study

We applied an online experimental vignette study, which allowed us to make causal inferences about applicants' perceptions of digital methods in the selection process (Aguinis & Bradley, 2014; Atzmüller & Steiner, 2010). At the same time, we ensured that all participants were provided with a realistic description of a selection process and enough contextual information, which is essential when employing a between-subjects design in a vignette study (Aguinis & Bradley, 2014; Atzmüller & Steiner, 2010).

#### 3.3.1 Method

*Design and procedure.* After giving their consent to participate in the study, participants were provided with a scenario and the accompanying contextual information. We told the participants that we were interested in their first impression of a hypothetical selection process composed of three steps: 1) application (submission) and screening, 2) assessment test, and 3) job interview. We employed a  $2 \times 2 \times 2$  between-subjects design and randomly assigned participants to one of the resulting eight hypothetical scenarios. The three factors were the level of digitalization (high, low) in each of the three stages of the selection process. By checking for interactions between factors (Atzmüller & Steiner, 2010; Dülmer, 2016), we were able to additionally test for accumulative and consistency effects of digital selection methods. After reading the scenario, participants answered a short survey that included our dependent variables. We provided the scenario descriptions and the questionnaire in German and English language. We designed all materials in the English language and translated them using back-and-forth translation (Brislin, 1970). Of all participants, 23.81% chose to answer in English.

*Sample.* Participants were potential job applicants ( $N = 504$ ), i.e., adults who were in the application process during the time of data collection or who considered applying for a new job in the near future. All participants were recruited online via social networks. Due to logical inconsistencies in answers between the number of applications in the last two years and the last

application within the last two years, we excluded 22 participants from our sample prior to conducting the analyses. Additionally, following the recommendations of Meade and Craig (2012), we applied two careless response detection methods. After examining outliers in the response time as well as response patterns in which participants consistently indicated the same answer, we removed another seven respondents from the sample prior to the analyses. We used an online survey tool that randomly assigned participants to one of the eight scenarios, which resulted in unbalanced samples across the vignette subsets. To increase the reliability of the results and to allow for meaningful interpretation (Atzmüller & Steiner, 2010; Dülmer, 2016), we balanced the design by randomly deleting 75 cases so that each vignette subset contained the same number of participants.

Our final sample ( $N = 400$ ) consisted of 56.00% women. Of all these respondents, 273 were students and 127 were professionals. The mean age was 26.55 ( $SD = 5.24$ ). Respondents with German nationality made up 74.25% of the sample; 6.00% were Polish, 3.25% Singaporean, and 2.75% Austrian; the rest held another nationality. In terms of educational achievements, 79.00% of the sample had a university degree. Among respondents, 88.25% indicated that they participated in at least one selection process in the last two years ( $Mdn = 3$ ).

**Manipulations.** We developed the manipulations for the treatment conditions by using a prestudy. With this prestudy, we aimed to select one digital and one non-digital selection method for each of the three stages of the selection process based on participants' ratings of the degree of digitalization of 21 presumably digital and non-digital selection methods via an online survey. First, we selected non-digital personnel selection methods from previous studies (Smither, Reilly, Millsap, Pearlman, & Stoffey, 1993; Steiner & Gilliland, 1996). These also subsume methods with a very low degree of digitalization (e.g., upload of a written CV to a company's career portal). Then, we added methods that apply digital technologies and have been increasingly used in practice in the last few years. As a result, the final questionnaire included twelve digital and nine non-digital personnel selection methods. For each non-digital

selection method, the prestudy included at least one digital selection method that, apart from making use of digital technologies, was similar to the non-digital selection method. In sum, we analyzed twelve pairs of personnel selection methods—four pairs for the application and screening stage, three pairs for the assessment stage, and five pairs for the interview stage.

Participants were students ( $N = 105$ ) who had already taken part in a personnel selection process or were planning to apply for a job in the near future. The mean age was 25.82 ( $SD = 5.61$ ), and 56.19% were women. Participants rated the degree of digitalization (i.e., “This selection process is very digital”) of each personnel selection method on scales ranging from 1 (*completely disagree*) to 7 (*completely agree*). We analyzed differences in the pairs of selection methods by applying paired samples  $t$ -test analyses. As expected, the means of the degree of digitalization were significantly different ( $p < 0.001$ ) for all pairs of personnel selection methods with moderate to large effect sizes. Based on the effect sizes, we chose one pair of selection methods for each stage: social media profile (digital) versus written CV (non-digital) for the application and screening stage; online-based work sample simulation (digital) versus work sample test at one of the facilities of an organization (non-digital) for the assessment stage; and online interview with an animated video chatbot without a prescribed structure (digital) versus personal face-to-face interview without a prescribed structure (non-digital) for the interview stage (see Table 3.1 for all verbal descriptions of these selection methods).

**Manipulation checks.** In addition to conducting the prestudy, we asked participants in the main study to rate the degree of digitalization of each of the three stages in their scenario to check if the manipulations worked. The response format ranged from 1 (not digital at all) to 7 (very digital). The results of independent  $t$ -tests showed that the manipulation was successful in all three investigated stages of the selection process. For the application and screening stage, participants rated the social media profile ( $M = 5.95$ ,  $SD = 1.30$ ) as more digital than the written CV ( $M = 4.56$ ,  $SD = 1.78$ ),  $t(364) = 8.93$ ,  $p < 0.001$ . Regarding the assessment test stage, participants rated the online-based work sample tests ( $M = 5.69$ ,  $SD = 1.58$ ) as more digital than

the work sample tests at one of an organization’s facilities ( $M = 3.01, SD = 1.67, t(398) = 16.51, p < 0.001$ ). In the case of the job interview stage, participants rated the unstructured chatbot interviews ( $M = 6.18, SD = 1.46$ ) as more digital than the unstructured face-to-face interviews ( $M = 2.33, SD = 1.56, t(396) = 25.52, p < 0.001$ ).

Table 3.1: Study 1 – Verbal Descriptions of all Non-digital and Digital Selection Methods

	Non-Digital	Digital
<b>Application &amp; Screening</b>	You need to upload your <b>written curriculum vitae</b> , which covers a list of your previous academic and professional history as well as your competencies, to the company’s career portal.	You need to upload a link to your <b>social media profile</b> (e.g., LinkedIn, Xing), which covers a list of your previous academic and professional history as well as your competencies, to the company’s career portal.
<b>Assessment</b>	After a positive evaluation of your written curriculum vitae, you need to fulfill a job-relevant task within the course of a <b>work sample test at one of the facilities of the company</b> .	After a positive evaluation of your social media profile, you need to fulfill a job-relevant task within the course of an <b>online-based work sample simulation</b> .
<b>Interview</b>	After a positive evaluation of the work sample test, you need to participate in a <b>personal (face-to-face) interview</b> with employees of the company at one of the company’s facilities. The interview is a casual conversation <b>without a prescribed structure</b> . It primarily serves the purpose of evaluating your personality. After the interview, the employees of the company evaluate your answers and make an acceptance or rejection recommendation.	After a positive evaluation of the work sample simulation, you need to participate in an <b>online interview with an animated video-chatbot</b> and no involvement of employees of the company. The chatbot analyzes the conversation (via artificial intelligence) and asks questions based on your answers <b>without a prescribed structure</b> . It primarily serves the purpose of evaluating your personality. After the interview, an electronic analysis system evaluates your answers and makes an acceptance or rejection recommendation.

**Measures.** All measures employed in Study 1 applied 7-point Likert-scales.

*Innovativeness.* To measure innovativeness perceptions of the selection process, we adapted three items from Zhao, Hoeffler, and Dahl (2012). Participants indicated if they perceived the described selection process as very innovative, very novel, and very original

(Cronbach's  $\alpha = 0.86$ ).

*Procedural justice.* To measure perceptions of procedural justice, which is also frequently termed procedural fairness, we adapted the three items from Bauer et al. (2001). A sample item was "I think that the selection process is a fair way to select people for the respective job" (Cronbach's  $\alpha = 0.87$ ).

*Employer attractiveness.* We measured applicants' perceptions of an organization's attractiveness as a potential employer by adapting the four-item organizational attractiveness measure from Ployhart, Ryan, and Bennett (1999). Specifically, we provided participants with a prompt stating, "In my opinion, based on this selection process, the company as an employer is...", followed by four semantic differential items: bad–good, unfavorable–favorable, unattractive–attractive, unappealing–appealing (Cronbach's  $\alpha = 0.94$ ).

To assess the distinctiveness of our mechanism and outcome variables, we conducted a confirmatory factor analysis. We followed the recommendations of Hair, Black, Babin, and Anderson (2018) and determined the chi-squared value ( $\chi^2$ ), the comparative fit index (CFI), for which values should be above 0.95 to indicate good fit, the Tucker Lewis index (TLI) with values above 0.95 indicating good fit, and the root mean square error of approximation (RMSEA), for which values that are lower than or equal to 0.08 indicate a reasonable fit. Our hypothesized three-factor model yielded a satisfactory fit to the data:  $\chi^2 [32] = 124.12, p < 0.001$ ; CFI = 0.97; TLI = 0.96; RMSEA = 0.08. Moreover, the hypothesized three-factor model fit the data better than a two-factor model with both mediators loading on one common factor ( $\chi^2 [34] = 949.17, p < 0.001$ ; CFI = 0.68; TLI = 0.58; RMSEA = 0.26;  $\Delta\chi^2 [2] = 825.05, p < 0.001$ ) as well as a single-factor model ( $\chi^2 [35] = 959.10, p < 0.001$ ; CFI = 0.68; TLI = 0.59; RMSEA = 0.26;  $\Delta\chi^2 [3] = 834.98, p < 0.001$ ). Additionally, we tested for convergent and discriminant validity of these constructs. The standardized loading estimates and average variance extracted (AVE) estimates of each construct exceeded 0.50, indicating convergent validity (Hair et al., 2018), and the AVE estimates were larger than the shared variance

(squared interconstruct correlation) with any other construct, supporting discriminant validity (Fornell & Larcker, 1981).

### 3.3.2 Results

Table 3.2 shows the means, standard deviations, and correlations among the study variables.

Table 3.2: Study 1 – Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Application and screening method	0.50	0.50	-					
2. Assessment method	0.50	0.50	0.00	-				
3. Interview method	0.50	0.50	0.00	0.00	-			
4. Innovativeness	4.15	1.57	0.14	0.04	0.41	-		
5. Procedural justice	4.34	1.38	-0.12	-0.05	-0.32	0.04	-	
6. Employer attractiveness	4.10	1.50	-0.11	-0.07	-0.39	0.06	0.65	-

Notes:  $N = 400$ ; variables 1 to 3 were constructed by dummy coding two experimental conditions to represent non-digital (coded 0) and digital (coded 1) selection methods; correlations with values of  $|r| \geq 0.14$  are significant at  $p < 0.01$  (two-tailed) and correlations of  $|r| \geq 0.11$  are significant at  $p < 0.05$  (two-tailed).

First, we estimated the direct effects of our conceptual model. To do so, we examined the main (each single stage) effects of the use of digital versus non-digital selection methods on perceptions of innovativeness (Hypothesis 1), procedural justice (Hypothesis 2), and employer attractiveness. Table 3.3 shows the regression results for these direct effects.

According to Hypothesis 1, we expected that potential applicants would perceive digital selection methods to be more innovative than non-digital selection methods. This hypothesis was supported for the application and screening stage ( $b = 0.44, p = 0.002$ ) as well as the interview stage ( $b = 1.28, p < 0.001$ ) but not the assessment stage ( $b = 0.12, p = 0.404$ ).

According to Hypothesis 2, we anticipated that potential applicants would perceive digital selection methods to be less fair than non-digital methods. We found support for this hypothesis for the application and screening stage ( $b = -0.33, p = 0.010$ ) as well as the interview stage ( $b = -0.88, p < 0.001$ ) but not the assessment stage ( $b = -0.14, p = 0.276$ ).

Table 3.3: Study 1 – Regression Results (Direct Effects) for Mechanisms and Outcome

Mechanisms, outcome variable and predictors	Estimate (b)	SE	t/F <sup>a</sup>	p
Innovativeness				
Application & screening method	0.44	0.14	3.14	0.002
Assessment method	0.12	0.14	0.83	0.404
Interview method	1.28	0.14	9.02	< 0.001
R <sup>2</sup>	0.19		30.62	< 0.001
Procedural justice				
Application & screening method	-0.33	0.13	- 2.58	0.010
Assessment method	-0.14	0.13	- 1.09	0.276
Interview method	-0.88	0.13	- 6.79	< 0.001
R <sup>2</sup>	0.12		18.00	< 0.001
Employer attractiveness				
Application & screening method	-0.19	0.11	- 1.76	0.079
Assessment method	-0.14	0.11	- 1.33	0.186
Interview method	-0.86	0.13	- 6.68	< 0.001
Innovativeness	0.16	0.04	3.96	< 0.001
Procedural justice	0.59	0.04	13.80	< 0.001
R <sup>2</sup>	0.49		75.10	< 0.001

Notes: N = 400; unstandardized estimates and standard errors (SE) are presented.

<sup>a</sup> t-statistics are reported for estimates of predictors and mechanisms; F-ratios are reported for R<sup>2</sup>.

Additionally, we checked for interaction effects between factors. Only the two-way interaction of the application and screening method and the interview method on innovativeness perceptions was significant ( $\beta = -0.21, p < 0.001$ ). The use of digital methods in the application and screening stage had a significant positive influence on innovativeness perceptions when the interview method was non-digital ( $\beta = 0.36, p < 0.001$ ) but was not significantly related to innovativeness perceptions when the interview method was digital ( $\beta = -0.07, p = 0.252$ ). Thus, the digital interview method appeared to overshadow the digital method in the application and screening stage in taking away its positive effect on innovativeness perceptions.

Proceeding with hypothesis testing, we examined whether potential applicants' perceptions of innovativeness and procedural justice indirectly affect the relationship between the digitalization degree of the selection methods (i.e., digital versus non-digital) and employer attractiveness (Hypotheses 3 & 4). We tested the indirect effects by applying the *PROCESS* macro

for SPSS (Hayes, 2018). When testing each of the indirect effects, we controlled for the others; this procedure allows adequate testing of theory and explanatory models (Hayes, 2018; Jones et al., 2014; Preacher & Hayes, 2008). We followed the recommendation of Preacher and Hayes (2008) and used bootstrapping to test for the significance of indirect effects. We report bootstrap estimates based on 5,000 bootstrap samples with bias-corrected 95% confidence intervals. Table 3.4 shows the regression results for the test of the indirect effects.

Table 3.4: Study 1 – Regression Results of Tests for Indirect Effects

Indirect effects	Estimate	SE	BC 95% CI	
			Lower	Upper
Application & screening method → Innovativeness → Employer attractiveness	<b>0.07</b>	0.03	0.019	0.139
Application & screening method → Procedural justice → Employer attractiveness	<b>-0.20</b>	0.08	-0.358	-0.050
Assessment method → Innovativeness → Employer attractiveness	0.02	0.02	-0.025	0.071
Assessment method → Procedural justice → Employer attractiveness	-0.08	0.08	-0.231	0.067
Interview method → Innovativeness → Employer attractiveness	<b>0.20</b>	0.06	0.089	0.328
Interview method → Procedural justice → Employer attractiveness	<b>-0.52</b>	0.09	-0.710	-0.359

Notes:  $N = 400$ ; BC 95% CI refers to the bias-corrected 95% confidence interval; estimate refers to estimate of the effect using 5,000 bootstrap samples; estimates that do not include zero in the BC 95% CI are statistically significant and appear in bold.

We found support for Hypothesis 3, which posited that innovativeness perceptions indirectly affect the relationship between the use of digital selection methods and employer attractiveness in a positive way for the application and screening stage ( $a \times b = 0.07$ , 95% CI [0.019, 0.139]) and the interview stage ( $a \times b = 0.20$ , 95% CI [0.089, 0.328]) but not for the assessment stage ( $a \times b = 0.02$ , 95% CI [-0.025, 0.071]). According to Hypothesis 4, we expected that perceptions of procedural justice indirectly affect the relationship between the use of digital selection methods and employer attractiveness in a negative way. We also found support for this hypothesis for the application and screening stage ( $a \times b = -0.20$ , 95% CI



[-0.358, -0.050]) as well as the interview stage ( $a \times b = -0.52$ , 95% CI [-0.710, -0.359]) but not the assessment stage ( $a \times b = -0.08$ , 95% CI [-0.231, 0.067]).

### 3.3.3 Discussion

The results of Study 1 confirm that digital selection methods do indeed send signals that influence applicants' perceptions of employer attractiveness in the application and screening stage as well as in the interview stage, but not in the assessment stage. Signaling innovativeness led to digital selection methods showing a positive indirect effect on potential applicants' attitudes towards an organization. Yet, lower procedural justice perceptions resulted in negative indirect effects of digital selection methods on employer attractiveness perceptions.

The lack of significant differences regarding innovativeness in the assessment stage might simply be explained by the fact that many organizations already use online-based assessment tests (Stone et al., 2013; Tippins, 2015). Consequently, potential applicants may no longer perceive this procedure to be an innovative method for selecting new employees. This possibility is also corroborated by the fact that the effects of digital methods in the interview stage overshadowed the effects of digital methods in the application and screening stage. Moreover, applicants may not see any significant differences in the fairness of online and offline assessments, as the goal in these assessment tests is generally clear and the procedure is closely related to the job and consistent for every applicant (Roth, Bobko, & McFarland, 2005), which provides less room for unfair treatment in either case.

While Study 1 was experimental and therefore provided high internal validity for inferring that digital selection methods cause potential applicants' perceptions, vignette studies remain hypothetical and prospective in nature (Aguinis & Bradley, 2014). Hence, in Study 2, we aimed to examine job applicants' reactions to real selection processes that they experienced when searching for a job. Examining job applicants' reactions to real selection processes allows us to extend our findings by assessing whether the effects of digital selection methods also apply in retrospect, i.e., after applicants have participated in a selection process.

### 3.4 Study 2: Field Survey Study

In examining job applicant reactions to digital selection methods in the field, we asked participants to consider the last selection process in which they had reached at least the interview stage. This approach is based on the critical incident technique, where respondents are asked to reminisce about a salient situation (Aquino, Tripp, & Bies, 2001, 2006; Flanagan, 1954). While a broad range of different digital methods is used in all stages of selection processes in the field, their individual diffusion is relatively low (see Spar, Pletenyuk, Reilly, & Ignatova, 2018; Weitzel et al., 2018). As we, furthermore, had the same hypotheses for each stage, we opted to examine the aggregate of digital selection methods. As in Study 1, we used an online survey for Study 2. The survey was conducted in the German language only.

#### 3.4.1 Method

*Sample.* We collected data from 342 people who had participated in (at least) one selection process in which they had reached the interview stage and asked them to refer to this process when answering the questionnaire. Participants were recruited via social networks. To determine our final sample, we used the same tests for logical inconsistencies and careless responses as in Study 1. As a result, seven participants were removed from the sample before we conducted our analyses.

Our final sample ( $N = 335$ ) consisted of 166 students and 169 professionals. Of all these participants, 50.45% were women and the mean age was 26.31 ( $SD = 5.36$ ). Most of the sample consisted of people with German nationality (92.83%), followed by those with Austrian (1.49%) and Swiss (1.19%) nationality; the rest held other nationalities or did not provide an answer. In terms of highest educational achievement, 61.19% of the respondents were holders of a university degree; 12.54% had completed an apprenticeship; 12.84% held a high school diploma; the rest indicated another educational achievement or did not provide this information. The majority of respondents (91.04%) indicated that they had participated in at least one selection process

in the last two years ( $Mdn = 4$ ). Most participants referred to a selection process that was carried out by an established organization (88.36%); 5.37% of the respondents referred to a selection process at a start-up company (age of firm: less than three years); the rest indicated another organization type or did not provide any answer. The selection processes to which applicants referred were conducted by organizations from various industries, with the service industry being the most frequently mentioned (22.39%), followed by banking and finance (13.13%). A large proportion of the respondents (84.78%) indicated that they received a job offer from the organization after participating in the selection process. Among these respondents, 91.55% accepted the job offer.

***Measure of digital selection process.*** We provided participants with descriptions of all 12 digital and nine non-digital selection methods that were used in the prestudy and asked them to mark those selection methods that had been applied in the respective selection process. We also included the option to add other selection methods that the given list did not cover. Overall, participants indicated 55 additional selection methods. To use that information for further analyses, the first author of this paper coded these methods regarding their degree of digitalization (i.e., digital versus non-digital) and another researcher from a German university who is familiar with the field of personnel selection validated the codes. Interrater reliability measured via Cohen's kappa was 76.11%, indicating a good level of agreement (Weathington et al., 2012).

As expected, all digital selection methods were at least somewhat used, and 45.37% of all participants indicated at least one digital selection method. Yet, as also expected, the frequencies of the individual digital selection methods were still relatively low, with digital ability tests being most often used (18.21%), followed by online-based work simulations (12.54%) and links to social media profiles (12.54%). In operationalizing our predictor as an overall share (percentage) of digital methods used in the entire selection process, we calculated the share by dividing the total number of digital selection methods by the total number of overall selection methods used in the entire selection process.

***Mechanism and outcome measures.*** We used the same measures as in Study 1 for innovativeness perceptions (Cronbach's  $\alpha = 0.80$ ), perceptions of procedural justice (Cronbach's  $\alpha = 0.83$ ), and employer attractiveness (Cronbach's  $\alpha = 0.93$ ).

Similar to Study 1, we conducted a confirmatory factor analysis to assess the distinctiveness of our mechanism and outcome variables. Our hypothesized three-factor model yielded a good fit to the data:  $\chi^2 [32] = 56.01, p = 0.004$ ; CFI = 0.99; TLI = 0.98; RMSEA = 0.05. This model fit the data better than a two factor model with both mediators loading on one common factor ( $\chi^2 [34] = 502.21, p < 0.001$ ; CFI = 0.75; TLI = 0.67; RMSEA = 0.20;  $\Delta\chi^2 [2] = 446.20, p < 0.001$ ), as well as a single-factor model ( $\chi^2 [35] = 694.50, p < 0.001$ ; CFI = 0.65; TLI = 0.55; RMSEA = 0.24;  $\Delta\chi^2 [3] = 638.49, p < 0.001$ ). Additionally, we tested the convergent and discriminant validity of the mechanism and outcome measures. The standardized loading estimates and AVE estimates of each construct exceeded 0.50, indicating convergent validity (Hair et al., 2018), and the AVE estimates were larger than the shared variance with any other construct, supporting discriminant validity (Fornell & Larcker, 1981).

***Controls.*** We included outcome favorability as a control variable. Outcome favorability refers to whether applicants received a job offer from the organization (Wilhelmy et al., 2018). It is an important determinant of applicants' perceptions of and attitudes towards an organization after they participate in a selection process (Hausknecht et al., 2004; Ryan & Ployhart, 2000). We coded outcome favorability as 0 for no job offer and 1 for a job offer.

Additionally, we collected information about age, gender, and educational achievement. Yet, in line with previous research in the applicant reactions literature (e.g., Ababneh, Hackett, & Schat, 2014; Bauer et al., 2006), we do not report these variables in our regression analyses, as they are uncorrelated with the dependent variables (see Table 3.5). An inclusion may reduce power or increase the possibility of type 1 errors, which suggest that there are effects when in reality, there are none (Aguinis & Vandenberg, 2014). Yet, analyses that included these control variables revealed similar patterns of results.

Table 3.5: Study 2 – Means, Standard Deviations and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Share of digital selection methods	0.15	0.19	-							
2. Innovativeness	2.98	1.42	0.36	-						
3. Procedural justice	5.49	1.20	-0.12	0.03	-					
4. Employer attractiveness	5.74	1.21	-0.05	0.14	0.37	-				
5. Outcome favorability	0.85	0.36	-0.19	-0.09	0.31	0.16	-			
6. Age	26.31	5.35	0.04	0.02	0.02	-0.07	-0.17	-		
7. Gender	1.49	0.50	-0.02	-0.08	-0.04	-0.01	0.00	0.03	-	
8. Educational level	3.78	0.95	0.16	0.00	-0.01	0.00	-0.12	0.24	0.13	-

Notes:  $N = 335$ ; share of digital selection methods is coded as a percentage (0 = 0.00%; 1 = 100.00%); outcome favorability is coded 0 = no job offer and 1 = job offer; gender is coded 1 = female and 2 = male; educational level is coded 1 = no educational qualification, 2 = high school certificate, 3 = apprenticeship or equivalent, 4 = bachelor's degree, 5 = master's degree and 6 = PhD ; correlations with values of  $|r| \geq 0.14$  are significant at  $p < 0.01$  (two-tailed) and correlations of  $|r| \geq 0.12$  are significant at  $p < 0.05$  (two-tailed).

### 3.4.2 Results

Table 3.5 presents the means, standard deviations, and correlations among variables used in Study 2.

Following the same analytical steps from Study 1, we first examined whether the use of digital selection methods has a positive direct effect on innovativeness perceptions (Hypothesis 1) and a negative direct effect on procedural justice perceptions (Hypothesis 2). Table 3.6 shows the regression results for these direct effects. Due to the variation in the measurement scales of the independent and dependent variables in this study, we report standardized estimates.

Table 3.6: Study 2 – Regression Results (Direct Effects) for Mechanisms and Outcome

Mechanisms, outcome variable and predictors	Estimate ( $\beta$ )	SE	$t/F^a$	$p$
Innovativeness				
Share of digital selection methods	0.35	0.05	6.79	< 0.001
Outcome favorability	-0.02	0.05	-0.32	0.747
$R^2$	0.13		24.47	< 0.001
Procedural justice				
Share of digital selection methods	-0.06	0.05	-1.15	0.251
Outcome favorability	0.30	0.05	5.70	< 0.001
$R^2$	0.10		18.89	< 0.001
Employer attractiveness				
Share of digital selection methods	-0.06	0.05	-1.03	0.304
Innovativeness	0.16	0.05	2.89	0.004
Procedural justice	0.34	0.05	6.44	< 0.001
Outcome favorability	0.05	0.05	1.00	0.316
$R^2$	0.16		15.95	< 0.001

Notes:  $N = 335$ ; outcome favorability is coded 0 = no job offer and 1 = job offer; all variables were z-transformed before the analyses were conducted; standardized estimates and standard errors (SE) are presented.

<sup>a</sup>  $t$ -statistics are reported for estimates of predictors and mechanisms;  $F$ -ratios are reported for  $R^2$ .

We found support for Hypothesis 1, which anticipated a positive relationship between the use of digital selection methods and the innovativeness perceptions of applicants ( $\beta = 0.35$ ,  $p < 0.001$ ). Hypothesis 2 anticipated a negative relationship between the use of digital selection methods and the procedural justice perceptions of applicants. Despite a significant negative

correlation between digital selection methods and applicants' procedural justice perceptions ( $r = -0.12, p = 0.029$ ), we did not find support for Hypothesis 2, as this relation diminished in the regression analysis ( $\beta = -0.06, p = 0.251$ ).

Next, we examined indirect effects in the relationship between the use of digital selection methods and employer attractiveness via perceptions of innovativeness (Hypothesis 3) and procedural justice (Hypothesis 4). Table 3.7 shows the regression results for the tests of the indirect effects.

Table 3.7: Study 2 – Regression Results of Tests for Indirect Effects

Indirect effects	Estimate	SE	BC 95% CI	
			Lower	Upper
Share of digital selection methods → Innovativeness → Employer attractiveness	<b>0.06</b>	0.02	0.015	0.102
Share of digital selection methods → Procedural justice → Employer attractiveness	-0.02	0.02	-0.064	0.017

Notes:  $N = 335$ ; BC 95% CI refers to the bias-corrected 95% confidence interval; estimate refers to the estimate of the effect using 5,000 bootstrap samples; estimates that do not include zero in the BC 95% CI are statistically significant and appear in bold.

In line with the positive relation between digital methods and innovativeness perceptions, we found an indirect effect of digital methods on employer attractiveness via innovativeness perceptions that supported Hypothesis 3 ( $a \times b = 0.06, 95\% \text{ CI } [0.015, 0.102]$ ). In line with the non-significant relation between digital methods and perceptions of procedural justice, we did not find a significant indirect effect via procedural justice perceptions ( $a \times b = -0.02, 95\% \text{ CI } [-0.064, 0.017]$ ) in support of Hypothesis 4.

### 3.4.3 Summary of Results

The results of Study 2 show that the degree of digitalization in the selection process was related to innovativeness perceptions such that higher shares of digital methods in the selection process were associated with higher innovativeness perceptions, which indirectly affected the attraction of applicants towards the organization. In contrast, the use of digital selection methods did not affect applicants' procedural justice perceptions in Study 2.

### **3.5 General Discussion**

We revealed signaling mechanisms of digital selection methods by examining their effects on applicants' employer attractiveness perceptions via perceptions of innovativeness and procedural justice with an experimental vignette experiment among potential applicants and a field study among actual job applicants. With the exception of the assessment stage in Study 1, both studies supported perceptions of innovativeness as a mechanism behind positive signals of digital selection methods on applicants' employer attractiveness judgments. In contrast, procedural justice perceptions were only supported as mechanisms of negative signals in the application and screening stage as well as the interview stage in the vignette experiment that examined potential applicants but not in the retrospective field study that involved actual applicants.

One explanation of why applicants did not use the degree of digitalization of selection methods to draw inferences about fairness when being surveyed retrospectively might be that applicants had collected more information throughout the selection process that allowed them to make a more detailed assessment of the organization and its selection procedure. Before making an application, applicants base their impressions regarding the fairness of an organization on readily available information that the organization conveys to applicants (Celani & Singh, 2011), such as information on the selection process. Throughout the selection process, however, applicants gain more information about the organization from further interactions (Klotz et al., 2013), which might decrease their uncertainty regarding the procedural fairness of the selection process and their perception of an organization's attractiveness and explain why digital methods are no longer used as proxies to form these perceptions. In this regard, our findings are generally in line with the results of Uggerslev et al.'s (2012) meta-analysis, which shows that applicants' perceptions of selection process characteristics and the impact of those



characteristics on applicant attraction vary according to the applicants' stage in the recruitment and selection process.

### **3.5.1 Theoretical Implications**

This research contributes to the applicant reactions literature (Chapman et al., 2005; Gilliland, 1993; Hausknecht et al., 2004; Uggerslev et al., 2012) in three ways. First, previous research has repeatedly called on scholars to keep up with technological developments in personnel selection (McCarthy et al., 2017; Ployhart, 2006; Ryan & Ployhart, 2014). We responded to these calls by specifically investigating the attitudes of (potential) applicants towards new forms of digital selection methods in comparison to non-digital selection methods. In investigating applicants' perceptions of digital methods in all three typical stages of the selection process in the experimental vignette study, we also extended the current state of research, which has mainly focused on applicant reactions to selection methods in just one phase (see McCarthy et al., 2017; Stone et al., 2013).

Second, we answered recent calls to expand the theoretical lens of the applicant reactions literature by drawing on signaling theory (McCarthy et al., 2017). While previous research in the field of applicant reactions to selection procedures mainly focused on Gilliland's (1993) framework based on organizational justice theory, we broadened the scope of the examination by demonstrating effects on perceptions of innovativeness. Independently of these specific dimensions, the mere expansion of applicants' perceptions provides support for the incorporation of signaling theory as a necessary theoretical extension. In this vein, our findings suggest that applicants make inferences based on signals that they receive from an organization's use of digital methods.

Third, by broadening the theoretical lens of the applicant reactions literature (Hausknecht et al., 2004; McCarthy et al., 2017; Ryan & Ployhart, 2000), we demonstrate that potential applicants use symbolic attributes such as their perceptions of the innovativeness of

selection methods (Lievens & Highhouse, 2003) to make inferences about an employer's attractiveness. This extends previous research in the applicant reactions literature, which has mainly focused on situationally based (e.g., fairness of the procedures) and dispositionally based (e.g., anxiety or motivation of applicants) perceptions of selection procedures (McCarthy et al., 2017).

### **3.5.2 Limitations and Future Research**

Even though we applied two studies that combine the advantages of internal validity (experimental vignette study) and generalizability (field study), there are limitations that future research needs to address. First, the results were not fully consistent, as a negative signal on procedural justice was revealed in Study 1 but not in Study 2. Although this difference may be explained by the different samples (we examined perceptions of potential applicants in Study 1 but those of actual applicants who retrospectively reflected on previous selection processes in Study 2), additional research is needed to confirm this difference. In particular, we do not know how applicants' innovativeness and procedural justice perceptions of digital selection methods might change over time. Therefore, additional research would benefit from longitudinal studies that investigate changes in applicants' perceptions of digital selection methods through the various stages of the selection process (see Barber, 1998)

Moreover, we looked at employer attractiveness as one signaling outcome. This was a useful approach for our research, as we wanted to examine the mechanisms through which digital methods in selection processes influence applicants' attitudes towards an organization. In relation to this objective, employer attractiveness is a central outcome of the applicant reaction framework (Gilliland, 1993; Hausknecht et al., 2004; McCarthy et al., 2017; Ryan & Ployhart, 2000). Yet, we cannot draw conclusions on other important outcomes, including actual behaviors such as job acceptance or recommendations to other potential applicants. Hence, future research would benefit from examining whether these outcomes are likewise affected by the

mechanisms that we proposed in our research, i.e., innovativeness and procedural justice perceptions.

Furthermore, while we derived mechanisms from two different theoretical perspectives, future research might examine whether our conceptual model needs to be extended by integrating other mechanisms that might influence the relationship between the use of digital selection methods and employer attractiveness assessments. As our research shows, innovativeness as one symbolic attribute (Lievens & Highhouse, 2003), is a useful signaling mechanism that links the use of digital selection methods and employer attractiveness. Future research might investigate whether other symbolic attributes, such as cheerfulness or sincerity (Lievens, 2007), influence the relationship between the use of digital selection methods and outcomes such as employer attractiveness.

In addition, while looking at actual applicants in the field in Study 2 allowed us to make more generalizable inferences, our sample mainly comprised participants from German-speaking countries (i.e., Germany, Austria, and Switzerland), who primarily applied for positions at established organizations. Therefore, to increase the external validity of the results, it might be valuable for future research to replicate this study in another national context and with a larger share of applicants who applied for new ventures.

### **3.5.3 Practical Implications**

While organizations save time and money by using digital technologies in their personnel selection processes (McCarthy et al., 2017), these technologies also trigger perceptions of the organization among applicants. Our research clarifies previous results that show that these perceptions can be both positive and negative by shedding light on the specific signals that are sent on innovation and procedural justice. When organizations know which signals that they are sending with different selection methods, they can proactively adapt their recruitment communication (Wilhelmy, Kleinmann, Melchers, & Götz, 2017). In this vein, the identification of these signals allows us to provide concrete recommendations for organizations and particularly

for human resource managers who aim to keep up with the latest technologies in their selection processes.

Our results demonstrate that potential applicants as well as applicants who have already gone through a selection process perceive the use of digital technologies in selection processes to be innovative. As applicants might also express their impressions of the selection process to others (Smither et al., 1993), innovativeness perceptions can influence an organization's overall reputation and employer image (Cable & Turban, 2003; Highhouse, Zickar, Thorsteinson, Stierwalt, & Slaughter, 1999) as an innovative employer that is well prepared for the future. This broad image, which can be built through word of mouth (Van Hove & Lievens, 2009), can help organizations attract and retain potential employees (Backhaus & Tikoo, 2004). Hence, by using digital technologies in the personnel selection process, organizations can underscore their innovativeness, which as a result can help them win the race for high-potential candidates in a highly competitive labor market (Sommer et al., 2017).

Yet, as we also found a negative effect of the signal provided by digital technologies on the perceptions of potential applicants, organizations need to take great care in selecting and implementing digital technologies in their selection processes. Otherwise, organizations may forgo attracting the best talent, as potential applicants who are the very target of selection processes might be discouraged from applying. Specifically, organizations need to address potential concerns regarding procedural justice. Applicants might perceive digital selection methods as less fair than non-digital methods because they have the impression that digital selection methods cannot provide enough information (Dineen, Noe, & Wang, 2004). Furthermore, digital selection technologies are based on machine learning, which can entail biases, e.g., related to race or gender (Caliskan, Bryson, & Narayanan, 2017), an issue that is also much discussed in the public debate (Dastin, 2018). Therefore, applicants might be afraid that they are not able to make a positive impression when digital selection methods are applied (Stone-Romero et al., 2003). Organizations could address this issue by clearly communicating which information they

need from applicants and what information they use to make their selection decisions. Furthermore, organizations should make sure to communicate openly to applicants that applicant information that is collected and digitally stored through screening and video interviews is not used for other purposes. These measures address concerns about procedural justice by highlighting how participants can provide all necessary information about themselves in the process and simultaneously reduce potential data privacy concerns (Bauer et al., 2006).

In sum, while reaping the positive effects of digital selection methods on innovativeness perceptions, organizations must and can address issues about procedural justice in multiple ways in their communication efforts towards applicants to bolster potential applicants' attitudes towards the organization.

#### **4 Essay III: Incumbent's Curse Revisited: Are Firm Stereotypes Beneficial or Harmful for Established Companies Pursuing Radical Technological Innovations?**

##### **Abstract**

In the face of rapid technological breakthroughs and changes, radical technological innovations are at the heart of a company's long-term survival. Yet, established companies often struggle while start-ups gain market share by pursuing radical technological innovations. From previous research, we know that this incumbent's curse can be the result of internal organizational barriers, but we lack an understanding of the role of external actors. Drawing on social judgments of organizations theory, we address this gap by suggesting that members of the general public possess firm stereotypes in the form of warmth and competence perceptions of established companies and start-ups, which affect public expectations about the success of these respective company types in pursuing radical technological innovations. Moreover, we suggest that social judgments might change in light of new information about a fatal error. We test our suggestions by utilizing three experimental studies. Our findings show that members of the general public generally perceive established companies to be more competent but less warm than start-ups. Being perceived as more competent also leads to higher success expectations for established companies pursuing radical technological innovations, while warmth perceptions have no effect, suggesting that established companies benefit from firm stereotypes. Yet, after a revelation of information about a fatal error, there are no longer significant differences in firm stereotypes or success expectations. We discuss theoretical implications for the literature and offer recommendations for decision-makers in established companies.

*Note: This chapter is based on a working paper co-authored by Jutta Stumpf-Wollersheim and Isabell M. Welp. Therefore, the plural instead of the singular is used throughout this chapter. Author contributions to this paper are summarized in Appendix D.*

**Current Status (see also Appendix C):**

Folger, N., Stumpf-Wollersheim, J., Welppe, I. M. (2020). Incumbent's Curse Revisited: Are Firm Stereotypes Beneficial or Harmful for Established Companies Pursuing Radical Technological Innovations? *Working paper*.

**Conference presentations (of previous versions):**

Folger, N., Stumpf-Wollersheim, J., Welppe, I. M. (2019, February). Incumbent Stereotypes: Obstacles to Radical Innovation for Established Firms? *Workshop der Wissenschaftlichen Kommission Organisation des Verbands der Hochschullehrer für Betriebswirtschaft e.v. (VHB)*, Münster (Germany), 13-15 February 2019.

#### 4.1 Introduction

To survive and stay relevant, established companies must adapt to the increasing pace of technological breakthroughs and changes through radical technological innovations. Such innovations not only disrupt the status quo of industries but also enable firms to put products or services with higher margins on the market and are therefore at the heart of organizations' long-term survival (Abernathy & Clark, 1985; Tushman & Anderson, 1986). However, many established companies have difficulties keeping up with start-ups that prosper and gain market share quickly through radical technological innovations (Christensen, 1997; Henderson, 1993; Henderson & Clark, 1990; Hill & Rothaermel, 2003). By 2020, only 10.20% of the original 500 US companies from 1955 remained on the Fortune 500 list (Perry, 2020). Similarly, in Germany, only 12 of the 30 companies listed on the DAX in 1988 were still on the index in September 2020 (STOXX Ltd., 2020). This fact is illustrated by famous examples of formerly highly renowned firms such as Kodak or Nokia, which have struggled while newcomers prospered in their markets by changing the status quo of the industries with radical technological innovations (Laamanen, Lamberg, & Vaara, 2016; Lucas & Goh, 2009). Similar tendencies are observable in the automotive industry, where newcomers such as Tesla challenge incumbent market leaders (Mocker & Fonstad, 2017).

From existing research, we already know that this struggle of established companies, which has been termed "*the incumbent's curse*" by Chandy and Tellis (2000, p. 1), can be attributed to at least three important barriers: first, differences in economic incentives among start-ups and established companies (Henderson, 1993); second, forces of inertia and the fallacy of organizational routines within established companies (Cohen & Levinthal, 1990; Hannan & Freeman, 1984); and third, the embeddedness of established companies within an established industry network that does not initially value the new technology (Christensen, 1997; Hill & Rothaermel, 2003).



Consequently, strategies on how established companies can overcome these barriers have drawn the attention of management scholars in recent decades (e.g., Ansari & Krop, 2012; Hill & Rothaermel, 2003; O'Reilly & Tushman, 2016). However, as Eggers and Park (2018) pointed out in their recent review on adaptation strategies of incumbent firms, even when companies can overcome the mentioned barriers, external actors or stakeholders “*need to be accounted for to understand the incumbent's ability to adapt*” (p. 373). Yet, our understanding of the role of external actors is still limited (Eggers & Park, 2018). Specifically, we lack a clear understanding of whether external actors have different perceptions of established firms and start-ups and of how these perceptions influence public judgments in the context of radical technological innovations.

To advance this understanding, we draw on the theory of social judgments of organizations (Bitektine, 2011) by proposing that people hold stereotypes of organizations based on their knowledge that a company is an established company or a start-up. Specifically, we focus on the two primary dimensions of firm stereotypes, i.e., warmth and competence (Fiske et al., 2007; Judd et al., 2005). By using warmth and competence as two typical firm stereotypes in our research, we follow Aaker et al. (2010) and Malone et al. (2013), who have shown that these stereotypes influence evaluators' judgments of an organization and as a result affect an organization's reputation and legitimacy. Moreover, we argue that these stereotypes affect the expectations of external actors on whether a company will be successful with radical technological innovation efforts, and we hypothesize that these expectations might change when a radical technological innovation in a company is associated with new information about a fatal error.

Investigating the role of stereotypes and social judgments of established companies and start-ups in the context of radical technological innovations is important for at least three reasons. First, due to stakeholders' limited information about the characteristics of an organization, stakeholder groups use proxies based on social judgments to translate available information into

organizational reputation and legitimacy (Bitektine, 2011; Mishina et al., 2012), which can affect an organization's performance (Bitektine & Haack, 2015). Second, radical technological innovations are characterized by uncertainty, unpredictability and high failure rates, which can have an impact on the social judgments of organizations and therefore endanger a firm's reputation, legitimacy and performance (Cooper & Smith, 1992). Hence, established companies that need to maintain their reputation and legitimacy might be more reluctant to engage in radical technological innovation than start-ups, which are still in the process of gaining legitimacy and developing their reputation (Cooper & Smith, 1992). Third, by increasing our understanding of the role of social judgments and firm stereotypes in the context of radical technological innovations, established companies can make more informed decisions.

By drawing on the theory of social judgments of organizations (Bitektine, 2011), we contribute in at least three distinct ways to the firm stereotypes literature as well as the literature on the role of established companies in the context of radical technological innovations. First, while previous research has mainly focused on organization-specific factors when explaining barriers to and opportunities for radical technological innovations in established companies, we conduct one of the first studies that investigates the role of external actors. More specifically, we test whether there are differences in evaluators' expectations of the success of radical technological innovations by established companies and start-ups due to firm stereotypes. Second, understanding how firm stereotypes impact the expected success of different company types (i.e., established companies versus start-ups) generally and more particularly in the context of radical technological innovations helps better clarify the largely unspecified concept of social judgments and firm stereotypes in the management literature (Bitektine, 2011; Mishina et al., 2012). Third, scholars have argued that we still know little about how stakeholders, such as members of the general public, make judgments about different types of companies and how such judgments might be adjusted in light of new information (Mishina et al., 2012). We address this issue by testing whether information about a specific context (i.e., radical technological

innovation) or news about a fatal error related to a radical technological innovation changes the social judgments of external stakeholders.

We test our predictions by applying three online experiments. We focus on members of the general public as a group of external actors because 1) they are one of the most important groups that evaluate an organization's legitimacy and reputation (Bitektine, 2011) and 2) we look at a radical technological product innovation in the business-to-consumer sector, and thus members of the general public can also be considered potential customers who directly influence the success of the company. Additionally, we concentrate on one specific radical technological innovation, namely, self-driving cars. This innovation is well known in the public and has also been classified as a radical innovation in a prestudy among 21 innovation experts.

## **4.2 Theoretical Foundation and Hypotheses Development**

### **4.2.1 Social Judgments of Established Companies and Start-Ups**

According to Bitektine (2011), a social judgment of an organization can be defined as "*an evaluator's decision or opinion about the social properties of an organization*" (p. 152). From the social psychology and organizational behavior literature, we know that people use mental shortcuts containing evaluative components, so-called stereotypes (Aaker et al., 2010), to make judgments about social properties. The two universal stereotype dimensions along which people judge other individuals or groups are warmth and competence (Fiske et al., 2007). While demonstrating warmth is generally associated with having a moral and caring character, high levels of competence reflect the perceived ability to effectively and efficiently carry out objectives (Cuddy et al., 2008). The management literature also refers to the constructs of warmth and competence as community and agency (e.g., Yang & Aggarwal, 2019) or character and capability (e.g., Mishina et al., 2012; Park & Rogan, 2019).

Although research on warmth and competence has looked intensively into evaluators' perceptions of individuals and groups (e.g., Cuddy, Fiske, & Glick, 2004; Fiske, 2012), scholars

have recently argued that individuals also form similar stereotypes and social judgments about organizations (Aaker et al., 2010; Malone et al., 2013). Indeed, previous research has found that individuals build different expectations regarding the warmth and competence of different organization types. For instance, Aaker et al. (2010) found that consumers perceive nonprofit organizations to be less competent but warmer than their for-profit counterparts. Yang and Aggarwal (2019) looked at differences in consumers' warmth and competence expectations for small and large companies and found that smaller companies are expected to be warmer than larger companies. On the competence dimension, however, consumers have no differential expectations.

We focus on obtaining a better understanding of individuals' perceptions regarding the warmth and competence of established companies and start-ups. In contrast to Yang and Aggarwal (2019), we argue that size is only one of several characteristics (e.g., age, market position) that distinguish established firms from start-ups (in contrast to large versus small companies) and that might ultimately affect evaluators' judgments regarding warmth and competence.

Warmth includes traits such as kindness and friendliness and is also closely related to trustworthiness (Cuddy, Glick, & Beninger, 2011). Building trust-based relationships is especially important for start-ups, as this is a key factor to build loyalty and as a result to gain legitimacy (Malone et al., 2013; Überbacher, 2014). Additionally, start-ups are often characterized by flat hierarchies and strong ties among employees. Frequently, start-ups make use of these characteristics and engage in selling an image of being a family-like organization, which might also increase the public's warmth perceptions (Cornelissen & Clarke, 2010). In contrast, established companies already have a stable market position, which enables them to put more pressure on their partners and to be a more aggressive player in the marketplace (Mukherji, Sorescu, Prabhu, & Chandy, 2011). This stable market position results in a position of greater power for established companies, which might negatively affect the public's warmth perceptions (Yang & Aggarwal, 2019). Hence, we propose the following hypothesis:

*Hypothesis 1: Start-ups are perceived as warmer than established companies.*

Competence includes traits such as competence, capability, and efficiency (Cuddy et al., 2008). To survive in highly competitive markets, companies must possess these traits to increase value for their customers (Slater & Narver, 1994; Yang & Aggarwal, 2019). Established companies have already proven that they can compete and survive in their markets, which can be a strong sign of their capability. In contrast, start-ups are new in the market and need to build knowledge about the market, which might initially result in lower competence expectations among the general public. Hence, we propose the following hypothesis:

*Hypothesis 2: Established companies are perceived as more competent than start-ups.*

#### **4.2.2 Radical Technological Innovations and Public Expectations**

While start-ups usually face large barriers when entering established markets, radical technological innovations allow them to compete with established players more easily, as such innovations represent revolutionary changes in technology with clear departures from existing practice (Dewar & Dutton, 1986). Hence, both established companies and start-ups need to build new skills to pursue radical technological innovations. Indeed, research shows that start-ups are not less successful in pursuing radical technological innovations than their incumbent counterparts; in many industries, start-ups even outperform established companies (Christensen & Bower, 1996; Henderson & Clark, 1990). While this evidence suggests that the public might expect no performance differences between established companies and start-ups in the case of radical technological innovations, we argue that evaluators are likely to attribute higher success rates to established companies. In the absence of detailed information about the capabilities of each firm type, as in the case of radical technological innovations, evaluators use prior beliefs and experiences when making expectations about future events (Fiske & Taylor, 1991; Srull & Wyer, 1989). Considering established companies, evaluators know from these organizations' incumbent status that they have been successful in the past. Furthermore, due to their longevity,

evaluators might expect these organizations to have the skills and capabilities to adapt more easily to the changing demands brought about by radical technological innovations. Moreover, previous research has shown that competence perceptions are far more important than warmth perceptions in regard to evaluations of products or services of companies (Aaker et al., 2010). Hence, we propose that evaluators expect established companies to be more successful in pursuing radical technological innovations, as they perceive them as more competent. Yet, in line with Aaker et al. (2010), we do not expect warmth perceptions to have an influence on the expectations of success for firms pursuing a radical technological innovation. More specifically, we hypothesize the following:

*Hypothesis 3: Established companies are expected to be more successful in pursuing a radical technological innovation than start-ups.*

*Hypothesis 4: Competence perceptions mediate the effect of company type (established company versus start-up) on success expectations for firms pursuing a radical technological innovation.*

Because we predict that established companies benefit from higher competence perceptions when pursuing radical technological innovations, we expect the occurrence of fatal errors in the innovation process to have negative effects on the success expectations of established companies and lead to disadvantages vis-à-vis start-ups. The case of a fatal error represents a new cue, which is used by evaluators to reconsider and potentially adapt their initial judgments (Anderson, 1974). Such a cue might lead to the conclusion that the firm is not capable of pursuing radical technological innovation. Hence, established companies can lose their advantage of being perceived as more competent in this case. In contrast, a fatal error might trigger warmth perceptions among evaluators. As warmth is associated with a behavior that is other-focused and morally acceptable (Cuddy et al., 2008), evaluators might believe in the case of the start-up that the fatal error was the result of unfortunate events and that similar errors will be avoided

in the future. In the case of established companies, however, we expect evaluators to be less forgiving, as they expect incumbents to make no fatal mistakes. Hence, we hypothesize the following:

*Hypothesis 5: Start-ups are expected to be more successful in pursuing a radical technological innovation than established companies after a fatal error occurs in the innovation process.*

*Hypothesis 6: Warmth perceptions mediate the effect of company type (established company versus start-up) on success expectations for firms pursuing a radical technological innovation after a fatal error occurs in the innovation process.*

### **4.3 Overview of Studies**

We tested our hypotheses by means of three online experiments. In Experiment 1, we tested the basic assumption that people use stereotypes in the form of warmth and competence perceptions to differentiate between established companies and start-ups in general (Hypotheses 1 and 2). In Experiment 2, we tested whether members of the general public expect established companies to be more successful in pursuing a radical technological innovation than start-ups and whether this difference can be explained by different competence perceptions (Hypotheses 3 and 4). Finally, Experiment 3 helped us to determine whether additional information about a fatal error connected to a radical technological innovation leads to different judgments with start-ups expected to be more successful in pursuing a radical technological innovation than established companies and whether this difference can be explained by different warmth perceptions (Hypotheses 5 and 6). Moreover, we also tested our expectations regarding warmth and competence perceptions (Hypotheses 1 and 2) in Experiments 2 and 3 to check whether firm stereotypes differ with changing contexts and new information about a fatal error.

#### **4.4 Experiment 1 – Stereotypes of Established Companies and Start-ups**

##### **4.4.1 Method**

We applied a two-level single factor between-subjects design that manipulated the type of company (established company versus start-up) to test our first two hypotheses. We recruited our participants ( $N = 130$ ; 72 female, 55 male, three diverse; 75.38% students and 24.62% employees; ages 18 - 54,  $M = 25.89$ ,  $SD = 7.23$ ) online via social networks and randomly assigned them to two groups. Both groups were asked to complete an online survey. The first group ( $n = 66$ ) was presented with 76 traits in the form of semantic differentials (on a seven-point scale) and asked to indicate the extent to which they believed these traits represent characteristics of an established company in general. The second group ( $n = 64$ ) was presented with the same traits but was asked to indicate the extent to which they believed these traits represent characteristics of a start-up in general. Four of these traits represented warmth-related traits (unkind–kind, cold–warm, greedy–generous, unfriendly–friendly; Cronbach's  $\alpha = 0.75$ ), and four traits represented competence-related traits (incompetent–competent, inefficient–efficient, ineffective–effective, incapable–capable; Cronbach's  $\alpha = 0.77$ ). These warmth- and competence-related traits are well established and have already been used in previous research on firm stereotypes (e.g., Aaker et al., 2010; Yang & Aggarwal, 2019). The other traits were filler traits that were not used for the purpose of this study. At the end of the survey, we collected demographic information.

##### **4.4.2 Results and Discussion**

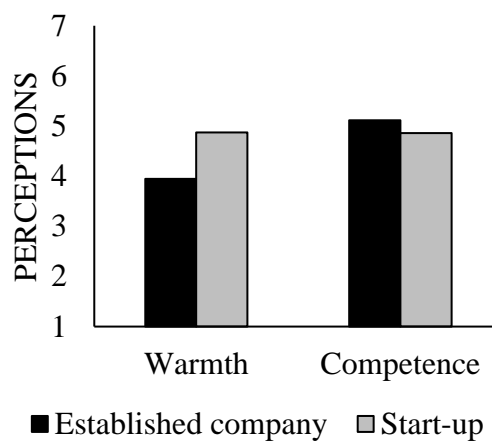
To test our first two hypotheses, which predict that established companies are generally perceived as less warm (Hypothesis 1) but more competent (Hypothesis 2) than established companies, we used independent  $t$ -tests. In support of Hypothesis 1, participants perceived start-ups ( $M_{SU} = 4.87$ ;  $SD_{SU} = 0.63$ ) to be significantly warmer than established companies ( $M_{EC} = 3.95$ ;  $SD_{EC} = 0.82$ ,  $t(128) = 7.17$ ,  $p < 0.001$ , one-tailed). We also found support for



Hypothesis 2 because participants perceived established companies ( $M_{EC} = 5.12$ ;  $SD_{EC} = 0.91$ ) to be significantly more competent than start-ups ( $M_{SU} = 4.86$ ;  $SD_{SU} = 0.76$ ,  $t(128) = 1.75$ ,  $p = 0.041$ , one-tailed).

The results suggest that individuals do indeed hold stereotypes of established companies and start-ups. Specifically, our findings show that start-ups are perceived to have higher degrees of warmth-related traits than established companies, while established companies are perceived to be slightly more competent than start-ups (see Figure 4.1).

Figure 4.1: Experiment 1 – Perceived Warmth and Competence of Established Companies versus Start-ups



Yet, we do not know if these firm stereotypes also affect the judgments of members of the general public when they have to rate their success expectations about the pursuit of a radical technological innovation by an established company in contrast to a start-up. Experiment 2 was designed to address this gap.

## 4.5 Experiment 2 – Firm Stereotypes and Success Expectations in the Context of a Radical Technological Innovation

### 4.5.1 Method

*Design, Manipulation, and Procedure.* To account for context-specific social judgments of organizations (Bitektine, 2011), we conducted a second experiment. Experiment 2 was an experimental between-subjects online vignette study with two factors (established company

versus start-up). At the start of the experiment, participants were invited to read a fictive news article about a fictitious car manufacturer that announced the launch of the first fully self-driving car on the German market. The news articles in both groups contained the same information, except for the description of the respective company. In the scenario of the first group, the fictitious car manufacturer was an established company, while the second group was presented with the scenario containing information about a start-up. Following previous studies (e.g., Hockerts & Wüstenhagen, 2010), we used age, size and market position (i.e., market-leader versus newcomer) to manipulate the type of company. Furthermore, we included the abbreviation "AG" (= *Aktiengesellschaft*) as an addendum to the company name in the established company scenario but not in the start-up scenario. This addendum signals that a company is part of a wider enterprise group, which is a typical characteristic of established companies but generally not of start-ups (Criscuolo, Nicolaou, & Salter, 2012). Figures 4.2 and 4.3 show the vignettes used in Experiment 2.

Figure 4.2: Experiment 2 – Vignette for Established Company Group

**The future is now and driverless! – The Mobiliv AG launches its first self-driving car "Mobi One" in 2020.**

The **Mobiliv AG** is an automobile company **founded in 1920**. The established company employs **120,000 people** in Germany. For the last two years, the **market-leading company** has put a strong focus on the development of software for fully autonomous driving. 150 employees are deployed in this research project. The Mobiliv AG aims to be the first to launch a **fully self-driving car** on the German market - the *Mobi One*.

With sensor-based communication between the car and its environment, the *Mobi One* drives to the desired destinations without human intervention. Fully autonomous driving will be faster through optimized traffic flow, and passengers can use the travel time productively or for relaxation. On this year's IAA motor show in Frankfurt, the *Mobi One* was presented as the automobile of the future. Since the Mobiliv AG completed all relevant tests successfully in 2019, the first pilot project is scheduled for 2020. The *Mobi One* will be incorporated into the company's existing carsharing service. This fully autonomous car service will be offered for 0.60 EUR per Minute.

Figure 4.3: Experiment 2 – Vignette for Start-up Group

**The future is now and driverless! – Mobiliv launches its first self-driving car “Mobi One” in 2020.**

**Mobiliv** is an automobile company **founded in 2017**. The young and fast-growing company employs **150 people** in Germany. For the last two years, the **new market entrant** has specialized in the development of software for fully autonomous driving. Thus, all 150 employees are deployed in this research project. Mobiliv aims to be the first to launch a **fully self-driving car** on the German market - the *Mobi One*.

With sensor-based communication between the car and its environment, the *Mobi One* drives to the desired destinations without human intervention. Fully autonomous driving will be faster through optimized traffic flow, and passengers can use the travel time productively or for relaxation. On this year's IAA motor show in Frankfurt, the *Mobi One* was presented as the automobile of the future. Since Mobiliv completed all relevant tests successfully in 2019, the first pilot project is scheduled for 2020. The *Mobi One* will be incorporated into the company's existing carsharing service. This fully autonomous car service will be offered for 0.60 EUR per Minute.

We used the fully self-driving car to represent a radical technological innovation after conducting a prestudy among 21 innovation experts. These experts were either scientists or experienced practitioners in the field of innovation management. We asked the experts to rate the radicality of the innovativeness of twelve different technological product or service innovations (e.g., air taxi, drone delivery) that were discussed in the media in the year the prestudy was conducted (2019). The radicality of these innovations was assessed on a five-point scale ( $1 = \text{incremental innovation}$ ;  $5 = \text{radical innovation}$ ). Even though hyperloop technology ( $M = 4.43$ ;  $SD = 0.75$ ) and the air taxi ( $M = 4.24$ ;  $SD = 0.77$ ) were rated as more radical than fully self-driving cars ( $M = 4.10$ ;  $SD = 0.83$ ), we chose the latter, as the technological development of this innovation is the most advanced, making the scenario more realistic for participants (Aguinis & Bradley, 2014). Table 4.1 shows a full overview of the technological innovations and the expert assessments.

Table 4.1: *Prestudy – Expert Assessments of Radical Technological Innovations*

Technological Innovation	Radicality of Innovation ( <i>1 = incremental; 5 = radical</i> )	
	<i>M</i>	<i>SD</i>
3D Metal-/Bio-/Food-Printing	4.05	1.02
Air Taxi	4.24	0.77
Blockchain Technology	2.95	1.07
Care Robots	3.52	0.93
Decentralized Energy System	3.52	0.75
DNA Report Cards	3.62	1.24
Drone Delivery	3.29	1.15
Hyperloop	4.43	0.75
Internet Banking	2.52	1.08
Self-Driving Cars	4.10	0.83
Smart Home	2.86	0.85
Smart Watches	2.05	1.02

Note:  $N = 21$ .

**Sample.** Participants ( $N = 280$ ) were recruited via social networks and the student network of the TUM School of Management. They were randomly assigned to one of the two groups. To detect careless responders, we included an attention check question in the survey following the vignette scenario (Meade & Craig, 2012), which resulted in the removal of 31 respondents from the sample. The final sample ( $N = 249$ ;  $n(\text{established company group}) = 122$ ,  $n(\text{start-up group}) = 127$ ) consisted of 132 female, 114 male, and three diverse participants. The mean age was 30.90 ( $SD = 11.43$ ). Among all respondents, 55.82% were students, and 41.37% worked full-time.

**Measures.** After reading the scenario, participants in both groups were asked to indicate the perceived warmth (items: kind, warm, generous, friendly) and competence (items: competent, capable, efficient, effective) of the respective car manufacturer by using a seven-point scale ( $1 = \text{strongly disagree}$ ;  $7 = \text{strongly agree}$ ). Cronbach’s  $\alpha$  for competence was 0.81 and for warmth 0.65. Due to the low reliability of warmth (Cronbach’s  $\alpha < 0.70$ ; Hair et al., 2018) we performed an exploratory factor analysis (principal component method) to check whether

all warmth-related items loaded significantly (factor loading > 0.35; Hair et al., 2018) on one construct, which resulted in the removal of friendliness (factor loading = 0.16). The final value of Cronbach’s  $\alpha$  for the three-item warmth construct was 0.79. Additionally, participants were asked to indicate their expectations about the success of the described company in pursuing the radical technological innovation. To this end, we adapted three items from Nagy, Pollack, Rutherford, and Lohrke (2012). The items were “I envision the company being successful with the self-driving car in the future”, “I imagine the company receiving favorable press coverage regarding the self-driving car in the future”, and “I imagine the company having a top innovation department that will benefit the organization” ( $1 = \text{strongly disagree}$ ;  $7 = \text{strongly agree}$ ). Cronbach’s  $\alpha$  for this measure was 0.78.

**Manipulation check.** At the end of the online experiment, to check if our manipulation worked as intended, we asked participants to indicate the type of company in their scenario on a scale from  $1 = \text{start-up}$  to  $7 = \text{established company}$ . As expected, participants in the established company condition held a stronger belief that the company in their scenario was an established company ( $M_{EC} = 5.33$ ,  $SD_{EC} = 1.81$ ), while those in the start-up condition had a stronger belief that their vignette described a start-up ( $M_{SU} = 2.46$ ,  $SD_{SU} = 1.29$ ). The difference was significant ( $t(218.23) = 14.38$ ,  $p < 0.001$ ), suggesting that the manipulation was successful.

#### 4.5.2 Results

Table 4.2 shows the means, standard deviations, and correlations among study variables.

Table 4.2: Experiment 2 – Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Company type	0.51	0.50	-			
2. Competence	5.23	1.00	-0.20	-		
3. Warmth	3.75	1.14	0.10	0.19	-	
4. Expected success	5.01	1.08	-0.19	0.56	0.26	-

Notes:  $N = 249$ ; company type was coded 0 = established company and 1 = start-up; correlations with values of  $|r| \geq 0.19$  are significant at  $p < 0.01$  (two-tailed).

In addition to the correlation estimates, we performed independent *t*-tests to test, in the context of a radical technological innovation, whether start-ups are perceived as warmer than established companies (Hypothesis 1), whether established companies are perceived as more competent (Hypothesis 2), and whether established companies are expected to be more successful in pursuing the radical technological innovation (Hypothesis 3). In line with the results from Experiment 1, we found that participants perceived established companies as significantly more competent than start-ups ( $M_{EC} = 5.44$ ,  $SD_{EC} = 0.93$  vs.  $M_{SU} = 5.04$ ,  $SD_{SU} = 1.03$ ,  $t(247) = 3.24$ ,  $p = 0.001$ ), supporting Hypothesis 1. However, in contrast to Experiment 1, we did not find support for Hypothesis 2 in the context of a radical technological innovation because participants did not perceive established companies to be significantly less warm than start-ups ( $M_{EC} = 3.63$ ,  $SD_{EC} = 1.05$  vs.  $M_{SU} = 3.86$ ,  $SD_{SU} = 1.22$ ,  $t(247) = 1.59$ ,  $p = 0.113$ ). Moreover, in support of Hypothesis 3, our results show that participants expect established companies to be more successful in pursuing the radical technological innovation than start-ups ( $M_{EC} = 5.21$ ,  $SD_{EC} = 1.01$  vs.  $M_{SU} = 4.81$ ,  $SD_{SU} = 1.11$ ,  $t(247) = 2.98$ ,  $p = 0.003$ ).

Additionally, we examined whether perceptions of competence mediate the relationship between company type (i.e., established company versus start-up) and expected success in pursuing the radical technological innovation (Hypothesis 4). We tested the mediation by applying the *PROCESS* macro for *SPSS* (Hayes, 2018). We used bootstrapping to test for the significance of indirect mediation effects (Preacher & Hayes, 2008). We report bootstrap estimates based on 5,000 bootstrap samples with bias-corrected 95% confidence intervals. Table 4.3 shows the regression results for the tests of the indirect effects.

Table 4.3: Experiment 2 – Regression Results of Tests for Indirect Effects

Indirect effects	Estimate	SE	BC 95% CI	
			Lower	Upper
Company type → Competence → Expected success	<b>-0.22</b>	0.07	-0.35	-0.09
Company type → Warmth → Expected success	0.04	0.03	-0.01	0.10

Notes:  $N = 249$ ; company type was coded 0 = established company and 1 = start-up; BC 95% CI refers to the bias-corrected 95% confidence interval; estimate refers to estimate of the indirect effect using 5,000 bootstrap samples; estimates that do not include zero in the BC 95% CI are statistically significant and appear in bold.

We found support for Hypothesis 4 because competence perceptions mediated the relationship between company type and the expected success in pursuing the radical technological innovation ( $a \times b = -0.22$ , 95% CI [-0.35, -0.09]). As expected, warmth perceptions had no significant influence on this relationship ( $a \times b = 0.04$ , 95% CI [-0.01, 0.10]).

### 4.5.3 Discussion

Overall, the results from Experiment 2 suggest two important insights. First, while individuals perceive established companies to be more competent than start-ups in the context of a radical technological innovation, which is in line with their general perceptions (see Experiment 1), the general perception of start-ups being warmer than established companies does not hold for the context-specific case. An explanation for this context-specific difference might be that individuals base their perceptions on the information about a radical technological product or service innovation and not on the company in general. In this case, as previous research has shown, competence judgments might overshadow warmth perceptions (Aaker et al., 2010), which might lead to individuals using only competence perceptions to differentiate between an established company and a start-up. Second, consistent with our predictions, our findings show that members of the general public expect established companies to be more successful in pursuing a radical technological innovation than start-ups. This relationship is mediated by higher competence perceptions of the general public for established companies than for start-ups.

While the results of Experiment 2 suggest that social judgments might be beneficial for established companies when they compete with start-ups in pursuing radical technological innovations, we still lack an understanding of whether new information about a fatal error connected to radical technological innovation might change the warmth and competence perceptions and social judgments of members of the general public. Experiment 3 was designed to close this gap.

#### **4.6 Experiment 3 – Firm Stereotypes and Success Expectations in Light of New Information about a Fatal Error Connected to a Radical Technological Innovation**

##### **4.6.1 Method**

*Design, Manipulation, and Procedure.* To test whether social judgments of established companies and start-ups differ when members of the general public receive a new cue about a fatal error connected to a radical technological innovation, we conducted another online between-subjects vignette experiment with two factors (established company versus start-up). Similar to Experiment 2, participants read a fictive online newspaper article about a fictitious car manufacturer that launched the first fully self-driving car on the German market. Yet, in contrast to Experiment 2, we included new information about a fatal accident of the self-driving car resulting in the deaths of two people. Again, we used age, size, market position, and the name addendum “AG” to manipulate the type of organization (condition 1: established company; condition 2: start-up). After reading the scenario, participants answered a survey that contained the measures for warmth-related traits, competence-related traits, and expected success of the organization in pursuing the radical technological innovation as well as a manipulation check and demographic information. Figures 4.4 and 4.5 show the vignettes used in Experiment 3.



## Essay III: Incumbent's Curse Revisited: Are Firm Stereotypes Beneficial or Harmful for Established Companies Pursuing Radical Technological Innovations?

Figure 4.4: Experiment 3 – Vignette for Established Company Group

The screenshot shows a news article on 'The Daily News' website. The header includes a search icon, language options (English, Deutsch), and buttons for 'SUBSCRIBE NOW' and 'LOG IN'. The main title is 'The Daily News'. Below the header, the URL 'www.dailynews.org', the date 'Friday, July 10, 2020', and the tagline 'Keeping you informed since 1879' are visible. A navigation bar lists various news categories: World News, Politics, Business, Opinion, Tech, Science, Health, Sports, Arts, Music, Books, Food, Travel, and Real Estate. The article text is enclosed in a box with a small author bio: 'Sam Muster, Berlin, Germany'. The headline reads: 'Self-driving car causes fatal accident! – The first self-driving car “Mobi One” by the established automotive company Mobiliv AG is involved in a car accident causing two deaths.' The first paragraph states: 'Mobiliv AG is a German automobile company founded in 1916. The established company employs over 130.000 people worldwide and has been highly successful in the combustion engine business. For the last four years, the market-leading company has put a strong focus on the development of software for fully autonomous driving. 150 employees were deployed in the research project to develop the first fully self-driving car on the German market – the Mobi One. In 2017, the company presented the radically innovative car at the IAA motor show in Frankfurt as the automobile of the future. Since Mobiliv AG completed all relevant tests successfully by the end of 2018, the first cars have been sold in the beginning of 2020.' The second paragraph continues: 'While the first drives of the Mobi One on the streets were successful and happened without any incidents, yesterday night, the Mobi One was involved in a fatal accident. The speaker of the local police stated that the self-driving car did not identify a STOP sign on the road when driving at night. As a consequence, the car did not stop and caused a severe collision with two people dying. As a reaction to the accident, Mobiliv AG expressed their condolences to the victims' relatives and confirmed that a problem in the software, responsible for the night vision was the cause of the accident. The problem has already been fixed with an automatic software update by the company.'

Figure 4.5: Experiment 3 – Vignette for Start-up Group

The screenshot shows a news article on 'The Daily News' website, identical in layout to Figure 4.4. The headline reads: 'Self-driving car causes fatal accident! –The first self-driving car “Mobi One” by the automotive start-up Mobiliv is involved in a car accident causing two deaths.' The first paragraph states: 'Mobiliv is a German automobile start-up founded in 2016. The young and fast-growing company employs 150 people in Germany. For the last four years, the new market entrant has specialized in the development of software for fully autonomous driving. All 150 employees were deployed in the research project to develop the first fully self-driving car on the German market - the Mobi One. In 2017, the company presented the radically innovative car at the IAA motor show in Frankfurt as the automobile of the future. Since Mobiliv completed all relevant tests successfully by the end of 2018, the first cars have been sold in the beginning of 2020.' The second paragraph continues: 'While the first drives of the Mobi One on the streets were successful and happened without any incidents, yesterday night, the Mobi One was involved in a fatal accident. The speaker of the local police stated that the self-driving car did not identify a STOP sign on the road when driving at night. As a consequence, the car did not stop and caused a severe collision with two people dying. As a reaction to the accident, Mobiliv expressed their condolences to the victims' relatives and confirmed that a problem in the software, responsible for the night vision was the cause of the accident. The problem has already been fixed with an automatic software update by the company.'

**Sample.** We recruited participants for Experiment 3 via the web platform *Prolific*, which offers access to a participant pool for scientific research and ensures high-quality data via transparent and binding terms and conditions for researchers and participants (Palan & Schitter, 2018; Peer, Brandimarte, Samat, & Acquisti, 2017). After the exclusion of six careless responders

who failed the attention check, the final sample consisted of 399 participants, who were randomly allocated to one of the two groups ( $n(\text{established company group}) = 205$ ;  $n(\text{start-up group}) = 194$ ). The sample comprised 147 female, 249 male, and three diverse participants. The mean age was 26.57 ( $SD = 8.63$ ). Among all respondents, 43.36% were students, and 43.36% worked full-time.

**Measures.** We used the same measures for competence, with four items (competent, capable, efficient, effective; Cronbach's  $\alpha = 0.86$ ), and warmth, with three items (kind, warm, generous; Cronbach's  $\alpha = 0.82$ ), as in Experiment 2. We also used a similar measure for individuals' expectations about the success of the company in pursuing the radical technological innovation. Yet, we adapted this measure in two ways. First, we informed participants that they should base their ratings on the assumption that the company had fixed the problem that led to the fatal accident. Second, in addition to the three items from Experiment 2, we included the following item: "I envision the company having a top management team that will benefit the organization". Cronbach's  $\alpha$  for this measure was 0.76.

**Manipulation Check.** The manipulation check question was identical to the one used in Experiment 2. As intended, participants in the condition with the scenario of the established company held a stronger belief that the company was an established company ( $M_{EC} = 5.60$ ,  $SD_{EC} = 1.54$ ), while those in the start-up condition had a stronger belief that the company in their scenario was a start-up ( $M_{SU} = 3.05$ ,  $SD_{SU} = 1.50$ ). The difference was significant ( $t(397) = 16.80$ ,  $p < 0.001$ ), suggesting that the manipulation was successful.

#### 4.6.2 Results

Table 4.4 shows the means, standard deviations, and correlations among the study variables.

Table 4.4: Experiment 3 – Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Company type	0.49	0.50	-			
2. Competence	4.44	1.17	-0.02	-		
3. Warmth	3.49	1.14	0.04	0.45	-	
4. Expected success	4.42	1.09	0.00	0.47	0.39	-

Notes:  $N = 399$ ; company type was coded 0 = established company and 1 = start-up; correlations with values of  $|r| \geq 0.39$  are significant at  $p < 0.01$  (two-tailed).

With Experiment 3, we investigated whether a new cue about a fatal accident connected to a radical technological innovation leads to different social judgments of start-ups and established companies. Hence, in addition to our original warmth and competence predictions (Hypothesis 1 and 2), we tested whether start-ups are expected to be more successful in pursuing the specified radical technological innovation than established companies (Hypothesis 5) and whether this relationship is mediated by higher warmth perceptions for start-ups (Hypothesis 6). The correlation coefficients as well as an independent *t*-test show that individuals do not differentiate between an established company and a start-up based on warmth ( $M_{EC} = 3.44$ ,  $SD_{EC} = 1.16$  vs.  $M_{SU} = 3.54$ ,  $SD_{SU} = 1.12$ ,  $t(397) = 0.82$ ,  $p = 0.412$ ) and competence ( $M_{EC} = 4.46$ ,  $SD_{EC} = 1.14$  vs.  $M_{SU} = 4.42$ ,  $SD_{SU} = 1.21$ ,  $t(397) = 0.41$ ,  $p = 0.681$ ) perceptions. Hence, Hypothesis 1 and 2 were not supported in the case of a new cue about a fatal error connected to a radical technological innovation. Similarly, our findings from the correlation matrix and an independent *t*-test show that we did not find support for Hypothesis 5 because participants did not have significantly higher success expectations for start-ups than for established companies ( $M_{EC} = 4.29$ ,  $SD_{EC} = 1.14$  vs.  $M_{SU} = 4.34$ ,  $SD_{SU} = 1.19$ ,  $t(397) = 0.44$ ,  $p = 0.662$ ). Furthermore, while our correlation coefficients give a first indication that we do not

find support for Hypothesis 6, we followed the recommendation of Zhao, Lynch, and Chen (2010) and tested the significance of the indirect effect of company type on expected success in pursuing the radical technological innovation via warmth perceptions by applying the *PROCESS* macro for *SPSS* (Hayes, 2018). Similar to Experiment 2, we used bootstrapping to test the significance of the indirect effect (Preacher & Hayes, 2008) and report bootstrap estimates based on 5,000 bootstrap samples with bias-corrected 95% confidence intervals. In line with the indications from the correlation coefficients, warmth perceptions had no significant influence on this relationship ( $a \times b = 0.02$ , 95% CI [-0.03, 0.07]). Hence, in testing the indirect effect, we did not find support for Hypothesis 6.

#### **4.6.3 Discussion**

We expected that members of the general public have higher warmth perceptions of start-ups than of established companies and that these expectations help start-ups recover better from news about a fatal error connected to a radical technological innovation. Consequently, we also expected that members of the general public expect start-ups to be more successful than established companies in further pursuing a radical technological innovation after a fatal error occurs. However, the findings of Experiment 3 show that in contrast to the general context (Experiment 1) and the context of a radical technological innovation (Experiment 2), members of the general public do not use stereotypes to differentiate between an established company and a start-up when they receive a cue about a fatal error connected to the radical technological innovation. Moreover, the new cue about a fatal error does not lead to differences in judgments about the expected success of the established company versus the start-up in pursuing the radical technological innovation. A potential explanation for this finding is that members of the general public might base their social judgments strongly on the new information about the fatal error, which as a result overshadows the effects of the organization type. Hence, the information

about a fatal accident resulting in two deaths that are directly connected to a radical technological innovation gives members of the general public a new basis to build their judgments and expectations about the company so that they may not need to rely on firm stereotypes.

#### **4.7 General Discussion**

The findings from our three experiments demonstrate three important insights. First, our results show that members of the general public generally use firm stereotypes in the form of warmth and competence judgments to differentiate between established companies and start-ups. Yet, these judgments change in the context of a radical technological innovation as well as in light of new information about a fatal error. Specifically, in the context of a radical technological innovation, individuals use competence judgments, but not warmth judgments to differentiate between these two organizational types. Hence, we demonstrate that firm stereotypes can be context-specific, which suggests that general stereotypes about established companies and start-ups might change based on the context under which individuals make their judgments. Furthermore, when members of the general public receive new information about a fatal error that is connected to a radical technological innovation, they neither use warmth nor competence perceptions to differentiate between established companies and start-ups. This finding suggests that a cue about a fatal error overshadows firm stereotypes that are present in a general context as well as partially present in the context of a radical technological innovation that is not connected to a fatal error.

Second, our results demonstrate that members of the general public have different expectations about the success of an established company versus a start-up in pursuing radical technological innovation. Specifically, established companies are expected to be more successful than start-ups. This result can be explained by competence perceptions. When members of the general public build their expectations about the success of a company in its pursuit of a

radical technological innovation, they draw on competence stereotypes but not on warmth stereotypes. Hence, as established companies are perceived as more competent, members of the general public also expect them to be more successful in pursuing a radical technological innovation.

Third, when evaluators receive a cue about a fatal error connected to a radical technological innovation, their expectations about the success of established companies are no longer significantly different from expectations about the success of start-ups. In this context, we expected that members of the general public tend to be more forgiving when judging start-ups than when judging established companies. Hence, we also predicted that start-ups would be expected to recover faster and therefore to have higher success expectation ratings due to higher warmth perceptions. However, our findings suggest that information about a fatal error is a cue that negatively affects warmth and competence perceptions and, as a result, negatively affects success expectations (Mishina et al., 2012), regardless of the company type.

#### **4.7.1 Theoretical Contributions**

By drawing on social judgments of organizations theory (Bitektine, 2011), this research contributes to the literature on the role of established companies in the context of radical technological innovations in three ways. First, we add to the research on opportunities and barriers for established companies pursuing radical technological innovations by showing that external actors and their social judgments play an important role in this context. More specifically, we show that members of the general public have higher competence perceptions of established companies and consequently expect these firms to be more successful in pursuing radical technological innovations. Hence, while start-ups need to invest many resources to increase their legitimacy (Überbacher, 2014), established companies benefit from belonging to a group that has legitimacy advantages.

While previous research has acknowledged that firm stereotypes in the form of warmth and competence perceptions can affect the reputation and legitimacy of organizations (Mishina

et al., 2012), the concept of social judgments of firms still lacks some specificity in the management literature (Bitektine, 2011). Namely, while the management literature has outlined the advantages of distinguishing between start-ups and established companies based on organizational characteristics and strategic decision-making (Criscuolo et al., 2012; Henninger, Brem, Giones, Bican, & Wimschneider, 2020), we lack an understanding of how external stakeholders distinguish between these two company types. By demonstrating that members of the general public, as one important subgroup of external stakeholders, use warmth and competence perceptions to differentiate between start-ups and established companies in general, we increase this understanding. Moreover, our findings show that these firm stereotypes are context-specific because members of the general public have higher competence perceptions for established companies but do not differentiate between established companies and start-ups based on warmth perceptions in the context of radical technological innovations.

Third, scholars have suggested that individuals might adjust their social judgments in light of new information and cues (Mishina et al., 2012). We add to this conceptual work by providing empirical evidence that, in addition to information about a radical technological innovation, a new cue about a fatal error connected to this radical technological innovation changes the social judgments of members of the general public. Specifically, our results demonstrate that individuals judge established companies and start-ups differently in the radical technological innovation context, but that these differences in social judgments do not hold in light of new information about a fatal error.

#### **4.7.2 Limitations and Future Research**

Although our studies offer several contributions, they have limitations, which provide avenues for future research. First, while our experimental designs allow for causal inferences (Shadish, Cook, & Campbell, 2002), this advantage comes with a trade-off with regard to a lower generalizability of our results. In particular, our scenarios in Experiments 2 and 3 are hypothetical, and we assume that participants would make similar judgments in a real-world

setting. Hence, future research might benefit from replicating our findings in a less hypothetical setting. For instance, researchers could ask participants to make judgments on real-world examples of established companies and start-ups that are currently pursuing the same radical technological innovation simultaneously.

Second, even though we based our decision on which radical technological innovation to use for our scenarios in Experiments 2 and 3 on a prestudy, our findings are only representative of the context of self-driving cars as one example of radical technological innovation. Hence, it might be interesting to see whether social judgments of members of the general public might be different in the context of another radical technological innovation. A self-driving car is a radical technological innovation that is connected to a market with rather high market entry barriers (van den Hoed, 2007). Therefore, replicating our experiments in a context of radical technological innovation that is connected to lower barriers to entry (e.g., the software industry) might be a promising endeavor for future research.

Third, we looked into warmth and competence perceptions as two dimensions of firm stereotypes because these are the dominant stereotypes that are used by evaluators to make judgments about individuals, groups, and organizations (Aaker et al., 2010). However, these might not be the only stereotypes that individuals use to differentiate between established companies and start-ups. From psychology and human resource management research, we know that individuals also judge based on age stereotypes (e.g., resistance to change), meaning that individuals use mental shortcuts to make judgments about older individuals or groups (Perry, Kulik, & Bourhis, 1996; Posthuma & Campion, 2009). As age is a distinctive element that distinguishes established companies from start-ups, future research might benefit from investigating the role of age stereotypes when members of the general public form their expectations about the success of a company pursuing radical technological innovations.



Fourth, in Experiments 2 and 3, we relied on expected success in pursuing a radical technological innovation as an outcome variable. This construct is similar to a cognitive legitimacy judgment (Nagy, Pollack, Rutherford, & Lohrke, 2012), which can affect a company's future performance and is therefore closely connected to long-term survival (Baum & Oliver, 1991). Yet, while this outcome variable is a judgment variable, future research might examine the actual behavior of members of the general public. For instance, members of the general public can also be considered potential customers of a radical technological product or service innovation in the business-to-consumer sector. Hence, investigating the relationship between firm stereotypes and behavioral outcomes, such as decisions to buy or use a product or service, would be another avenue for future research.

Fifth, we looked at members of the general public because they constitute one important stakeholder group that can affect a company's reputation and legitimacy. Yet, as Eggers and Park (2018) highlight in their review of research on established firms' adaptation to technological change, other stakeholder groups, such as financial analysts, might also influence the likelihood of success in pursuing a radical technological innovation. Consequently, it would be interesting to see whether other stakeholder groups also base their success expectations for companies pursuing radical technological innovation on firm stereotypes and whether these groups make social judgments that differ from those of members of the general public.

Finally, our research suggests that members of the general public generally perceive start-ups to be warmer than established companies. Yet, this stereotype does not help start-ups in the context of radical technological innovation. Hence, future research would benefit from investigating contexts, situations, and cues in which warmth perceptions might help start-ups to increase their legitimacy. Moreover, it might be interesting to study how start-ups could increase their competence perceptions in the context of radical technological innovation to catch up with established companies.

### 4.7.3 Practical Implications

Our studies provide several important insights for practitioners in established companies. The study suggests that established companies can benefit from firm stereotypes when pursuing radical technological innovations. As established companies are perceived as more competent than start-ups, members of the general public also expect them to be more successful in pursuing a radical technological innovation. While previous research has already suggested that pursuing radical technological innovations is an effective response strategy for established companies to address technological disruptions by start-ups (Aboulnasr, Narasimhan, Blair, & Chandy, 2008; Markides, 2006), our findings provide evidence that in contrast to start-ups, when established companies execute this strategy, they even have the benefit of the doubt among members of the general public. Hence, when pursuing radical technological innovations, decision-makers from established companies could benefit from firm stereotypes by actively communicating their belonging to the type of company that has already proven its competence in the past. Our results suggest that this can enhance success expectations among members of the general public. Consequently, established companies can have higher cognitive legitimacy than start-ups (Bitektine, 2011).

Yet, this advantage of being perceived as more competent disappears when a fatal error connected to a radical technological innovation occurs. Hence, to regain their competitive advantage from being an established company in the case of a fatal error, decision-makers should invest their time and resources and develop strategies and cues that help restore their reputation for competence. By providing positive cues about the company's competence, established companies might counteract the adverse events of a fatal error, increase perceptions of their competence (Mishina et al., 2012), and consequently restore the competitive advantage that they had before the fatal error occurred, which eventually might help them succeed in pursuing the radical technological innovation.

## 5 Overall Conclusion and Discussion<sup>5</sup>

This thesis set out to analyze three stakeholder groups' perspectives on digital transformation efforts of organizations and to discuss respective impacts on applicants, employees, and organizations overall. More specifically, the main goals of this thesis were to investigate (1) whether employees adapt their work behavior by increasing individual ambidexterity when they perceive increasing technological turbulence, as in the case of increasing digital transformations in business environments, (2) how applicants react to digital methods in contrast to established non-digital methods in the personnel selection process of organizations, and (3) whether individuals in the general public form social judgments and differentiate based on stereotypes when they assess the success of a radical technological innovation endeavor of an established company in contrast to that of a start-up.

While all essays in this thesis individually contribute to different streams in the management literature, their common theme is the context of digital transformation, i.e., organizational change processes triggered by emerging digital technologies. Consequently, this thesis also makes two main overall contributions. First, it integrates concepts and frameworks from organizational and general management research with the concept of digital transformation, which has so far been studied almost exclusively in management information systems research (see Vial, 2019). Second, the empirical findings of this thesis suggest that organizations should be aware of stakeholders' perspectives on digital transformation efforts because efficient management of these perspectives can improve the support of stakeholders and, as a result, increase the chances of digitally transforming the organization in a successful way (Stouten, Rousseau, & Cremer, 2018).

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<sup>5</sup> This section is partly based on Folger, Brosi, & Stumpf-Wollersheim (under review); Folger, Brosi, Stumpf-Wollersheim, & Welpe (under review); and Folger, Stumpf-Wollersheim, & Welpe (2020).

## **5.1 Discussion of Main Findings and Contributions**

Essay I provides empirical evidence that employees' ambidexterity increases the more technologically turbulent they perceive the environment in which their organization operates. Moreover, the findings show that an organization's formalization moderates this relationship, at least in the short-term period of three weeks, with high degrees of formalization strengthening this positive relationship. Yet, this moderating effect does not last after a longer period of six weeks. These findings suggest that organizations, at least in the short term, can help their employees adapt to changing circumstances more efficiently (Boyne & Meier, 2009) by providing written rules, procedures, and guidelines, which give them internal stability in times of external instability (i.e., technological turbulence). Consequently, Essay I contributes to the individual ambidexterity stream in the organizational management theory literature by extending scholarly knowledge of the antecedents of individual ambidexterity as well as by responding to recent calls from researchers to investigate interaction effects of these antecedents (Junni et al., 2015; Raisch & Birkinshaw, 2008). Moreover, the findings of Essay I give empirical support for the proposition of Birkinshaw and Gupta (2013) that employees at all hierarchy levels in an organization face some kind of ambidexterity challenge in turbulent environments.

Essay II shows that the use of digital methods in the personnel selection process in the application and screening stage as well as in the interview stage has positive effects on applicants' perceptions of innovativeness, which, in turn, positively impact employer attractiveness perceptions. Yet, the findings also suggest that before applicants take part in a personnel selection process, the use of digital selection methods may deter potential applicants because they associate digital methods with lower procedural justice, which negatively affects the overall attractiveness of the potential employer. Even though the second study of Essay II suggests that these negative effects are not present after applicants participate in an actual personnel selection process, organizations should still consider the negative effects when making their decisions to

incorporate digital methods, as they might lose potentially promising candidates during the personnel selection process or before those candidates even apply. Essay II contributes to the applicant reactions literature by responding to recent calls to investigate applicant perceptions of new, digital personnel selection methods (McCarthy et al., 2017; Ryan & Ployhart, 2014) and to expand and broaden the theoretical lens (McCarthy et al., 2017).

The findings of Essay III suggest that members of the general public rely on two dimensions of firm stereotypes, namely, warmth and competence, when making judgments about established companies and start-ups. Specifically, in the absence of a specific context, individuals perceive start-ups to be warmer but less competent than established companies. In the context of a radical technological innovation, individuals still believe that established companies are more competent and, as a result, expect them to be more successful in pursuing the radical technological innovation. Yet, in the context of a radical technological innovation, individuals do not differentiate on the warmth dimension. When members of the general public receive new information about a fatal error connected to a radical technological innovation, they do not differentiate between established companies and start-ups based on warmth and competence stereotypes. In this case, their judgments about the expected success of the pursuit of radical technological innovation by established companies versus start-ups are also not significantly different. Essay III contributes to the social judgment of firms and firm stereotypes literature as well as to the literature on incumbents' responses to radical innovations by showing that firm stereotypes and social judgments are used by external actors for making assessments about the expected performance of established companies and start-ups pursuing radical technological innovation. Moreover, the results contribute to scholarly discussions on different effects of social judgments and firm stereotypes (Mishina et al., 2012) by providing empirical evidence that firm stereotypes and social judgments are context-specific and are prone to adjustments in light of new information.

In summary, the underlying essays of this thesis make individual theoretical contributions to various concepts and theories in the management literature. Further, the thesis also makes contributions on a broader level by enlarging the scholarly scope and understanding of the concept of digital transformation. Specifically, by integrating different theoretical frameworks and concepts from the management and organization literature and showing that changes due to (digital) technologies in organizations can impact the perceptions and judgments of various stakeholders, this thesis shows that the concept of digital transformation should be considered in various disciplines of management research instead of focusing on it almost exclusively in management information systems research. Additionally, this thesis contributes to the digital transformation literature by providing empirical evidence that the concept is a multifaceted phenomenon that needs to be considered on several levels (Vial, 2019). The findings increase our understanding of the role of three different stakeholder groups (i.e., employees, applicants, and members of the general public) in the context of digital transformation and how their perceptions and judgments might lead to either positive or negative effects for organizations.

### **5.2 Implications for Practice**

Digital transformation has become an imperative for survival for most organizations in the world over the last decade (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014; Hess et al., 2016). Yet, there is only limited empirical research that might help managers make informed decisions in regard to digital transformations of their organizations or parts of them (Warner & Wäger, 2019). In particular, the role of stakeholders often remains unclear for practitioners, even though stakeholder support is considered important for the success of digital transformation projects (Matt et al., 2015). Knowing the impacts of digital transformation endeavors on important stakeholder groups, such as employees, applicants, and members of the general public, as well as the potential consequences for organizations, might help practitioners improve

their decision making in relation to digital transformations. Consequently, the findings of the three empirical essays in this dissertation provide some guidance for practitioners.

Essay I shows that employees directly react ambidextrously when they perceive high technological turbulence in their organization's environment. Hence, as individual ambidexterity has positive effects on performance (Kobarg et al., 2017; Schnellbacher et al., 2019), organizations can benefit when their managers are transparent in their communications to employees about technological developments in the environment that might impact the organization. Today, organizations across almost all industries are faced with the rapid development of digital technologies, which might substantially change how these organizations operate. By increasing awareness of these changes among employees, our results suggest that organizations can increase employees' ambidextrous work behavior, which might help organizations manage digital transformation processes successfully. Moreover, the findings of Essay I suggest that at least in a short term, managers can help their employees become ambidextrous in technologically turbulent times by providing them with written rules, procedures, and guidelines that might assist them in making decisions on how to divide their work time between exploitative and explorative work tasks.

The findings of Essay II provide important insights for recruiters on how digital personnel selection methods are perceived by applicants. On the one hand, the use of digital personnel selection methods increases perceptions of innovativeness among applicants, which might lead to an image of an innovative employer that is well prepared for the future and therefore an attractive organization to work for (Backhaus & Tikoo, 2004). On the other hand, in their communication efforts, recruiters should address the potential negative effect of digital selection methods on prospective applicants' attraction to the organization through lower perceptions of procedural justice. Ensuring the fairness of the selection process is important for preventing the

potential loss of top talent before and during the personnel selection process. A possible measure to increase fairness could be to provide applicants with information on how candidates are selected when digital selection methods are used.

The results of Essay III provide guidance for managers of established companies when it comes to decisions of pursuing a radical technological innovation, which might help their organizations cope with technological breakthroughs and consequently with (digital) transformations of product and service offerings as well as business models. Specifically, the findings suggest that established companies can benefit from social judgments and firm stereotypes in the context of radical technological innovations because members of the general public expect such companies to be more competent than start-ups and consequently to be more successful in pursuing the innovation. Hence, established companies might benefit from simply highlighting their role as an incumbent player in their industry when informing the public about their radical technological innovation efforts. Yet, at the same time, established companies need to be aware that a fatal error connected to a radical technological innovation can make this advantage obsolete. As fatal errors might occur despite careful preventive measures, established companies could and should develop strategies and measures to address the lost advantage over start-ups, such as providing positive cues that might counteract the adverse effects of the fatal error and restore their reputation for competence (Mishina et al., 2012).

Beyond the individual implications of the three essays, this dissertation also provides practical implications at a broader level. The thesis suggests that even though digital transformation in practice is mostly regarded as a strategic phenomenon that concerns top-level management teams and leaders (Fitzgerald et al., 2014; Westerman et al., 2014), the perspective of different stakeholder groups on the digital transformation efforts of the organization must be considered when decisions are made. Specifically, the thesis shows that the perceptions and judgments of employees, applicants, and members of the general public about digital transformation endeavors can positively but also negatively affect organizations. Moreover, at the time



this thesis was written, the COVID-19 pandemic led to significant changes in society as well as in the business world. Due to the worldwide implementation of social distancing measures to stem infections, many organizations were forced not only to use digital technologies to reorganize the work of their employees and to change the way that they hire personnel but also to digitally transform whole business models via radical technological innovation faster than expected. Hence, especially in times like these, when the timing of the change is rather unexpected, outside the control of the organization, and in need of fast execution, this thesis provides empirically supported evidence for managers to make informed decisions.

### **5.3 Limitations and Directions for Future Research**

This thesis is subject to several limitations that need to be considered in interpreting the findings. Based in part on the limitations, this dissertation concludes by presenting avenues for further research. While some of the limitations discussed in the essays only concern the respective findings, some common limitations will be discussed in the following.

First, even though the methods applied in all three essays were designed to limit common method bias to a large extent, complete immunity to the bias cannot be assumed for all three essays. In Essay I, data were collected at several points in time; yet, all the measures were self-reports from the same participants and therefore might still be prone to common method bias (Podsakoff et al., 2012). In experimental studies, like those in Essays II and III, common method bias is usually not a problem because independent and dependent variables “*are not obtained from the same person at the same point in time*” (Podsakoff et al., 2003, p. 899). Yet, the research models in both studies also comprise mediator variables, and those measures were collected together with the measures for the dependent variable. In this case, even though the research models are based on theory, common method bias concerns regarding the observed relationship between the mediator variables and the dependent variables cannot be completely excluded (Podsakoff et al., 2003).

Second, the majority of participants of this thesis's studies are from Germany. Hence, even though the increasing digitalization in various fields of organizations and technological turbulence affect organizations all around the world, the generalizability of the findings to other countries and national cultures may be limited. Replication studies with participants from other nations might clarify whether large parts of this thesis's findings are indeed limited to the boundaries of Germany.

Third, the measurements of central constructs used in this thesis, such as individual ambidexterity, procedural justice, or expected success, are not definitive measures of the respective constructs. Hence, this thesis cannot make any statements on whether the results would differ if other measures are used. Future research might shed more light on this issue.

While this thesis increases our understanding of the perspectives of three stakeholder groups, namely, employees, applicants, and members of the general public, as well as the respective effects on organizations in the context of digital transformation, two additional avenues for future research appear to be promising.

First, future research might benefit from investigations of the role of other stakeholder groups in the context of digital transformation. For instance, scholars could study how customers react to organizations that digitally transform customer-centered organizational processes (e.g., customer support). Additionally, it might be interesting to see if the social judgments of investors differ from those of members of the general public in regard to the assessment of the expected success of established companies in pursuing radical technological innovations as an answer to the digital disruptions in their industries.

Second, future research might examine other outcome variables that shed more light on the role of employees, applicants, and the general public in the context of organizations' digital transformation. For instance, while individual ambidexterity increases with growing perceptions of technological turbulence, there might be adverse effects such as increased stress levels

among employees, which might result in long-term negative impacts for employees and organizations. Considering applicants, it might be interesting to see whether the use of digital selection methods in the personnel selection process affects applicants' actual behavior, such as job offer acceptance. In the case of social judgments of firms that pursue radical technological innovations, scholars might investigate whether members of the general public also use other stereotypes (e.g., age stereotypes) to differentiate between established companies and start-ups.

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## 7 Appendix

### **Appendix A: Reference for the First Essay (Essay I, Chapter 2)**

Folger, N., Brosi, P., Stumpf-Wollersheim, J. (under review). Individual Ambidexterity as a Response to Perceived Technological Turbulence – The Moderating Role of Formalization. Manuscript submitted for publication at the European Management Journal.

### **Appendix B: Reference for the Second Essay (Essay II, Chapter 3)**

Folger, N., Brosi, P., Stumpf-Wollersheim, J., Welpe, I. M. (under review). Applicant Reactions to Digital Selection Methods: A Signaling Perspective on Innovativeness and Procedural Justice. Manuscript submitted for publication at the Journal of Business and Psychology.

### **Appendix C: Reference for the Third Essay (Essay III, Chapter 4)**

Folger, N., Stumpf-Wollersheim, J., Welpe, I. M. (2020). Incumbent's Curse Revisited: Are Firm Stereotypes Beneficial or Harmful for Established Companies Pursuing Radical Technological Innovations? *Working paper*.

## **Appendix D: Author Contributions to the Essays in this Dissertation**

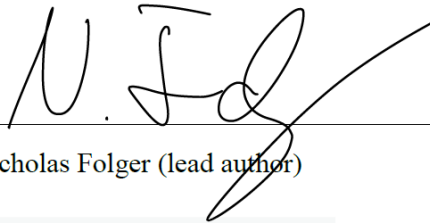
### *Essay I: Individual Ambidexterity as a Response to Perceived Technological Turbulence – The Moderating Role of Formalization*

Nicholas Folger developed the research question and the research design under supervision of Prisca Brosi and Jutta Stumpf-Wollersheim.

Nicholas Folger was responsible for the collection of the data. The German panel provider Consumerfieldwork GmbH helped in the data collection process.

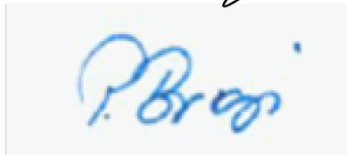
Nicholas Folger was responsible for the data analysis. Throughout the analysis process, he received feedback from Prisca Brosi and Jutta Stumpf-Wollersheim.

The article was written in an iterative cooperative process, in which Nicholas Folger wrote the first draft of a full paper, which was developed through suggestions, recommendations and feedback from Prisca Brosi and Jutta Stumpf-Wollersheim.



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Nicholas Folger (lead author)



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Prof. Dr. Prisca Brosi (co-author)



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Prof. Dr. Jutta Stumpf-Wollersheim (co-author)



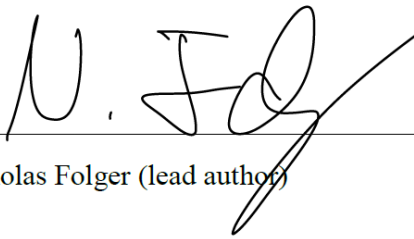
*Essay II: Applicant Reactions to Digital Selection Methods: A Signaling Perspective on Innovativeness and Procedural Justice*

Nicholas Folger developed the research question and the research design under supervision of Prisca Brosi, Jutta Stumpf-Wollersheim and Isabell M. Welpe.

Nicholas Folger was responsible for the collection of the data. He collected the data by himself and supervised five (former) students of the TUM School of Management who helped in the data collection process.

Nicholas Folger was responsible for the data analysis. Throughout the analysis process, he received feedback from Prisca Brosi, Jutta Stumpf-Wollersheim and Isabell M. Welpe.

The article was written in an iterative cooperative process, in which Nicholas Folger wrote the first draft of a full paper, which was further developed through suggestions, recommendations and feedback from Prisca Brosi, Jutta Stumpf-Wollersheim and Isabell M. Welpe.



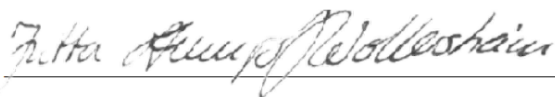
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Nicholas Folger (lead author)



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Prof. Dr. Prisca Brosi (co-author)



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Prof. Dr. Jutta Stumpf-Wollersheim (co-author)



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Prof. Dr. Isabell M. Welpe (co-author)

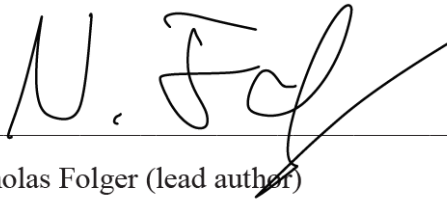
*Essay III: Incumbent's Curse Revisited: Are Firm Stereotypes Beneficial or Harmful for Established Companies Pursuing Radical Technological Innovations?*

Nicholas Folger developed the research question and the research design under supervision of Jutta Stumpf-Wollersheim and Isabell M. Welpé.

Nicholas Folger was responsible for the collection of the data. He collected data by himself and supervised two (former) students of the TUM School of Management who helped in the data collection process.

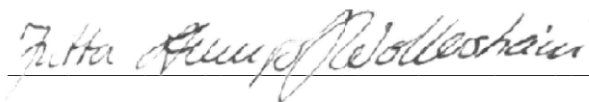
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Nicholas Folger (lead author)



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Prof. Dr. Jutta Stumpf-Wollersheim (co-author)



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Prof. Dr. Isabell M. Welpé (co-author)