



**Essays on current topics in
employee entrepreneurial behaviors and attitudes**

Cumulative Dissertation

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This thesis is dedicated to my family for their endless love, support and encouragement. I have an immense amount of gratitude for my parents, who continuously gave me confidence and motivation, and inspiring me to always do my best.

FOREWORD

The author of this cumulative dissertation works as an external doctoral candidate at the Chair of International Management and Social Entrepreneurship and has gained valuable job experience in entrepreneurship and human resources during this research project. A constant exchange between the domains of research and practice ensures the uniqueness of this research project and bridges the gap between science and practice.

SHORT SUMMARY

A firm's entrepreneurial orientation (EO) is its propensity to act proactively, innovate, take risks, and engage in competitive and autonomous behaviors. Prior research shows that EO is an important factor for new ventures to overcome barriers to survival and fostering growth, measured by annual sales and employment growth rates. In particular, individual-level EO (IEO) is an important driver of a firm's EO. The firm's ability to exploit opportunities appearing in the market and to achieve superior performance depends on the employees' skills and experiences to act and think entrepreneurially. The main objective of this dissertation is to investigate how and when employees engage in entrepreneurial behaviors at work. Building on three essays, this dissertation takes an interdisciplinary approach to employee entrepreneurial behaviors in new ventures, encompassing both entrepreneurship and gamification research. The first main contribution proposed in this field is a more nuanced understanding of how employee entrepreneurial behaviors help young firms cope with growth-related, organization-transforming challenges (i.e., changes in organizational culture that accompany growth, the introduction of hierarchical structures, and the formalization of processes). When new ventures grow, employees' IEO tends to manifest in introducing technological innovations and business improvements rather than in actions related to risk-taking. Second, this dissertation reveals the relevance of self-efficacy for entrepreneurial behaviors and explores how gamification can enhance employee entrepreneurial behaviors in new ventures. Based on these findings, this dissertation contributes to EO research by highlighting the role of IEO as a building block for EO pervasiveness. This research further develops our knowledge on the use of gamification in new ventures. This cumulative dissertation is structured as follows. Part A is an introduction to the study of entrepreneurial behaviors. Part B contains the three essays.

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Part A: Summary

1 Introduction

Miller (1983) was one of the first researchers to introduce the notion of firm-level entrepreneurship as a set of organizational behaviors. Miller (1983, p. 771) stated that a firm is entrepreneurial when it “engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with ‘proactive’ innovations, beating competitors to the punch.” Coming from this definition, numerous researchers have studied three dimensions to classify EO, namely, innovativeness, risk-taking, and proactivity (Covin & Wales, 2012). Borrowing ideas from strategic management, Lumpkin and Dess (1996) argue that the field of entrepreneurship developed from an emphasis on “how new entry is undertaken” (1996, p. 136), including a firm’s domain, its product-market relationships, and resource deployments to study entrepreneurial processes within firms. Thus, the authors (1996) expanded the EO to include five dimensions: (1) innovativeness, (2) risk-taking, (3) proactiveness, (4) competitive aggressiveness, and (5) autonomy.

Innovative behaviors refer to experimenting with technological leadership and novelty in the development of products, services, and processes (Hughes & Morgan, 2007) and are the extent of deviating from established practices (e.g., Lumpkin & Dess, 1996; Rauch et al., 2009; Slater & Narver, 1995). Proactive behaviors aim to change and improve work environments (Parker & Collins, 2010; Salanova & Schaufeli, 2008). Moreover, proactivity is associated with opportunity-seeking behavior that incorporates future needs and trends (e.g., Anderson et al., 2015; Lumpkin & Dess; Wiklund et al., 2003). Building on Parker, William, and Turner (2006), Grant and Ashford (2008, p. 8) define proactive behaviors as actions that “consider anticipation, planning, and action directed toward future impact (...).” Recent scholars consider risk-taking behaviors as a form of challenging extrarole behavior that is directed toward improving and challenging the status quo of organizational processes (e.g., de Jong et al., 2013; Hughes & Morgan, 2007; Hughes et al., 2018; Lau et al., 2012; Rigtering and Weitzel, 2013). Risk-taking represents a willingness to act under a high level of uncertainty regarding the likely outcomes

(Lumpkin & Dess, 1996). According to Hughes and Morgan (2007, p. 652), “Competitive aggressiveness conveys the intensity with which a firm chooses to compete and efforts to surpass competitors reflecting a bias toward out-maneuvering and out-doing rivals.” Competitive aggressive firms pay close attention to their competitors’ actions and assess opportunities to exploit the firm’s strengths and competitors’ weaknesses (Davidson, 1987). Hughes and Morgan (2007, p. 652) report that autonomy is “the authority and independence given to an individual or team within the firm to develop business concepts and visions and carry them through to completion.”

Hughes and Morgan (2007), in their study on the relationship between EO and business performance in the state of firm growth, find that strong EO results in high growth rates. EO can help new ventures respond to managerial problems and the challenges presented by organizational growth (Chrisman et al., 1998; Hughes & Morgan, 2007; Wales et al., 2011; West & Noel, 2019; Zahra et al., 2002). More specifically, Lumpkin, Wales, and Ensley (2006) claim that EO helps new ventures overcome barriers to survival and growth, particularly fostering growth rates, measured by annual sales and employment growth rates (Gilbert et al., 2006; Murphy et al., 1996). Moreover, Hughes and Morgan (2007) contend that with a larger size, increasing product complexity, market maturity, and a larger headcount, the transformation of internal organizational structures is necessary to keep productivity high. Against this background, an entrepreneurial-oriented strategy can help new ventures develop and identify competencies and cost-efficient organizing practices (Achtenhagen et al., 2010).

Notwithstanding, Covin and Wales (2012), in their review on formative and reflective measures of EO, emphasize that EO is a firm-level concept that pervades organizations across hierarchy levels. Wales and colleagues (2020) argue that IEO is a building block for EO pervasiveness. The authors contend that top managers develop a firm’s entrepreneurial strategy and communicate it within the organization. Employees at lower levels implement the strategies of

upper-level managers and exhibit attitudes and behaviors that can proliferate to guide the organization's behavior as a whole (Fellnhofer, 2016; Tang et al., 2009). Similarly, Covin and Lumpkin (2011) suggest EO is an individual's "tendency to respond to situations or classes of situations in an entrepreneurial manner" (2011, p. 858).

The individual-level EO (IEO), in particular, helps new ventures discover and exploit opportunities in the market. Against this background, IEO contributes to a new venture's competitive advantage due to the employees' expertise, knowledge, and forward-looking perspective they bring to their work (Bartel & Lichtenberg, 1987, 1990; Siegel et al., 1997; Link & Siegel, 2007). Therefore, a firm-level focus on EO neglects the individual component of EO and, in particular, how IEO contributes to EO pervasiveness (e.g., Covin & Wales, 2019; Shane & Venkataraman, 2000; Wales et al., 2020; Wales et al., 2011b).

Notwithstanding, the role of IEO on EO pervasiveness is not sufficiently studied, particularly in the context of new ventures. The lack of understanding of how IEO manifests and how IEO might contribute to organizational success may underlie current limitations on understanding the antecedents and drivers of EO within firms. Furthermore, a better understanding of how IEO manifests could be valuable to researchers in understanding how employees can contribute to new venture growth and organizational performance. Although research has already indicated the importance of IEO for EO, research on IEO often focuses on top-level managers (Davis et al., 2010; De Clercq et al., 2010; Hornsby et al., 2002; Kuratko et al., 2005; Pearce et al., 1997) or founders' entrepreneurial behaviors (Deb & Wiklund, 2019; Miller & Le Breton-Miller, 2011; Mousa & Wales, 2012). Against this background, Hughes and Morgan (2007) state that assessing entrepreneurial opportunities should be the responsibility of all employees. The authors contend that firms need to ensure employee involvement and participation in the firm's EO activities to create an advantage (Hughes & Morgan, 2007). Hughes and Morgan (2007, p. 658) further contend that "strong human capital is needed to lever the ability of the firm as a whole to perform certain activities to a superior level relative to competitors."

Accordingly, scholars overlook the role of nonmanagerial employees' entrepreneurial behavior that might potentially result in positive organizational outcomes.

Furthermore, although researchers and experts recognize IEO as a decisive factor for economic success and allowing a firm to adapt to changing internal and external needs (Hernandez, 2019; Lukeš, 2012, Mustafa et al., 2018), less attention is given to strategies on how to motivate employees to engage in entrepreneurial behaviors at work (Chen et al., 2015). Indeed, existing studies offer interesting viewpoints on the use of gamification, i.e., "the process of making activities in nongame contexts more game-like by using game design elements" (Sailer et al., 2017, p. 372), to increase the likelihood of nascent behavior (Kumar & Raghavendran, 2015; Patricio, 2017; Patricio et al., 2018, 2020). More specifically, studies have shown that game design elements enhance perceived self-efficacy and, in turn, entrepreneurial behaviors (Gawke et al., 2017; Ho et al., 2021; Mustafa et al., 2018). Notwithstanding, existing studies offer less insight into using game mechanics to meet employees' self-efficacy to perform entrepreneurial activities at work. Moreover, incorporating game elements into work activities can be difficult because it requires a thoughtful understanding of motivation and design. Current scholarship tends to explore gamification theoretically, failing to adapt gamification design into practice and thereby overlooking the importance of measuring the effects of gamification tools (Gudiksen, 2015; Murawski, 2020; Patricio et al., 2018; Patricio et al., 2020). Thus, there is a gap between theoretical approaches to identify the antecedents of employee entrepreneurial behavior and the lack of knowledge on using this understanding in practice (Mustafa et al., 2018).

To respond to these shortcomings in the literature, this dissertation aims to make at least two main contributions to the existing entrepreneurship literature. *First*, this thesis aims to better understand and provide examples of how nonmanagerial employees understand and perceive EO aspirations. The current research responds and builds on Lumpkin and Dess's (1996) five-dimensional conceptualization of EO and sees IEO as a building block for EO (Wales et al., 2011). This thesis considers EO as a dispositional construct (Covin & Lumpkin, 2011) and

suggests that operational attributes (e.g., access to financial resources) (Christensen, 2005; Rigtering & Weitzel, 2013), external influencing factors (e.g., market dynamics) (Wales et al., 2011), and one's tendencies (i.e., individual variables such as personal attitudes and characteristics) in particular explain the likelihood of IEO (Hughes et al., 2018; Kollmann et al., 2017; Mair, 2005; Rauch & Frese, 2007; Stevenson & Jarillo, 1990). More specifically, high self-efficacy, i.e., the extent to which individuals are confident about their skills to complete tasks and projects (Bandura, 1994, 1997), increases the likelihood of entrepreneurial behaviors (Mustafa et al., 2018; Palmer et al., 2019; Steward et al., 2021; Wood & Bandura, 1989). *Second*, this thesis aims to explore the use of gamification to foster nonmanagerial employees' IEO. Using design science research that can potentially reduce the existing gap between theory and practice, an exploratory study conducted as part of this dissertation develops a gamification framework for increasing employee motivation to engage in entrepreneurial behaviors. The tool was tested in a high-tech venture in Germany and evaluated using on-site observations and exploratory interviews.

The remainder of Part A is structured as follows. First, the three essays written as part of this dissertation are described. Second, a conceptual model that incorporates the results of the essays is proposed. Third, a concluding discussion addressing the overall research findings is provided.

2 Summary

The *first article* investigates how IEO unfolds when a new venture grows, and employees seek various ways to cope with growth-related, organization-transforming challenges. Via an in-depth exploratory qualitative study design, the research data for this project were collected over two years in a high-tech venture in Germany. This study is based on a qualitative approach because it allows us to explore a contemporary issue in-depth in a real-life context. EO is a

context-dependent and largely tacit phenomenon that manifests differently depending on environmental conditions (e.g., organizational culture, firm strategy, organizational resources) (Wales et al., 2011). Contrary to other articles published in the literature (e.g., Abiodun & Rosli, 2014; Anderson & Eshima, 2013; Bucktowar et al., 2013; Linton, 2019), the moderating role of factors that reside within the organization (i.e., environmental variables, societal, cultural variables, structural organicity) can be considered.

Furthermore, EO is a dynamic construct (Covin & Wales, 2019; Hughes & Morgan, 2007; Lumpkin & Dess, 1996). Therefore, data collection should occur at different points in time. Such an approach allows gaining a deeper understanding of the employee-level effects on the pervasiveness of EO and the employees' role in the firm's entrepreneurial strategy with consideration of the dynamics of the firm (Monge, 1990). Thus, a qualitative approach that observes a new venture via periodic interviews with nonmanagerial employees and on-site observations over several months or years was chosen to enrich our understanding of how IEO helps a firm pursue its entrepreneurial strategy. A qualitative approach with a theory-developing setup, such as in this research project, allows drawing representative or generalizable findings (Dyer & Wilkins, 1991, Siggelkow, 2007). The findings of this study highlight the need to view EO as a multidimensional construct and the value of employees for EO pervasiveness. Moreover, my findings reveal how IEO manifests in EO and changes over time. In particular, my article demonstrates that when new ventures grow, employees' IEO changes. Their entrepreneurial behaviors tend to manifest in introducing technological innovations and business improvements rather than in actions toward risk-taking behavior. Thus, the article provides evidence that fostering IEO is critical for improving workflows and maintaining efficiency within growing new ventures when product and organizational complexity increases. Based on these findings, this article contributes to EO research by highlighting the role of IEO as a building block for EO pervasiveness and is considered a key for new venture success.

The *second article* summarizes the existing gamification research in human resource management (HRM). This article adopts a systematic literature review method to probe into existing scholarly articles on gamification in HRM, identify approaches to meaningful gamification design, and discuss possible risks of gamifying HRM practices and tools. Thus, this article focuses on the “what” of gamification in HRM, answering the research question, “In which areas of HRM is gamification applied, and what are the reported outcomes of it?” The second question, “How can gamification be applied in HRM?”, moves on to consider the “how” of gamification design, examining which elements of gamification should be combined and pointing to risks of gamification in HRM. This study reveals four potential application areas of gamification: (1) supporting employee motivation, engagement, and performance, (2) improving training outcomes, (3) supporting talent management measures, and (4) fostering knowledge management activities. The study further emphasizes that more indicator-based findings on the effects of gamification in HRM are necessary to assess the use of game design elements. However, as in previous studies, this analysis confirms that there is less consensus on indicators and aspects describing gamification and views that differ on which game elements represent a gamified system. Hence, the current research results on the effectiveness of gamification are hardly comparable, transferrable, and therefore generalizable.

The *third article* is dedicated to the use of gamification to motivate employees to engage in entrepreneurial behavior. Via design science research (Hevner, 2007), this study develops a tool that enhances employees’ motivation to engage in entrepreneurial behaviors at work. This method is commonly used to explore the use of gamification frameworks in various contexts (Cheong et al., 2013; El-Masri et al., 2015; Silic & Lowry, 2020) because it allows researchers to develop theories and artifacts and to ensure practical utility (Donnellan, 2012; Gregor & Hevner, 2013; Hevner, 2007; Holmström, 2009; Morschheuser et al., 2017a, 2017b). In particular, this study takes a behaviorist learning perspective, arguing that motivation results from past positive and negative reinforcements, which influence the probability of future behavior

(Sailer et al., 2013). In this vein, self-efficacy is considered a psychological perspective on motivation through gamification (Banfield & Wilkerson, 2014; Ortiz Rojas et al., 2017). Based on a synthesis of current scholars in entrepreneurship and gamification, the study suggests a list of features required to successfully implement gamification and develop a gamification tool intended to enhance employee entrepreneurial behavior. Moreover, I evaluate the proposed tool via on-site observations of the gamification tool in a new venture in Germany and exploratory interviews with users. The findings reveal that the gamified tool motivates employees to engage in entrepreneurial behaviors. New ventures can take advantage of the new opportunities in gamification to discover and explore creative solutions.

Overall, the first article contributes to research on EO with a focus on individual-level EO. The second article seeks to complement research on gamification with a synthesis and analysis of current scholars on the use of gamification in HRM. The third article combines research on the use of gamification with research on individual-level EO. The focus of each article and field of interest are summarized in Table 1.

Article		Research field
<p>Article 1: Individual-level entrepreneurial orientation and new venture growth: A study in a high-tech venture in Germany</p>		<p>Entrepreneurial orientation (Individual-level entrepreneurial orientation)</p>
<p>Article 2: Gamification in human resource management—Status quo and quo vadis</p>		
<p>Article 3: A gamified approach for enhancing employee entrepreneurial behaviors in new ventures</p>		<p>Gamification (Applying and designing gamification in organizations)</p>

Figure 1. Contribution to research field

Table 2 provides a detailed overview of the bibliographic information of the articles introduced in the previous section, including authorship information, journal ranking, and publication status.

Table 1. Bibliographic information of the essays

Article No.	Bibliographic Information	Authorship Information	Other Comments	Journal Ranking	Publication Status	Awards
1	Murawski, L. & Bort, S. (2021). Growing up but still be entrepreneurial? The entrepreneurial orientation-performance relationship. <i>Paper presented at 81st Academy of Management Annual Meeting, Virtual, Online.</i>	Lena Murawski is lead author in this paper. She directed the development of the basic research idea and the theoretical and conceptual model. The interpretation of the results and the writing of the paper were also done by Lena Murawski. Suleika Bort provided theoretical guidance and support in the conception and design of the project.	The conference presentation was held by Lena Murawski.	n/a	<ul style="list-style-type: none"> Conference presentation at the 81st Academy of Management Annual meeting Submitted to The International Journal of Entrepreneurship and Innovation in January 2022 (Journal Ranking: C) 	
2	Murawski, L. & Kneisel, E. (2019). Using Gamification for Enhancing Employee's Motivation on Work and their Striving for Further Training: A Literature Review. <i>Proceedings of the European Academy of Management (EURAM) Conference, Lisbon, Portugal.</i> ¹	Lena Murawski is lead author in this paper. She directed the development of the basic research idea and the theoretical and conceptual model. The interpretation of the results and the writing of the paper were also done by Lena Murawski. Evi Kneisel provided theoretical guidance and support in the analysis of results.	The conference presentation was held by Lena Murawski.	n/a	Conference presentation at the Academy of Management (EURAM) Conference	
	Murawski, L. (2020). Gamification in human resource management—Status quo and quo vadis. <i>German Journal of Human Resource Management: Zeitschrift für Personalforschung</i> , 35(3), 337-355.	Lena Murawski is the only author of this article and took full responsibility of publication in the Journal "German Journal of Human Resource Management".		VHB: C	Published	

Table 2 (continued)

Article No.	Bibliographic Information	Authorship Information	Other Comments	Journal Ranking	Publication Status	Awards
3	Murawski, L. (2021). Level up entrepreneurial behaviors: A case study on the use of gamification to encourage entrepreneurial acting and thinking. <i>Proceedings of the 23rd International Conference on Sustainable Business and Entrepreneurship, Zurich, Switzerland.</i> ³	Lena Murawski is the only author of this article and took full responsibility of publication on the conference.	Lena Murawski was invited to a guest speech on 14 th of June 2021 at a start-up incubator of the city of Bochum, Germany. She transferred the theoretical contributions of this paper into practice and provided guidance to founders for the development of their business with the use of gamification.	n/a	<ul style="list-style-type: none"> Conference presentation at the 23rd International Conference on Sustainable Business and Entrepreneurship The article is currently in the revision process (Creativity and Innovation Management, Journal Ranking: C) 	For the presentation at the conference, Lena Murawski was awarded the "Best Presentation Award".

3 Conceptual Model

This section summarizes the findings of this thesis and introduces a conceptual model of EO among the relationships of IEOs and their influencing factors. The conceptual model incorporates the results of the essays conducted as part of this dissertation.

The advantage of this model is that IEO is considered a building block for EO, and it considers the implications of EO's and IEO's conceptions, i.e., the influence of external, organizational, and individual factors. In this conceptual model, EO is a result of reciprocal interactions between influencing factors (i.e., external, organizational, and individual) and IEO from the "bottom-up" and the "top-down." Hence, it explicates the critical role of employees and their influence upon the viability of the entrepreneurial strategy employed (Link & Siegel, 2007). More specifically, employees implement the strategies of upper-level managers and exhibit attitudes and behaviors that can proliferate to guide the organization's behavior as a whole (Fellnhofer, 2016; Tang et al., 2009). Likewise, individual business units have independent resources, and they may require different levels of EO to create and sustain performance (Engelen et al., 2014; Wales et al., 2011). Thus, considering employees as a vital source of EO (Wales et al., 2011), there is a mutual influence between individual and organizational factors. Finally, a firm's EO can depend on its competitors' orientation choices and market dynamics; the more significant the competitive intensity, the greater the contribution EO has on business performance (Deshpandé et al., 2012).

Figure 1 shows the conceptual model. A detailed description of each component is presented below.

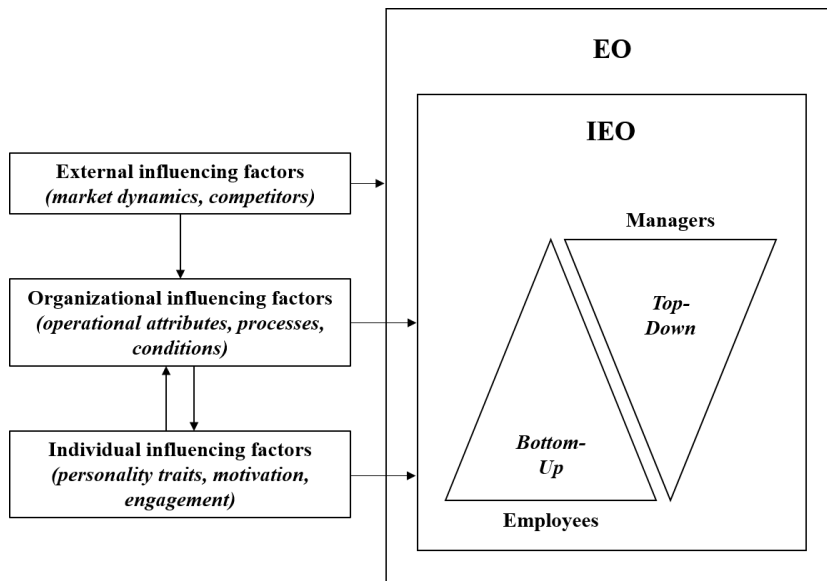


Figure 2. Conceptual model of EO in new ventures

EO. EO is a multidimensional process and can be divided into five dimensions: proactivity, risk-taking, innovativeness, competitive aggressiveness, and autonomy (Lumpkin & Dess, 1996). According to Lumpkin and Dess (1996), these five dimensions vary independently of one another and provide an indication of the organization's posture toward entrepreneurship.

IEO. EO is a firm-level concept and a firm's posture toward entrepreneurial behaviors, as described in detail above. IEO is a component of EO and describes the entrepreneurial exploration and exploitation activities of employees and managers (*see Article 1*). Employees' entrepreneurial efforts provide new opportunities for growth and development and help the firm identify opportunities on the market and act entrepreneurially (e.g., Hornsby et al., 2009; Monsen & Boss, 2009; Wales et al., 2011). IEO is helpful for new ventures to improve workflows and maintain efficiency within the organization when product and organization complexity increases (Cardon, 2003; Greiner, 1972; Wang et al., 2017). IEO pervades organizations through both the development of entrepreneurial strategies from the "top-down" and employees following the entrepreneurial strategy through entrepreneurial behaviors from the "bottom-up" (*see Article 1*). While top-level managers' (Davis et al., 2010; De Clercq et al., 2010; Hornsby et al.,

2002; Kuratko et al., 2005; Pearce et al., 1997) or founders' IEO (Deb & Wiklund, 2019; Miller & Le Breton-Miller, 2011; Mousa & Wales, 2012) leverages a firm's EO from the "top-down" and sets the entrepreneurial strategy for the firm (Dess et al., 1997), employees' IEO enables the firm to follow its entrepreneurial strategy from the "bottom-up."

Individual influencing factors. Employees working in new ventures engage in entrepreneurial behaviors and improve organizational performance (see Article 3). In particular, their entrepreneurial behaviors are mainly driven by individuals' self-efficacy (Caines et al., 2019; Hmieleski & Corbett, 2008; Mauer et al., 2017; Mustafa et al., 2018). Individuals with high perceived self-efficacy are more likely to engage in entrepreneurial behaviors (Gawke et al., 2017; Mustafa et al., 2018). As the results from Article 2 and Article 3 reveal, recognizing and rewarding employee initiatives cultivates a climate to promote employee entrepreneurial behaviors and can enhance employees' motivation to perform entrepreneurial activities.

Organizational influencing factors. Organizational growth is a crucial determinant for IEO. As can be inferred from Article 1, employees mind the persistent challenge of establishing communication when new teams are formed, new processes are introduced, and new formal organizational structures are introduced. For example, the study reveals that employees fear losing transparency in management's communication of strategic decisions at the same time, and they value open and straightforward communication. Hence, when organizations grow, employees proactively seek to continuously create a work environment that meets their needs (i.e., having a team that shares the same goals and objectives and promotes fairness among colleagues). Furthermore, whereas central decision-making powers prevent employees from contributing to technological innovations in young ventures, employees actively seek ways to implement their ideas in product development and the firm's strategic direction (i.e., organizational-level and external entrepreneurial activities) in more mature firms. Against this background, employees' IEO manifests in seeking ways to increase business performance and improve individual and teamwork efficiency.

External influencing factors. Other drivers of a firm's entrepreneurial strategy are a competitive market and stakeholder demands (Hughes & Morgan, 2007). Given new ventures' own limited public recognition and legitimacy and having low organizational awareness, a significant challenge for new ventures seems to be competing with established firms (Lumpkin et al., 2006). These challenges entail relying heavily upon EO in their strategy-making behavior to overcome barriers to survival and growth (Lumpkin et al., 2006). A firm with a growth-oriented strategy needs to discover and exploit opportunities appearing in the market and develop products continuously (Chrisman et al., 1998; Hughes & Morgan, 2007; West & Noel, 2019; Zahra et al., 2002). For example, Rauch and colleagues (2009, p. 764) argue that "in an environment of rapid change and shortened product and business model lifecycles, the future profit streams from existing operations are uncertain and businesses need to constantly seek out new opportunities."

Based on the conceptual model outlined above, in the following, the three essays are presented and discussed in greater detail.

4 Discussion

In this dissertation, I address how nonmanagerial employees' IEO contributes to EO pervasiveness and organizational growth in new ventures. Furthermore, this research project set out to explore how gamification can be a useful technique to enhance IEO in new ventures. First, my findings emphasize the importance of considering IEO as a building block for EO and, thus, a primary driver of organizational growth. Second, my findings reveal how IEO unfolds when a new venture grows. Finally, my findings show how gamification can motivate employees to engage in IEO, discover and exploit opportunities appearing in the market, and continuously develop products and services. In the following, I discuss the implications of my findings for theoretical debates on EO and gamification.

A *first* theoretical contribution following my study is developing a more nuanced understanding of EO (Miller, 2011; Wales et al., 2011), beginning with the emphasis on IEO as a building block for EO pervasiveness. While existing studies have been relatively silent on the individual level of EO, my findings reveal that employees' entrepreneurial efforts provide new opportunities for growth and development and help the firm identify opportunities on the market. Hence, I address recent calls by Wales et al. (2011; 2020), Gupta and Gupta (2015), and Miller (2011) to expand EO from the firm level to the individual and, in particular, the non-managerial employee level. While scholars have often emphasized the role of founders' IEO for EO pervasiveness (Davis et al., 2010; De Clercq et al., 2010; Miller & Le Breton-Miller, 2011; Mousa & Wales, 2012), the understanding of how nonmanagerial employees' IEO manifests remains limited. My study emphasizes that EO pervades organizations by developing entrepreneurial strategies from the "bottom-down" and employees following the entrepreneurial strategy through entrepreneurial behaviors from the "bottom-up".

Second, my analysis reveals that employees' IEO manifests through proactive, autonomous, innovative, and competitive aggressive behaviors. These practices can help organizations cope with growth-related, organization-transforming challenges (i.e., changes in organizational culture that accompany growth, the introduction of hierarchical structures, and the formalization of processes). In this sense, my study advances our knowledge of how IEO contributes to EO pervasiveness and, thus, how IEO contributes to new venture growth. Furthermore, my study aligns with work in the EO literature that emphasizes that each EO dimension (i.e., proactivity, innovativeness, autonomy, risk-taking, competitive behavior) may have greater or lesser importance (Lumpkin & Dess, 1996). More specifically, my study shows that when a new venture grows, employees seek various ways to cope with growth-related, organization-transforming challenges. Furthermore, in line with the growth of the venture, employees' IEO changes and their entrepreneurial behaviors tend to manifest in introducing technological innovations and business improvements. In sum, employees' entrepreneurial behaviors can help

new ventures adapt to changing internal and external needs. Thus, IEO can help firms identify opportunities in the market and improve productivity and thus can be considered a main driver of organizational growth.

Third, I did not find any evidence of risk-taking behaviors, the fifth EO dimension in Hughes and Morgan's (2007) and Lumpkin and Dess's (1996) EO framework. Two possible explanations for this finding point to possible avenues for future research on IEO. First, risk-taking may not accurately define IEO and refers only to firm-level entrepreneurship. For example, George and Marino (2011, p. 998) argue that "EO was originally defined as a firm-level construct, and extending the domain of the construct to other levels of analysis is clearly not appropriate, as it captures an entirely different class of objects (nations, teams, or individuals vs. firms." Notwithstanding, the current findings broaden our perspective and embark on an investigation of EO and IEO as a whole. Modifying and extending EO helps researchers to examine the synergy of individual-level EO as a source of firm-level EO in new ventures and better understand how EO manifests within organizations. Second, research has shown that trust and perceived self-efficacy are psychological antecedents of risk-taking behaviors (Colquitt et al., 2011; Costigan et al., 2006; Dedahanov & Rhee, 2015; Gao et al., 2011; Mayer, 2007). For example, Dedahanov and Rhee (2015) found that employees avoid taking risks because of a lack of trust in the organization and a lack of trust in managers. More specifically, the authors (Dedahanov & Rhee, 2015, p. 1846) note that employees with a "lower level of trust in organization are more likely to feel unsafe to share their concerns and have defensive silence." This assumption aligns with my findings derived from *Article 3*. I found that self-efficacy is a crucial driver of entrepreneurial behaviors held by employees. I suggest that gamification can be a helpful tool to enhance IEO and illustrate support for the inclusion of gamification to encourage the employee's self-efficacy to perform entrepreneurial activities at work. More specifically, I found that recognizing, rewarding and championing the employee's initiatives foster employees' motivation to perform entrepreneurial activities (Globocnik & Salomo, 2015; Rutherford

& Holt, 2007; Wakkee et al., 2008). Considering the above findings, I suggest that perceived trust enhances self-efficacy and increases the likelihood of engaging in risk-taking behaviors. Likewise, gamification can be a tool to increase self-efficacy and, in turn, to enhance employees' motivation to engage in entrepreneurial behaviors at work. For further research, it is therefore recommended to probe into the relationship between gamification and trust. This allows researchers to look at how rewards and recognition through the use of gamification can enhance trust—as a source of IEO—within the organization.

As a *fourth* contribution, my study shows that formal and hierarchical structures can serve as a favorable context for entrepreneurial workers in organizations who strive to proactively shape these environments. This contrasts with other studies, which suggest that the potential for EO to have any effect on performance decreases over time because growth-related organizational transformations, such as a change from informal to formal organizational structures (Gilbert et al., 2006), reduce the opportunity for employees to make autonomous decisions and limit employees' scope of action for taking entrepreneurial actions (de Jong et al., 2013). For example, prior research shows that in a growing venture, the transformation from an informal to a formal organizational structure entails fundamental changes in job design (de Jong et al., 2013; Greiner, 1978; Scott & Bruce, 1987). De Jong and colleagues (2013, p. 20) propose that autonomy and “job design matter for bottom-up opportunity pursuit.” My findings suggest that it is management's responsibility to give employees a certain scope of action for their entrepreneurial behaviors. Otherwise, employees become frustrated or feel a lack of recognition from peers or managers within the organization. As a result, as can be inferred from my research (*see Article 1*), employees join forces with peers or employees who have worked for the company for a long time to build a coalition. This allows them to legitimize their innovative and proactive behavior and ensures that the firm recognizes their ideas for improving organizational performance.

As a final contribution, this dissertation shows that communication within organizations seems to be an essential driver for the pervasiveness of EO. In my study, informal communication (e.g., informal communication between coworkers or employees and managers, spontaneous conversations) plays a crucial role in supporting employees to exhibit entrepreneurial behaviors and attitudes (*see Article 3*). My study shows that formal employee-employee and employee-manager communication (e.g., provided through team meetings) help employees share and develop new ideas and improve products or services in the more mature firm. Moreover, employees engage in EO when organizational members share a common understanding of each other's roles, role relationships, and policies. Establishing accountabilities and authorities within the organization provides employees with work autonomy and a sense of ownership to articulate and develop ideas. Last, and considering the relationship between entrepreneurial behaviors and self-efficacy, it is important to examine the extent to which trust within organizations may lead to higher levels of self-efficacy and, thus, entrepreneurial behaviors held by employees (Bergh et al., 2011; Dedahanov & Rhee, 2015; Welter & Smallbone, 2006, 2011). For example, Dedahanov and Rhee (2015, p. 1846) note that "employees with higher level of trust tend to have higher level of self-efficacy that enables them to share their concerns to make difference in their organization, whereas individuals with lower level of trust are more likely to have a lower level of self-efficacy to make change with their suggestions and remain acquiescently silent."

In addition to the theoretical contributions, my work offers some managerial implications because they emphasize that a firm needs to learn how to manifest EO-associated behaviors and attitudes to increase its ability to cope with organizational challenges. My findings suggest that the intentions underlying employees' entrepreneurial behaviors correspond to the challenges the firm faces during organizational growth and organizational transformations (*see Article 1*). More specifically, my research can guide entrepreneurs on using gamification in HRM (*see Article 2*) and using game-design elements to follow their entrepreneurial strategy

(see Article 3). I encourage practitioners to introduce gamification to enhance employees' perceived self-efficacy, which encourages employees to engage in those behaviors. This will help new ventures to (a) fully exploit employees' entrepreneurial potential for improving organizational performance and (b) encourage and sustain their motivation and engagement to work in the firm that allows them to change and improve work environments (Parker & Collins, 2010), enhance their own perceived responsibility, and encourage high task performance (Salanova & Schaufeli, 2008).

This dissertation has limitations¹ that guide further research suggestions. First, it would be interesting to see what other understandings and aspirations employees in new ventures have toward EO. A helpful approach would be to use taxonomies that incorporate variables of environmental conditions (e.g., organizational culture, firm strategy, organizational resources), the jobs that individuals have, their demographic and personality traits, or the network they are embedded in (Rigtering & Weitzel, 2013; Wales et al., 2011). Several possible research questions could include the role of organizational structures (i.e., team-based and agile environments) or the role of informal leadership on employee entrepreneurial behaviors. Since EO is central to all firms, future research needs to compare my results across organizations that differ with age, industry, and size (i.e., more mature SMEs or larger organizations). Research investigating IEO in larger organizations will add to our understanding of how decentralized organizational structures and resource capabilities (i.e., financial, personnel) affect IEO. This will allow researchers in the field of entrepreneurship to collect more data to gain a deeper understanding of the individual-level effects on the pervasiveness of EO in any organization, whether a new venture, SME or corporate.

Second, research on different samples and adopting specific foci that reflect what it means for an organization to "be entrepreneurial" (Miller, 2011; Wiklund & Shepherd, 2005;

¹ See Part B for limitations for each study.

Wales et al., 2011), and taking various perspectives and focusing on “bottom-up”, “top-down”, or temporal EO, will help to clarify the conceptualization of EO by investigating EO and its internal and external linkages. Moreover, it would be of great value to examine how the elements of risk and risk perceptions of actors in firms influence firm growth among entrepreneurial ventures and assess which role individual risk-taking might play for organizational growth. The EO literature has frequently emphasized that risk propensities among founders might be detrimental to new venture growth (Hughes & Morgan, 2007; Lumpkin et al., 2006; Mullins & Forlani, 2005; Tang & Tang, 2007). Nevertheless, some also have argued that risk-taking decisions might lead to superior performance (Boermans & Willebrands, 2012; Neneh, 2019; Wang et al., 2017). In this regard, my findings sensitize us that employees might be conscious that risk-taking does not necessarily add value to the organization or help the firm pursue its strategy. However, understanding which role risk-taking behavior plays in the context of employee IEO would be of great value to provide evidence of the degree to which risk-taking is likely for new venture growth. Furthermore, researchers need to reach a consensus on how individual-level risk-taking behaviors manifest. How can these individual risk-taking behaviors contribute to firm-level risk-taking behaviors?

Third, my study emphasizes the need to refine and extend current EO measures to reflect the different types of organizations and levels in which EO occurs. While the field has traditionally embraced EO exclusively at the firm level (Covin & Lumpkin, 2011; Geroche & Marino, 2011), several studies have contended that entrepreneurship can be examined on any level of analysis, such as individual or top-management teams (Wales et al., 2011a). For instance, Miller (2011) argues that examining EO on various levels may help to uncover new variables to characterize EO. My findings show that IEO enables firms to follow their entrepreneurial strategy and suggest that IEO is a building block for EO in organizations. In this vein, my study chal-

lenges scholars working on EO to broaden their focus beyond conceptualizing EO as a unidimensional view toward developing a more fine-grained understanding of its multidimensional nature.

Last, future research that evaluates the antecedents or requirements for meaningful gamification to foster IEO will help to understand the actual influence of these game mechanics on perceived self-efficacy. Furthermore, researchers need to examine gamification as a multidimensional construct, comprising both understandings of gamification techniques and technical and social skills to exploit gamification. In particular, this stream of research needs to test and validate the links among gamification, self-efficacy, and employee entrepreneurial behavior in other new ventures and provide practical recommendations on incorporating gamification efforts into organizations. Such research could further examine the industry, as well as cross-country differences in IEO and the use of gamification to foster IEO.

Moreover, it is necessary to iteratively adapt the design of the gamification application to encourage IEO, using feedback from employees. Likewise, researchers argue that the mere implementation of gamification mechanisms does not automatically lead to improved HR practices and tools (Hamari et al., 2014; Herranz et al., 2018; Marache-Francisco and Brangier, 2015). Instead, the current literature emphasizes the need to consider employees' characteristics and the need for meaningful gamification design (i.e., that evokes intended behavior) (Georgiou et al., 2019; Ivan et al., 2019; Sailer et al., 2013; Sox et al., 2014; Stadnicka and Deif, 2019). Accordingly, Hunicke and colleagues (2004, p. 5) confirm the centrality of human-centered gamification design by suggesting, "by understanding how formal decisions about gameplay impact the end user experience, we are able to better decompose that experience, and use it to fuel new designs, research and criticism, respectively." Hence, evaluating and considering the employee's personality traits before implementing gamification will help firms fully exploit the full potential of gamification to encourage employee entrepreneurial behavior.

Overall, gaining an even deeper understanding of the impact of nonmanagerial employees' entrepreneurial behaviors and attitudes can provide additional theoretical and practical insights for antecedents that contribute to the proliferation of EO within firms. My hope is that my research on how EO manifests and how gamification contributes to EO pervasiveness will provide a foundation for researchers to continue developing this critical line of research.

5 Conclusion

This dissertation intends to encourage readers to consider employee engagement as an essential factor influencing new venture success. This dissertation thus contributes to a better understanding of key drivers for new venture growth. Likewise, my research provides evidence for applying gamification in the work context, which can encourage IEO. Combining an empirical investigation on IEO in a growing venture and practical experiences in the case company opens a new avenue for successfully managing new venture growth. The integration of my practical experiences and a model developed through empirical research lays the foundations for further research projects in entrepreneurship and gamification.

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Part B: Essays

Essay 1: Individual-level entrepreneurial orientation and new venture growth: A study in a high-tech venture in Germany

Title	Individual-level entrepreneurial orientation and new venture growth: A study in a high-tech venture in Germany
Author(s)	Lena Murawski, Suleika Bort
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Abstract	This paper explores how individual-level entrepreneurial orientation (IEO) unfolds when a new venture grows and employees seek various ways to cope with growth-related, organization-transforming challenges. Building on a qualitative study of nonmanagerial employees' entrepreneurial behavior, our study reveals that when new ventures grow, employees' IEO changes and their entrepreneurial behaviors tend to manifest in introducing technological innovations and business improvements rather than in actions towards risk taking behavior. Based on these findings, we contribute to EO research by highlighting the role of IEO as a building block for EO pervasiveness. Furthermore, we theorize about how the components of IEO change when new venture grow and we show how new ventures can draw on their human resource to continuously improve and develop innovative products and services.
Keywords	entrepreneurial orientation, individual entrepreneurial orientation, new venture growth, entrepreneurial strategy

Introduction

Entrepreneurial orientation (EO) refers to a firm's strategic posture towards entrepreneurship (Miller, 1983), and it is a key driver of organizational growth and performance (Covin et al., 2020; Lumpkin, Wales, & Ensley; 2006; Wales, Covin, & Monsen, 2020; Wiklund & Shepherd, 2003). In this sense, EO is generally conceptualized as a firm-level concept that pervades organizations across hierarchy levels, horizontally across business units, and temporally as an organization develops (Wales, Monsen, & McKelvie 2011a; Wales, Covin, & Monsen, 2020). Yet, this firm-level focus neglects the individual component of EO and in particular how individual-level entrepreneurial orientation (IEO) contributes to EO pervasiveness (e.g., Covin & Wales, 2019; Shane & Venkataraman, 2000; Wales, et al., 2020; Wales et al., 2011b).

Existing research on IEO shows that individual members differ in their dispositions to act in entrepreneurial ways (Kollmann et al., 2017) and that certain individual characteristics are important predictors of new venture success (Rauch and Frese, 2007). In addition, current scholars on IEO illustrate that in particular nonmanagerial employees are critical for EO pervasiveness and enable a firm to follow its entrepreneurial strategy (Kollmann et al., 2017; Krauss et al., 2005). For example, Wales and colleagues (2011a, p. 901) contend that nonmanagerial employees are “a key element in the causal link between organizational strategy and performance and should therefore receive more attention from EO researchers.” They call for qualitative studies to deepen our understanding and to provide examples of how nonmanagerial employees understand and perceive EO aspirations which will provide more-fine-grained information on how EO is manifest as an organizational attribute (Hughes & Morgan, 2007; Wales et al., 2011a). In fact, current scholarship that investigates EO focuses solely on top-level managers (Davis, Bell, Payne, & Kreiser, 2010; De Clercq, Dimov, & Thongpapanl, 2010; Hornsby, Kuratko, & Zahra, 2002; Kuratko, Ireland, Covin, & Hornsby, 2005; Pearce, Kramer, & Robbins, 1997) or the founders' entrepreneurial behaviors (Deb & Wiklund, 2019; Miller & Le Breton-Miller, 2011; Mousa & Wales, 2012), thereby overlooking the role of nonmanagerial

employees' entrepreneurial behavior that might potentially result in positive organizational outcomes. By empirically assessing how nonmanagerial IEO manifests and how it creates value for a growing venture, this paper seeks to address the above-mentioned shortcomings in the literature.

To study our research question, we conducted an explorative in-depth case study over 2 years in a high-tech IT venture operating in Germany. Interviews with the founders and non-managerial employees of the case company, as well as on-site observations provide evidence about the presence of EO in the new venture. In line with Hughes and Morgan's (2007) and Lumpkin and Dess's (1996) five-dimension EO framework, our analysis reveals that employees' IEO is manifested through proactive, autonomous, innovative, and competitive aggressive behaviors. Each of these practices allowed the organization to cope with growth-related, organization-transforming challenges but its meaning and frame of reference was attached to new meaning as the venture grew - i.e., changes in organizational culture that accompany growth, the introduction of hierarchical structures, and the formalization of processes. In line with the growth of the venture, employees' IEO changes and their entrepreneurial behaviors tend to manifest in introducing technological innovations and business improvements. However, interestingly, we did not find any evidence of risk-taking behaviors and attitudes which is the fifth EO dimension in Hughes and Morgan's (2007) and Lumpkin and Dess's (1996) EO framework. The theoretical implications of this finding are discussed in the remainder of this article, specifically: (1) the exhibition of risk-taking behaviors may be highly specific depending on the existence of a culture of risk throughout the organization, (2) resources which encourage risk taking and allow experimenting with opportunities are weak in growing new ventures, and (3) there may be no substantive relationship between risk-taking as dimension of EO and IEO. Our research contributes to the EO literature in three important ways: Firstly, we address recent calls by Wales et al. (2011b; 2020), Gupta and Gupta (2015), and Miller (2011) to expand EO from the firm level to the individual, and in particular, the none-managerial employee level. In

this sense, our study advances our knowledge of how IEO contributes to EO pervasiveness, and, thus, how IEO contributes to new venture growth. While scholars have often emphasized the role of founders' IEO for EO pervasiveness (Davis, Bell, Payne, & Kreiser, 2010; De Clercq, Dimov, & Thongpapanl, 2010; Miller & Le Breton-Miller, 2011; Mousa & Wales, 2012), our understanding of how nonmanagerial employees' IEO manifests remains rather limited. The findings of this study provide answers to this important question by highlighting (1) the need to view EO as a multidimensional construct, and (2) the value of employees for EO pervasiveness. Secondly, our findings unfold how IEO manifests in EO and changes over time. We theorized about the temporally changing nature of IEO and therefore extend Lumpkin and Dess' (1996) five-dimension framework of EO. In particular, our study demonstrates that each EO dimension may have greater or lesser importance based upon any given context and different points in time (Lumpkin and Dess, 1996). In addition, by exploring IEO as a building block of EO, we build on a recent call to widen our understanding and conceptualization of EO (Miller, 2011; Wales et al., 2011).

This paper is structured as follows: First, we situate our case study within the broader literature by reviewing and synthesizing current findings on EO and its pervasiveness within organizations, with a special focus on new ventures. Second, we outline our research approach for examining nonmanagerial employees' IEO in new ventures and how this behavior contributes to new venture growth and then present our findings. Finally, we discuss our findings and the implications they have for managers.

Theoretical Background

The relevance of IEO and EO as an organizational attribute

EO was initially introduced as a firm-level construct reflecting "the entrepreneurs' behavioral dispositions" (Covin and Miller 2014, p. 18). Miller (1983) was one of the first researchers to introduce the notion of firm-level entrepreneurship as a set of organizational behaviors. He

(1983, p. 771) stated that a firm is entrepreneurial when it “engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with ‘proactive’ innovations, beating competitors to the punch” (Miller, 1983, p. 771). Coming from this definition, numerous researchers have studied three dimensions to classify EO – namely innovativeness, risk-taking, and proactivity (Covin & Wales, 2012). The work of Lumpkin and Dess (1996) expanded the EO dimensions to five, which include innovativeness, risk taking, proactiveness, competitive aggressiveness, and autonomy. In this sense, Lumpkin and Dess (1996) view EO as multi-dimensional process and propose these dimensions to vary independently of each other. Covin and Wales (2012), however, in their review on formative and reflective measures of EO, state that the profile of relevant dimensions for describing a firm as entrepreneurially-oriented is contextually dependent. The authors (2012, p. 20) argue that “an independent examination of EO’s dimensions may be particularly useful for the purpose of assessing likely variations in the stability of antecedent-to-dimension or dimension-to-outcome relationships over time.” Against this backdrop, Hughes and Morgan (2007) developed a scale which incorporates five separate first-order reflective scales pertaining to proactivity, innovativeness, risk-taking, competitive aggressiveness, and autonomy.

In line with recent IEO research (e.g., Kollmann et al., 2017), we conceptualize IEO as “a tendency to respond to situations, or classes of situations in an entrepreneurial manner” (Covin and Lumpkin 2011, p. 858). This definition highlights an individual’s none-managerial interest or inclination to behave entrepreneurially and which includes the five EO dimensions: proactivity, innovativeness, risk-taking, autonomy, and competitive aggressiveness.

Proactivity. Individuals with proactive behavioral traits aim to change and improve work environments (Parker & Collins, 2010), enhance perceived responsibility and encourage high task performance, as well as to bring change to the workplace (Salanova & Schaufeli, 2008). Moreover, proactivity at work is associated with opportunity-seeking behavior that incorporates future needs and trends (e.g., Anderson et al., 2015; Lumpkin & Dess; Wiklund et

al., 2003). Building on Parker, William, and Turner's (2006) conceptualization of proactive personality and personal initiative concepts, Grant and Ashford (2008, p. 8) define proactive behaviors at work as "anticipatory action that employees take to impact themselves and/or their environments", and "consider anticipation, planning, and action directed toward future impact (...)" (Grant & Ashford, 2008, p. 8).

Innovativeness. Innovative employees are considered as highly engaged in deviating from established practices (e.g., Lumpkin & Dess, 1996; Rauch et al., 2009; Slater & Narver, 1995). More specifically, innovative behaviors refer to experimenting with technological leadership and novelty in the development of products, services, and processes (Hughes & Morgan, 2007).

Risk-taking. Recent scholars consider risk-taking behaviors as a form of challenging extra-role behavior that is directed towards improving and challenging the status quo of organizational processes (e.g., de Jong et al., 2013; Hughes & Morgan, 2007; Hughes et al., 2018; Lau et al., 2012; Rigtering and Weitzel, 2013). Risk-taking represents a willingness to act under high level of uncertainty regarding the likely outcomes (Lumpkin & Dess, 1996).

Autonomy. Hughes and Morgan (2007, p. 652) report that autonomy is, "the authority and independence given to an individual or team within the firm to develop business concepts and visions and carry them through to completion. Autonomy gives employees the freedom to think and act without interference (Engel, 1970; Spreitzer, 1995), as well as to create new ideas that contribute to entrepreneurial activities (Lumpkin & Dess, 1996).

Competitive Aggressiveness. According to Hughes and Morgan (2007, p. 652), "Competitive aggressiveness conveys the intensity with which a firm chooses to compete and efforts to surpass competitors reflecting a bias toward out-maneuvering and out-doing rivals." Competitive aggressive firms pay close attention to their competitor's actions and assess opportunities to exploit the firm's strengths and competitors' weaknesses (Davidson, 1987).

IEO and new venture growth

EO has been found to be a critical pathway for new venture performance and growth. For example, Lumpkin, Wales, and Ensley (2006) show that venture age moderates the propensity of organizations to act entrepreneurially. The authors claim that young ventures may be forced to rely heavily upon EO in their strategy-making behavior to overcome barriers to survival and growth. Their study points out that young firms are entrepreneurial by nature. A number of organizational problems push firms to pursue EO, including the large number of constraints imposed by highly dynamic markets. A firm with a growth-oriented strategy has a greater need to discover and exploit opportunities appearing in the market, and to continuously develop products (e.g., Chrisman, Bauerschmidt, & Hofer, 1998; Hughes & Morgan, 2007; West & Noel, 2019; Zahra et al., 2002). Rauch and colleagues (2009, p. 764) argue that “in an environment of rapid change and shortened product and business model lifecycles, the future profit streams from existing operations are uncertain and businesses need to constantly seek out new opportunities.” To take advantage of opportunities and combine new resources, new ventures must continuously scrutinize practices, actively seek new ways to improve efficiency, and increase their ability to innovate. While EO in general is an important component of new ventures, IEO has been in particular helpful for new ventures to improve workflows and maintain efficiency within the organization when product and organization complexity increases (Cardon, 2003; Greiner, 1972; Wang et al., 2017). Highly skilled workers can help new ventures discover and exploit those opportunities, and, therefore, contribute to a new ventures competitive advantage due to their expertise, new knowledge, and the forward-looking perspective they bring to their work (e.g., Bartel & Lichtenberg, 1987, 1990; Siegel, 1999; Siegel, Waldman, & Youngdahl, 1997; Link & Siegel, 2007). Numerous scholars have acknowledged the fact that employee activity is essential for enabling and sustaining firm-level entrepreneurship (Hornsby et al., 2009; Monsen & Boss, 2009; Wales et al., 2011a). More specifically, Hughes and Morgan (2007), in their study on the relationship between entrepreneurial orientation and business

performance at the stage of firm growth, state that assessing entrepreneurial opportunities should be the responsibility of all employees. The authors contend that firms need to ensure employee involvement and participation in the firm's EO activities to create advantage (Hughes & Morgan, 2007). Hughes and Morgan (2007, p. 658) further state, “strong human capital is needed to lever the ability of the firm as a whole to perform certain activities to a superior level relative to competitors”.

Methods

Research Design

For our research design, we chose an approach that would allow us to observe and analyze in greater detail a phenomenon that has so far proven to be largely inaccessible to research inquiry and employed ethnographic methods (Yin, 2002). In particular, to investigate our research question, we collected data based on a two-year longitudinal case study approach. The longitudinal design enables us to examine how nonmanagerial employee behaviors and attitudes changes over time impacting EO pervasiveness.

A qualitative approach is well suited to study our research question employed because it allows us to explore a contemporary issue in-depth in a real-life context. The challenge is when studying EO that, despite the broad consensus on the definition of EO and behaviors related to it, this concept is widely seen as difficult to operationalize in empirical work (Slevin & Terjesen, 2011; Wales, Gupta, & Mousa, 2011b). EO is a context-dependent and largely tacit phenomenon that manifests in different ways depending on environmental conditions (e.g., organizational culture, firm strategy, organizational resources) (Wales et al., 2011a). In particular, cross sectional surveys therefore present a number of limitations, and hamper exploration of the dynamics of EO-related behaviors (Wales et al., 2011b). In contrast to other articles publishes in the literature, moderating role of factors that reside within the organization

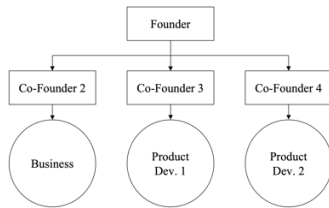
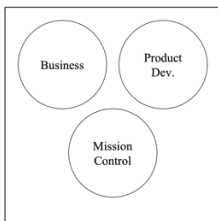
(i.e., environmental variables, societal cultural variables, structural organicity) are taken into account.

Furthermore, it is important to understand how the pervasiveness of EO changes over time. EO is a dynamic construct (Covin & Wales, 2012; Hughes & Morgan, 2007; Lumpkin & Dess, 1996). Data collection therefore should occur at different points of time. Such an approach allows to gain a deeper understanding of the employee level effects on the pervasiveness of EO and the employees' role in the firm's entrepreneurial strategy with consideration of the dynamics of the firm (Monge, 1990). Thus, a case study approach that tracks a new venture via periodic interviews with nonmanagerial employees and on-site observations over several months or years was chosen to enrich our understanding of how EO helps a firm pursue its entrepreneurial strategy. A single case study with a theory-developing set-up, such as in our study, allows to draw representative or generalizable findings (Dyer & Wilkins, 1991, Siggelkow, 2007).

Background Information

The investigated firm was founded in 2016 by a team of four entrepreneurs. The firm operates in the IT sector and provides static application security testing to national and international customers. The case offers a unique perspective because the firm experience a rapid growth. In 2019 (t_1), the company had 23 employees. In early 2020 (t_2), the venture was acquired by a large Suisse-based IT company with offices in Switzerland, France, and the USA. After the merger, 198 employees work in the company. All employees working at the new venture were transferred to the new company and continued working from the German office. Employees kept their technical focus in the merged company and are now working in internationally distributed teams. Nevertheless, the firm experienced a huge transformation. Table 1 gives an overview on the case company's organizational structure in t_1 and t_2 .

Table 1. Case Company Overview

	t_1	t_2
Employees	23	198
Teams	3	3 (6 sub-teams each)
Leadership Style	Formal Leaders	Formal Leaders, Informal Leaders
Organizational Structure	Hierarchical Structure, Informal Organic Structure	Team-Based Organization, Informal Organic Structure
Communication	Formal and Informal	Formal and Informal
Organizational Chart		
Job Design	Autonomous, centralized decision-making	Autonomous, Self-organizing teams

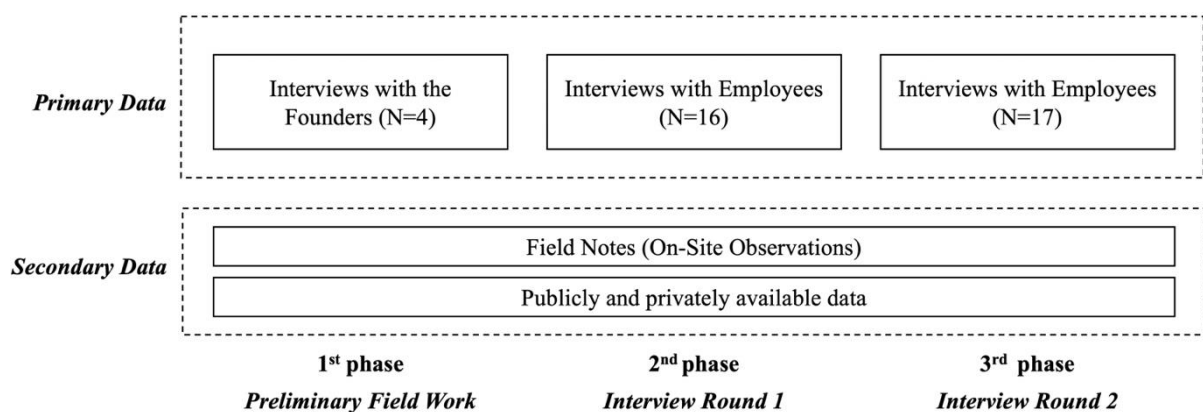
Data Collection

Data collection took place between January 2019 and June 2021 and was divided into three phases. In the *first phase*, in early 2019, we carried out preliminary field work to familiarize ourselves with the company and its business model. We talked to the founders (N=4) to understand the firm's strategic orientation and to bring greater breadth and context to the interview data. In the *second phase*, between April and July 2019, we conducted interviews with employees (N=16) working in the new venture for understanding how nonmanagerial employees engage in entrepreneurial activities. Employees provided details about how they perform their work and discussed their entrepreneurial behaviors and attitudes, guided by open-ended questions, as suggested for exploratory interviews (Aaker & Day, 1983). We intervened only to facilitate reasonable coverage, to ask follow-up questions, and to clarify why and how employees engage in entrepreneurial activities. The employees were randomly selected, depending on their availability for the interviews. The employees work as software engineers (N=12) or in

the area of business (i.e., marketing, finance) (N=4). In the *third phase*, we repeated the interviews to test the change in responses and to further explore the longitudinal nature of the impact of organizational growth on EO pervasiveness. During the second round of interviews, six out of 16 employees we initially interviewed were not working for the firm anymore. We therefore interviewed employees who joined the company after, or have been working for the company already in 2019, but not took part in the first round. 14 employees interviewed work as software engineers, and three respondents work in the area of business (i.e., marketing, finance).

During the time of the studies, one author was present at the company and was able to provide ethnographic insight into operational activities, tensions, and engagement across the enterprise. This allowed us to be part of the firm, working with the employees and building a trusting relationship with them to encourage their willingness to share personal insights in the study. We took field notes based on on-site observations and publicly and privately available data (i.e., company presentations, internal analytics, the firm's homepage, internal chats) to gain an abstract understanding of employee role in the firm's entrepreneurial strategy. See Figure 1 for the description of our data collection.

Figure 1. Data Collection



Primary Data

We interviewed randomly selected employees and then digitally recorded and transcribed our interviews. These face-to-face interviews lasted between 10 and 40 minutes, during which we informed interviewees about the study and told them that their answers would not be shared with managers. The procedure and measures were the same at both interview times. Notwithstanding, after consolidating the data gained in the first round of interviews, we added additional aspects to the questions raised in the interviews which were not covered back in 2019.

Adopting a qualitative approach in this research, and building on Hughes and Morgan's (2007) EO scale, we asked participants to freely express their opinion on the following statement: "Employees are granted the autonomy and responsibility to act independently in the interests of the company." In particular, we asked participants to describe concrete examples of how and when they engaged in entrepreneurial activities.

The descriptive information on the primary data is presented in Table 2.

Table 2. Primary Data

Source	Details	Use in the analysis
Interviews with the founders	Interview transcripts	To understand the firm's strategic orientation, to bring greater breadth and context to the interview data, to triangulate interview analysis
Interviews with the employees	Interview transcripts	To assess the manifestation of EO
Observing the research field	Taking field notes for 24 months	To triangulate facts (i.e., the firm's internal documents) and participant observations, to build a trusting relationship with the employees

Secondary Data

We further triangulated the information gathered in the interviews and from the fieldwork with publicly available data (such as the company's website and brochures) and privately available data (such as company presentations, internal analytics), as well as the issues raised in the interviews with the founders (i.e., growth-related challenges at the time of our research). Data triangulation allowed us to better understand the phenomenon of interest, as all the data on their own are necessary but insufficient to explain our research object (Yin, 2014). Our iterative process of data triangulation allowed us to expand beyond the identified entrepreneurial behaviors and attitudes towards a deeper understanding on how these entrepreneurial actions relate to EO processes within the firm. This approach further allows us to assess the impact of organizational strategy on employee entrepreneurial behaviors and attitudes, and, particularly, how these behaviors change over time due to firm growth.

Data Analysis

We analyzed our data in two steps. As a preliminary first step, we sought to thoroughly understand the new venture and its EO, since analyzing employee interviews requires a deep knowledge of the organizational environment. To accomplish this, we interviewed the founders to better understand their perspective on the EO and in particular the link between EO and firm growth. The main source of data in our second step and further analysis was the employee interview data. During this second step we read the interview transcripts of both interview round one and two and used them to identify IEO behaviors and attitudes. We analyzed our interview transcripts using spreadsheet software, as recommended for qualitative data analysis (Gioia, Corley, & Hamilton, 2013; Miles & Huberman, 1994; Strauss & Corbin, 1998). Reviewing field notes taken after interviews and informal conversation also helped us to analyze the interviews. Moving back and forth between data analysis and the literature allows us to ensure that the nonmanagerial employees' behaviors and attitudes precisely capture EO.

Findings

Description of EO: The founders' perspectives

In this section, we outline some major insights we gained from our interviews with the founders that helped us profoundly understand the venture and its growth phase. One of the founders described the extent to which the firm's growth is driven by achieving wider market reach through technological product development:

“The firm grows according to the needs of changing and evolving tasks. Our workforce expands every time we reach higher levels of complexity in product development, and, in particular, complexity in business areas such as sales, marketing, and finance. Financial resources from investors increase the rapidity of growth, and somehow force the company to grow faster.” (Founder 3; lines 1279–1283)

This founder emphasized how important coordinating resource deployment is to respond to competitive market and stakeholder demands.

In addition, two of the founders described the challenges of the greater formalization and decentralized management structures needed as the firm grows:

“I think it's a big challenge to introduce the second level of management...because we [the founders] have to decide everything straightforward so that we can move forward quickly...you don't want to make complicated process decisions.” (Founder 3; lines 1143–1146)

“If you cover all these areas in the beginning as one person, the biggest challenge is to find experts in the respective areas who have so much know-how that they can take it off and explain to you why something is good and then implement it. I cannot be an expert in all areas. This is why the biggest challenge is to find people in areas that are experts and at the same time have the culture fit...and that the product remains as good as it is without being developed by myself and [that] the employees can do it alone. We need to put the right people in the right positions. (...)” (Founder 3; lines 1169–1175)

As product complexity increases (i.e., rapidly introducing product technology advancements), workflow efficiency can be negatively affected, and introducing new hierarchical structures as well as hiring experts becomes necessary. Accordingly, as market activities expanded, the company was challenged to more closely coordinate tasks, which it achieved through greater decentralization.

Founder 2 indicated that employees' skills and experiences in introducing and adapting processes are means for improving workflows and maintaining efficiency within the organization. Employees were expected to take responsibility for high work performance and productivity:

"I'd say we can still work on processes. It is a typical start-up disease. However, since we all talk to each other and everyone feels responsible, this is very helpful. If we can get everyone to perceive their area of responsibility as their own, then processes are created automatically." (Founder 3; lines 1245–1248)

More specifically, the founders note that the ability of employees to proactively engage in improving performance and to identify bottlenecks is essential to maintaining organizational performance:

"We don't release things that we don't feel are perfect. I think this will be a challenge at some point: Finding the right people who aim to identify and solve specific bottlenecks" (Founder 1; lines 854–857)

"(...) the product remains as good as it is without being continued by the founders, and that the employees feel responsibility for the organization. Again, putting the right people in the right positions. That is important. (Founder 1; lines 872–875)

Two major challenges for this new venture seemed to be competing with established firms, given the new venture's own limited public recognition and legitimacy, and having low organizational awareness. More specifically, as the company grew, it had to deal with increasing headcount, the introduction of hierarchical structures, the formalization of processes, and changing patterns in the organizational culture, all of which required it to reconfigure and utilize its available resources more efficiently. Our analysis also provides some support for the conceptual premise that EO varies vertically throughout hierarchical structures, since the founders expect nonmanagerial employees who exhibited entrepreneurial behaviors aimed at pursuing high performance levels.

Description of IEO and performance: The employees' perspectives

In line with prior research (Dai et al., 2014; Frese, 2009; Hughes & Morgan, 2007; Linton, 2019), our study also reveals that nonmanagerial employees' EO-associated behaviors and at-

titudes emerge mainly via *proactive, innovative, autonomous, and competitive aggressive* behaviors and attitudes. In contrast to prior research, we were unable to find any statements that can be linked to risk-taking behaviors.

T. The employees showed patterns of innovative, proactive and autonomous behavior and would readily deviate from established practices and initiate change to modify and refine the status quo:

“It's constantly changing how we organize things. When I started here, we didn't have any meetings at all. Then we introduced the Wednesday meetings once a month, where everybody told what they were doing and then it was realized that it's way too much when you grow and it's not manageable anymore. That's why we tend to do smaller groups with smaller meetings. That's one of the benefits of being a startup. I can go to the managers and suggest if things could be done in another way. You can be part of having a great company.” (employee 7; lines 662–670)

“Many things are changing at the moment. I think that is also a challenge. You have to get involved, think sensibly about how to organize things better—what can you change.” (employee 7; lines 632-634; t1)

“So, for me personally, it is challenging that you have to invest more in a startup compared to an established company, where you are only a tiny wheel in the gearbox. I think it is less difficult and less stressful because you can rely on existing teams....I think this [working at a start-up] is something that can be rewarding, because you can help to build up a lot. Which of course is an additional burden. You simply have to put more energy into work.” (Employee 7; lines 625–631; t1)

Furthermore, our results show that in this firm, nonmanagerial employees' EO orientation was aimed at coping with challenges the firm faced during growth-related organizational transformations. Our sample shows that employees recognize the organizational challenges that result from firm growth: maintaining team spirit and scaling organizational culture, committing to and accepting new group dynamics and to hierarchical structures (i.e., committing to proactively communicate with colleagues), and maintaining and improving efficient teamwork and communication (i.e., seeking new ways to improve collaboration).

“I think getting to know each other is a challenge. That you can't work together as well as with colleagues with whom you have been working for only a few months. I think that this means that a little bit of work effectiveness is lost, especially at the beginning, because it takes longer to discuss. Of course, you have to adapt to new people. I think that you have to look at how they differ from

your personality and how it harmonizes with you because you have to deal with every person differently.” (Employee 8; lines 773–783; t1)

“You have to make sure that the team continues to know each other well, so that everyone gets to know the new employees. I think our team events make this possible. You should actively encourage every member of the team, take care of the team, and be a contact person for everyone.” (Employee 10; lines 816–819; t1)

“I commit to work properly myself. That is what teamwork affects. If I did not document and program properly, then the others cannot work with my things either. On the other hand, I see it as my job to pick up new employees right there. I want to pass on my knowledge....It’s about sharing as much knowledge as possible. Also, how processes are passed on. To tell someone, ‘Just look over my shoulder.’” (Employee 12; lines 1102–1108; t1)

The employees faced changes to the firm’s organizational culture and to the processes and structures, both of which they perceived as organizational challenges that needed to be solved. In particular, respondents cited the persistent challenge of establishing communication when new teams are formed, when new processes are introduced, and when organizational structures are introduced. Employees feared losing transparency in management’s communicating strategic decisions and, in interviews, that they valued open and simple communication. Hence, employees seemed to be aware of the need to maintain the efficiency of internal processes as the company grew. Moreover, when it comes to contributing to maintaining the organizational culture, our interviews indicate that employees proactively sought to create a work environment that meets their needs (i.e., having a team that shares the same goals and objectives and promotes fairness between colleagues).

T₂. In the more mature firm, entrepreneurial behaviors revolve around employees’ self-actualization and their knowledge and skills. Whereas central decision-making powers prevented employees from contributing to technological innovations, employees actively seek ways to implement their own ideas in product development and the firm’s strategic direction (i.e., organizational-level and external entrepreneurial activities). Employees’ EO manifests in proactive, innovative, autonomous, and competitive aggressive behaviors. The respondents’ display of entrepreneurial behavior manifest in seeking ways on how to increase business performance and improving individual and team work efficiency. Furthermore, employees deliver solutions to improve products and services to outperform industry rivals.

“It’s about defining structures. I’ve also talked to other employees that it’s a bit strange that it’s not entirely clear who has which responsibilities. (...) and defining that [responsibilities] is also important for a company as it grows. So that the employees know which employees they can turn to with which issues. (...) Where is the best place to bring this [new ideas for structural changes, new ideas for the product] in, who are my contacts? How are the structures, hierarchies and tasks distributed?” (Employee 3; lines 687–694; t2)

“We wanted to give each other more feedback within the team. So, now there is a big matrix where everyone can type in when they have received feedback and you can see how many people have not yet received feedback. The goal of the whole team is to always give about 40 feedbacks per month.” (Employee 4; lines 772–777; t2)

“Talking about new features, we can be super creative. We can all be creative and think big. I think this is really good. (...) As soon as it comes to business or new products, that’s more difficult. (Employee 14; lines 735–744; t2)

“Whether it is implemented afterwards depends on how it is discussed in the team. Of course, the more people are involved, the more difficult it gets. (...) But in general, if there is consensus, then things are implemented.” (Employee 4; 743–746; t2)

“It always depends on the idea. If I have a small idea how to make our analysis better, then it’s just a small improvement. If I have an idea that, well, we’ve talked about something like almost a new product, then I talk to the CEO about it. Because of course this will influence the strategy.” (Employee 10; lines 1090–1095; t2)

Representative supporting data for each EO dimension are shown in Appendix A.

Discussion

In this paper, we address the question how nonmanagerial employees’ IEO contributes to EO pervasiveness and organizational growth in new ventures. Our findings first unfold that IEO manifests in proactive, autonomous, innovative and competitive aggressive behaviors. Secondly, our findings reveal that employees seek different ways to cope with growth-related, organization-transforming challenges. As firm size increases, employees’ IEO changes and their entrepreneurial behaviors tend to manifest in introducing technological innovations and business improvements. Finally, we show that nonmanagerial employees enable a firm to follow its entrepreneurial strategy (i.e., provided from the “bottom-down”) through entrepreneurial behaviors from the “bottom-up. In the following, we discuss the implications of our findings for theoretical debates on EO as well as IEO.

A first theoretical implication following from our study is the development of a more nuanced view of EO (Miller, 2011; Wales et al., 2011), beginning with the emphasis on its multidimensional conceptualization. While existing studies have been relatively silent on the individual level of EO, our findings unfold that employees' IEO is a building block for EO to exist. In this study, employees' entrepreneurial efforts provide new opportunities for growth and development and help the firm to identify opportunities on the market. Hence, our study emphasizes that EO pervades organizations through both the development of entrepreneurial strategies from the "bottom-down" and employees following the entrepreneurial strategy through entrepreneurial behaviors from the "bottom-up". Although scholars have called for a more in-depth analysis of EO to understand how it pervades organizations (Wales et al., 2011), existing studies implicitly assume that top-level managers (Davis, Bell, Payne, & Kreiser, 2010; De Clercq, Dimov, & Thongpapanl, 2010; Hornsby, Kuratko, & Zahra, 2002; Kuratko, Ireland, Covin, & Hornsby, 2005; Pearce, Kramer, & Robbins, 1997) or the founders' entrepreneurial behaviors (Deb & Wiklund, 2019; Miller & Le Breton-Miller, 2011; Mousa & Wales, 2012) leverage a firm's EO from the bottom-down. Our findings challenge this idea by showing that employees and their IEO contributes to EO pervasiveness and is critical for EO to exist, since employees enable the firm to follow its entrepreneurial strategy. While our findings thus confirm the general notion of EO as a multidimensional construct (Wales et al., 2011), they additionally draw attention to the relevance of IEO for EO pervasiveness.

A second implication offered by the findings of this study concerns a refinement of our understanding of how IEO can create value in organizations (Forcadell & Úbeda, 2020; Kollmann et al., 2007; Santos et al., 2020). Our study reveals that employees seek different ways to cope with growth-related, organization-transforming challenges (i.e., changes in organizational culture that accompany growth, the introduction of hierarchical structures, and the formalization of processes). As firm size increases, employees' attitude towards EO changes and their entrepreneurial behaviors tend to manifest in introducing technological innovations and business improvements. As such, our study aligns with work in the EO literature that emphasizes that EO can temporally change (Lumpkin & Dess, 1996) and each EO dimension may have greater or lesser importance based upon any given context and different points in time

(Lumpkin and Dess, 1996). While IEO behaviors and attitudes refer to proactive, autonomous, innovative, and competitive aggressive behaviors, in our case company, the intentions underlying these behaviors change over time. We believe this finding do broaden our perspective of how EO manifests and pervades organizations.

Third, our findings highlight the fact that additional attention and research efforts still need to be dedicated to dealing with risk-taking propensity and individual-entrepreneurial behavior. In this study, we did not find any evidence of risk-taking behaviors and attitudes which is the fifth EO dimension in Hughes and Morgan's (2007) and Lumpkin and Dess's (1996) EO framework. Three possible explanations for this finding point to possible avenues for future research on IEO. First, provided that research has shown that an environment where people can take risks creates a climate where the benefits of risk-taking outweigh the costs of failure (Hornsby and colleagues, 2002), there is reason to believe that a lack of a culture of risk may have hampered employees feeling to be safe about taking risks. In our study, although managers wanted innovation, effective communication and a reward system that allows employees to experiment with ideas is lacking. Thus, research needs to examine the role of culture of risk as source of risk-taking behaviors. Second, studies have shown the importance of the availability of resources to encourage risk-taking (Hornsby et al., 2002). While this study was undertaken in a new venture where resources available for innovations might be constrained, we believe that a lack of resources hamper employees to undertaking risks. Thus, we believe it is important to explore which resources need to be provided to facilitate and encourage risk-taking behaviors in new ventures. Third, risk-taking may be a distinct dimension of EO, but is not suitable to characterize IEO. As such, our study aligns with work in the management literature that emphasizes that the EO concept focuses on the firm and not the individual (Covin & Lumpkin, 2011; George & Marino, 2011). As such, we believe our study do broaden our perspective and to embark on an investigation of EO and IEO as a whole. Such an investigation should include the synergy of individual-level EO as source of firm-level EO in new ventures. This allows us to capture individual-level entrepreneurial behavior as sources of firm-level entrepreneurship and to better understand how EO manifests within organizations.

Furthermore, studies have shown that the potential for EO to have any effect on performance decreases over time, because growth-related organizational transformations—such as a change from informal to formal organizational structures (Gilbert, McDougall, & Audretsch, 2006)—reduce the opportunity for employees to make autonomous decisions and limit employees' scope of action for taking entrepreneurial actions (de Jong et al., 2013). While existing studies thus point at the fact that formal organizational structures reduce EO levels in organizations, our findings sensitize us for the fact that it is not only informal organizational structures where processes and systems have yet to be embedded (Gilbert et al., 2006), and job designs are based on autonomous decisions (de Jong et al., 2013), that serve as a favorable context for entrepreneurial workers in organizations who strive to proactively shape these environments (Moser et al., 2017; de Jong et al., 2013). Our findings suggest that employees need a formal or informal leader that supports the employees' entrepreneurial activities. Otherwise, employees get frustrated or feel a lack of recognition from either peers or managers within the organization. As result, as inferred from our case company, employees join forces with peers or employees that work for the company for a long time in order to build a coalition. This allows employees to increase legitimization of their innovative and proactive behavior and ensures that the firm recognizes their ideas on how to improve organizational performance.

A final important implication surfacing from our findings is the role of communication for the pervasiveness of EO. In this study, informal communication (e.g., casual communication between coworkers or employees and managers, spontaneous conversations) plays a key role in supporting employees to exhibit entrepreneurial behaviors and attitudes. In contrast, we find that formal employees and employee-manager communication (e.g., provided through team meetings) help employees share and develop new ideas and improve products or services in the more mature firm. Moreover, employees engage in EO when organizational members share a common understanding of each other's roles, role relationships and policies. Establishing accountabilities and authorities within the organization provide employees with work autonomy and a sense of ownership to articulate and develop ideas.

In addition to contributions to the literature, these findings have managerial implications because they emphasize that a firm needs to learn how to manifest EO-associated behaviors and

attitudes to increase its ability to cope with organizational challenges. The present findings can guide entrepreneurs on how to use EO to follow their entrepreneurial strategy and suggest that the intentions underlying the employees' entrepreneurial behaviors correspond to the challenges the firm faces during organizational growth, and, respectively, organizational transformations. Thus, we encourage practitioners to provide employees a certain scope of action to (a) fully exploit their entrepreneurial potential for improving organizational performance, and to (b) encourage and sustain their motivation and engagement to work in the firm that allow them to change and improve work environments (Parker & Collins, 2010), enhance their own perceived responsibility, and encourage high task performance (Salanova & Schaufeli, 2008). Moreover, processes and points of contact within organizations that give entrepreneurial behaviors a certain kind of structure can encourage employees to engage in those behaviors.

Conclusion

In this study we explored how nonmanagerial employees' IEO is manifested and how their IEO contributes to EO proliferation within a new venture. Drawing on 20 interviews with employees working in a new venture operating in the IT sector in Germany, we show how nonmanagerial employees' IEO responded to the firm's entrepreneurial strategy, and, thus, to contribute to new venture growth. We built on Hughes and Morgan's (2007) and Lumpkin and Dess's (1996) five-dimension framework and examined how proactiveness, innovativeness, risk-taking, autonomy, and competitive aggressiveness is manifested in nonmanagerial employees' behaviors and attitudes related to EO. Besides showing that IEO contributes to EO pervasiveness in the new venture, our findings reveal how IEO enabled the firm to cope with organizational growth-related challenges. In doing so, this paper offers two theoretical contributions. First, it widens our understanding of EO by highlighting the role of IEO for EO pervasiveness. Second, we highlight the notion of EO as a multidimensional construct, and show that nonmanagerial employees entrepreneurial behaviors enable a firm to be entrepreneurial.

For future research, it would be interesting to see what other understandings and aspirations employees in new ventures have towards EO, and what implications these have for new

venture growth. A useful approach would be to use taxonomies that incorporate variables of environmental conditions (e.g., organizational culture, firm strategy, organizational resources), the job that individual has, their demographic and personality traits, or the network they are embedded in (Rigtering & Weitzel, 2013; Wales et al., 2011a). Which role do organizational structures (i.e., team-based and agile environments) play? How does informal leadership affect employee entrepreneurial behaviors? Thus, given the fact that EO is central to all firms, we will compare our results across organizations that differ along age, industry, and size (i.e., more mature SMES or larger organizations). This will allow us to collect more data to gain a deeper understanding of the employee level effects on the pervasiveness of EO.

Thus, research on employee understandings and aspirations towards EO will lead to a more robust interpretation of findings on how employee entrepreneurial behavior informs and supports firm-level EO and organizational growth. Furthermore, research on different samples and adopting specific foci that reflect what it means for an organization to “be entrepreneurial.” (e.g., Miller, 2011; Wiklund & Shepherd, 2005; Wales et al., 2011), and taking various perspectives and focusing on bottom-up, top-down, or temporal EO will help clarifying the conceptualization of EO by investigating EO and its internal and external linkages. Moreover, it would be of great value to examine how the elements of risk and risk perceptions of actors in firms influence firm growth among entrepreneurial ventures and to assess which role individual risk-taking might play for organizational growth. The EO literature has frequently emphasized that risk propensities among founders might be detrimental to new venture growth (Hughes & Morgan, 2007; Lumpkin et al., 2006; Mullins & Forlani, 2005; Tang & Tang, 2007). Yet, some have also argued that risk-taking decisions might lead to superior performance (Boermans & Willebrands, 2012; Wang et al., 2017). In this regard, our findings sensitize us for the fact that employees might be conscious of the fact that risk-taking does not necessarily add value to the organization or helps the firm pursue its strategy. However, understanding which role risk-taking behavior plays in the context of employee IEO would be of great value to provide evidence of the degree to which risk-taking is likely for new venture growth.

Moreover, our study emphasizes the need to refine and extend current EO measures to reflect different types of organizations and levels in which EO occurs. While the field has traditionally embraced EO exclusively at the firm level (Covin & Lumpkin, 2011; Geroge & Marino, 2011), several studies have contended that entrepreneurship can be examined on any level of analysis, such as individual, or top-management team (Wales et al., 2011). For instance, Miller (2011) argues that examining EO on various levels may help to uncover new variables to characterize EO. Our findings show that IEO enables firms to follow their entrepreneurial strategy and suggest that IEO is a building block for EO in organizations. In this vein, this study challenges scholars working on EO to broaden their focus beyond framing EO as unidimensional view towards developing a more fine-grained understanding of its multidimensional nature.

Evidently, this study also has its limitations. Methodologically, this study was a longitudinal in-depth, single-case study. This method and analysis has been widely adopted by prior research, and engaged in collecting multiple rounds of data collection in the case company. Notwithstanding, further research needs to be conducted to exclude alternative explanations for the employee's entrepreneurial actions. To address this limitation, we substantiated our interview data as much as possible with the secondary documents and the data collected through the interviews with the founders as well as the firm-internal documents, which also helped us to prevent any occurrence of retrospective bias in our data.

Despite these limitations, we believe this paper offers fresh and relevant insights into EO in organizations and how IEO can contribute to new venture growth. We conclude that ignoring the analysis of nonmanagerial employees' behaviors and attitudes related to EO can be problematic, given that our understanding of how EO manifests within firms is limited. Gaining an even-deeper understanding of the impact of nonmanagerial employees' entrepreneurial behaviors and attitudes can provide additional theoretical and practical insights for antecedents that contribute to the proliferation of EO within firms. It is our hope that our research on how EO is manifest on an individual level will provide a foundation upon which researchers continue developing this important line of research.

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Appendix

Appendix A: Representative supporting data for EO dimensions

EO Dimension	Representative supporting data
Proactivity	<p>“It is important to be fair and to give feedback every time and in every team. I think the worst thing that can happen to a team is not being open with each other. Then people are talking about each other but don’t dare to tell the other people what problems they have with the person. So, first of all, talking honestly with each other, that’s like a relationship. You also have to talk, otherwise it’s just superficial.” (Employee 1; lines 160–166; t₁)</p> <p>“As the company grows...someone has to tell new people what to do, because you can’t have such large teams where everyone has a say.” (Employee 2; lines 236–239; t₁)</p> <p>“The team lead asks each individual what he or she has to do and asks for the current status. This is no longer possible with large teams.” (Employee 2; lines 239–241; t₁)</p> <p>“That international employees are integrated because they do not speak German...As the team grows, it becomes more difficult to talk to everyone.” (Employee 2; lines 336–339; t₁)</p> <p>“If I can help, I will help. After all, it’s best to work in a place where people understand each other and can work well together.” (Employee 3; lines 398–399; t₁)</p> <p>“I think everyone is there for everyone. You can always go to someone and ask for help. It is uncomplicated. Everyone says, ‘No problem, I like to help.’...Everyone is always ready to help. I imagine it being different in other companies—that this is not necessarily the case. And of course, the fact that we do so much in our free time, that’s a nice and very meaningful thing to do for team building—that you get people to do things together.” (Employee 5; lines 496–498; t₁)</p> <p>“So, for me personally, it is challenging that you have to invest more in a start-up compared to an established company, where you are only a tiny wheel in the gearbox. I think it is less difficult and less stressful because you can rely on existing teams...I think this [working at a start-up] is something that can be rewarding, because you can help to build up a lot. Which of</p>

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- course is an additional burden. You simply have more to do, more energy that you have to put into something.” (Employee 7; lines 625–631; t₁)
- “Many things are changing at the moment. I think that is also a challenge. You have to get involved, think sensibly about how to organize things better—what can you change.” (employee 7; lines 632–634; t₁)
- “I can talk to the managers and tell them whether something could be done one way or another. You can take part in having a great company. For me, that is definitely a positive factor. It is a challenge, but it is positive. Something that makes me rather happy.” (Employee 7; lines 649–651; t₁)
- “It's constantly changing how we organize things. When I started here, we didn't have any meetings at all. Then we introduced the Wednesday meetings once a month, where everybody told what they were doing and then it was realized that it's way too much when you grow and it's not manageable anymore. That's why we tend to do smaller groups with smaller meetings. That's one of the benefits of being a startup. I can go to the managers and suggest if things could be done in another way. You can be part of having a great company.” (employee 7; lines 662–670; t₁)
- “I think every employee can contribute to this [maintaining the culture]. As long as everyone is interested in the community and is up for it, it works very well. That's why I also have a bad conscience because I haven't gone to lunch with the team in the last few weeks....But I am always present at the team events. If people didn't feel like going to events anymore or if everyone didn't go out to lunch like that, then of course something like that [the culture] would break down. In this respect, everyone is in demand, that everyone lives this corporate culture.” (Employee 8; lines 713–720; t₁)
- “I think getting to know each other is a challenge. That you can't work together as well as with colleagues with whom you have been working for only a few months. I think that this means that a little bit of work effectiveness is lost, especially at the beginning, because it takes longer to discuss. Of course, you have to adapt to new people. I think that you have to look at how they differ from your personality and how it harmonizes with you because you have to deal with every person differently.” (Employee 8; lines 773–783; t₁)
- “It is a start-up; we are all open minded and I think that is good. I think that's something that should be taken into account in our hiring processes. So, hiring people who are open minded like us, that you get to know the people easily and get to know the team quickly and feel comfortable quickly.” (Employee 9; lines 786–790; t₁)
- “You have to make sure that the team continues to know each other well, so that everyone gets to know the new employees. I think our team events make this possible. You should actively encourage every member of the team, take care of the team, and be a contact person for everyone.” (Employee 10; lines 816–819; t₁)
- “For example, if an employee receives a task that can be defined differently by several employees, lack of communication is a big problem.” (Employee 12; lines 1011–1014; t₁)
- “I commit to work properly myself. That is what teamwork affects. If I did not document and program properly, then the others cannot work with my things either. On the other hand, I see it as my job to pick up new employees right there. I want to pass on my knowledge....It's about sharing as

- much knowledge as possible. Also, how processes are passed on. To tell someone, 'Just look over my shoulder.'" (Employee 12; lines 1102–1108; t₁)
- "I believe that the start-up culture will remain, that we do team events and play football together. At some point, with 1000 employees, that won't work, but I don't want to talk about that for now." (Employee 14; lines 1320–1323; t₁)
- "It essentially says that people do more than what is expected of them. And that people show initiative. That's not desired in all companies, but it is in ours. I can imagine that if the company grows even more, you will need even more structures. And people who then simply do what they are told." (Employee 7; lines 154–157; t₂)
- "You can always talk to others about technical issues. Do they also perceive this as a problem? In any case, it's good to know that you can reach out to everyone. But I haven't had done this yet. (...) It was always small things, for example in the way we program something or plan something." (Employee 18; lines 1132–1136; t₂)
- "So you have to assert and prove yourself within the company. Because I don't think the CEO has time to listen to everyone's idea. It's more complicated than in a small company." (Employee 8; lines 814–817, t₂)
- "I believe that a company grows organically and especially when it grows that quickly, it is not that easy to keep up with such a structure. (...) If you grow up too fast, there have to be people who recall on how we structure ourselves and how we can reorganize ourselves. And I think this is perhaps something that needs to be done, but the managers are not aware of that. Or doesn't realize that it's necessary now." (Employee 10; lines 1022–1028; t₂)
- "I would say that responsibilities for tasks are rather clear. But if not, that inhibits efficiency. I think talking to all the people involved first is a good thing. You probably do that in a hierarchical company, too. (...) Often it's [defining responsibilities] is not done properly and often it's not really clear." (Employee 3; lines 557–662; t₂)
- "One big problem is a lack of processes. (...) If many people join, some kind of responsibilities always have to be defined. Even if there is no hierarchy, there are some kind of responsibilities. That's also a problem when you don't have hierarchies. Then the responsibilities have to be defined." (Employee 12; lines 412–417; t₂)
- "If I see a problem, then I talk to others and check if there are other people who also see the problem or who feel that something needs to be changed. Also, the result can be to have an approach or the result can be that the problem is not a problem at all." (Employee 10; lines 1070–1073; t₂)
- "I have the feeling that my suggestions are heard. Especially with regard to topics that I have dealt with a lot. People are more likely to listen to what I suggest because I'm more familiar with the subject than my supervisor. (...) Then I came up with my own solutions." (Employee 8; lines 832–835; t₂)
- "We first talked about it and then proposed it. (...) So we were able to talk more about our alternative solution in the meetings." (Employee 4; lines 718–720; t₂)
- Innovative-ness "We should introduce a ticket system so that the work is tracked and you make sure that the work gets done. So far, the team lead asks each individual

- employee what they have to do and asks for the current status. This is no longer possible with large teams.” (Employee 13; lines 1140-1144; t₁)
- “For example, when employees join, it would be helpful to make a round of introductions....If you simply knock on all the offices and introduce the new one. That’s enough to have seen the people. An email would also be good with a mini profile.” (Employee 2; lines 255–257; t₁)
- “Another point is that the onboarding could be improved in the technical area: Which aspects are included in the onboarding? Which code styles one should use? In other words, technical basics would have to be brought up to the same level, so that the software would look like a unified whole afterwards. We would have to introduce uniform regulations within the company. That would also help if someone leaves or takes on a different role. Then you can get up to speed faster and more efficiently.” (Employee 5; lines 472–477; t₁)
- “So, we need definitions of processes, but they don't help if nobody follows them. Clearly defined processes will not help if management does not make sure that they are followed....In large companies, you have several training sessions for this, so that you can start working on a project. We can't go through that, but what we should do, for example, would be a whole day where the developers get together and talk about how development will be done. This would create an exchange. In doing so, we would level up the way we are programming. It wouldn't even have to be written down, but you would get to the point where everyone works the same way.” (Employee 1; lines 111–121; t₁)
- “We first had meetings in which we brainstormed. We thought about what we wanted to do. And we created documents. So, we first had an idea, that's when we also created a prototype, but that didn't work. And then later we decided to approach the problem differently. We tried to simplify the problem. (...) It's an ongoing process. Right now, though, there's no plan for when we're going to put time in there to change it again.” (Employee 14; 753–759; t₂)
- “I think new ideas are always well received. I already have that impression. So I would probably talk to my team lead about it first. Because he knows the individual teams better. Then I would push the idea together with him. I am actively involved in developing and contributing ideas.” (Employee 12; lines 1160–1165; t₂)
- “First you have to prove yourself, be a little bit pushy and show that you have the ability to do so. It takes time until you have a certain standing in the company so that you can grow. And that's a challenge, which frustrated me at the beginning. Actually, it is desired, but of course, not everyone can do that.” (Employee 7; lines 179–184; t₂)
- “We wanted to give each other more feedback within the team. So, now there is a big matrix where everyone can type in when they have received feedback and you can see how many people have not yet received feedback. The goal of the whole team is to always give about 40 feedbacks per month.” (Employee 4; lines 772–777; t₂)
- “We have our own question-and-answer forum, but when it comes to launching our own initiatives or changing the structures in the team, we do that in our weekly team meeting. We present our results there, get feedback.” (Employee 8; lines 811–815; t₂)

- “When I started in the team, there were two people. We just work in our small sub-team. And of course, with two people, you don't need that much structure. But we are planning to grow to six people this year. And then the team work will be different. (...) Of course, we are also aware that we have to do something to keep efficiency.” (Employee 18; lines 1402–1407; t_2)
- “We check how good our results are. We created a process for that. It wasn't me alone, but I was involved. That's what we looked at every day at our team meeting. The process now helps us to solve tasks and to check how good our results are. And then, as we grow, new joiners will have a process they can stick to. That didn't exist before.” (Employee 12; lines 449–454; t_2)
- “But consensus must be found, of course. You can always propose something. But if no one sees it the same way and is willing to go along to work with you on that, nobody will. I think the possibilities are there, as long as you can find fellow campaigners to support you.” (Employee 12; lines 486–491; t_2)
- Autonomy “You are allowed to communicate in any case, that is not prohibited. But whether something changes is something else. In our team, we are a large team with 40 people, if you feel like changing something, you look for another person and change it. That's easy.” (Employee 13; lines 1168–1172; t_2)
- “Within the team, you can always change things. We also always have the opportunity to have a say in technical issues, but a lot depends on how we approach the processes as a team.” (Employee 12; 452–455; t_2)
- “The willingness to innovate is very high. We are willing to be innovative. But when I propose things, I'm told I'm not responsible for that. I have good relationships with my team, (...) and I get recognition but we're not supposed to. It's very confusing.” (Employee 8; lines 845–849; t_2 , $\text{span style="font-family: 'Times New Roman'"}>$)
- “Whether it is implemented afterwards depends on how it is discussed in the team. Of course, the more people are involved, the more difficult it gets. (...) But in general, if there is consensus, then things are implemented.” (Employee 4; 743–746; t_2)
- “I wouldn't say on my own, we're going to do this and that in the early days. But I think that if I talk to my team and we decide that something makes sense after we have discussed that with the impacted teams, then we can introduce things. (Employee 7; 166–170; t_2)
- “I think this is not being promoted. (...) When it comes to issues that I really just carry on my own, nobody interferes. There I can work autonomously. When it becomes more product-specific, the whole thing becomes much more critical. For the reason that a lot of people look at the product (...) Accordingly, it's a little less autonomy and self-determination at that point to make changes directly to the product.” (Employee 18; lines 1540–1546; t_2)
- “Responsibilities are not clear. We do not have a hierarchy. At the end, you have to reach out to the whole team. But if you're not sure about your idea, you just talk to one other person. In the end, probably nothing will change.” (Employee 10; 1083–1087; t_2)
- “Topics are predefined. (...) Of course, the project manager makes suggestions as to what we might work on. But we also have the possibility to make suggestions and say that this would fit into the topic area. So I think

Competitive
Aggressive-
ness

there are possibilities. (...) Yes, at least we can have an influence. There are also suggestions from the project manager. But it's up to us to decide whether we should do it now or whether we want to expand it or do it differently.” (Employee 2; lines 911–925; t_2)

“I've been running to people who are responsible for that and saying, good idea. And then nothing happens. But I'm not allowed to change things myself. I can't do that either, I don't have the technical means.” (Employee 2; 930–934; t_2)

“Exactly, that's where I can work freely. We have a certain structure. Otherwise, I work largely autonomously. The main thing is to get to the goal.” (Employee 7; lines 162–165; t_2)

“I can work with the tooling that I feel comfortable with. Without having to talk to anyone. Or that I have to ask anyone for permission. And because of this freedom, I have a little bit more agility to innovate. In what I do. That works very well. And I perceive that as a very positive thing.” (Employee 14; lines 779–785; t_2)

“It's about defining structures. I've also talked to other employees that it's a bit strange that it's not entirely clear who has which responsibilities. (...) and defining that [responsibilities] is also important for a company as it grows. So that the employees know which employees they can turn to with which issues. (...) Where is the best place to bring this [new ideas for structural changes, new ideas for the product] in, who are my contacts? How are the structures, hierarchies and tasks distributed?” (Employee 3; lines 687–694; t_2)

“I saw the topic coming up. I said I thought our approach was good, but we ran out of time. But the others told me that this is not part of my responsibility or task to have such considerations. And that these thoughts are on behalf of the management team.” (Employee 2; lines 892–896; t_2)

“In a smaller team, you have a much higher leverage as a single employee. (...) In terms of how we approached things, but of also in terms of the company's strategic direction. I had a lot of influence on how the company developed or how I solve technical difficulties. (...) I don't call the CEO and have a coffee with him to propose something. He probably doesn't have time for that. So you have much less influence on how the company develops strategically or where it's going.” (Employee 2; lines 903–909; t_2)

“Talking about new features, we can be super creative. We can all be creative and think big. I think this is really good. (...) As soon as it comes to business or new products, that's more difficult. (Employee 14; lines 735–738; t_2)

“I think you can talk to everyone about strategy. But when the strategy is communicated to the employees, it has already gone through a few more stages. I think the CEO talks to the project managers and then they communicate this to us. Then, of course, it's harder to say, I don't think that's such a good idea. (...) For example, there was a change in the technology we should use. Our project manager was also a little surprised by the decision. The CEO just said that we will go with this decision without any further explanation. We still did not understand it. I do not think that it is worth starting a discussion about it. (...) But technically, it would have made sense to do both. But for us it doesn't make sense to question it

again. In the end, it's even less work for us.” (Employee 18; lines 1501–1512; t₂)

“It always depends on the idea. If I have a small idea how to make our analysis better, then it's just a small improvement. If I have an idea that, well, we've talked about something like almost a new product, then I talk to the CEO about it. Because of course this will influence the strategy.” (Employee 10; lines 1090–1095; t₂)

“How I do my work is up to me. I am quite autonomous. At the same time, my job is always team related. That means that everything I do is touched by someone before and after. (...) In the practical implementation I am free. In the strategic decision I have no say at all.” (Employee 14; lines 772–776; t₂)

Essay 2: Gamification in human resource management—Status quo and quo vadis

Title	Gamification in human resource management—Status quo and quo vadis
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Abstract	Gamification has recently been presented as a promising opportunity to improve human resource management (HRM) practices and tools. However, while the number of publications on gamification has been increasing in recent years, an overview of the current landscape of HRM-related literature of gamification is missing so far. Intending to support and ease the understanding of prior research findings in this field, this article conducts a systematic literature review. This study contributes to the field of human resources research by examining 45 research papers, aiming to explore areas of application and outcomes of the use of gamification in HRM. Propositions are outlined along with elaborating risks and approaches on how to mitigate the risks of using game design elements in HRM.
Keywords	Digitization, gamification, human resource management, literature review, management

Introduction

During the last decade, the trending topic of gamification, most widely understood as the use of game elements in non-game contexts, has experienced a major popularity boom (Deterding et al., 2011). The application of game design elements, such as points, badges, and leaderboards, became an established practice throughout society (Rapp et al., 2019). Over the years, an enormous amount of research has been carried out in an attempt to design frameworks and taxonomies for gamification and game design elements. Studies have explored systems, designs, architectures, and, lately, the effects of gamified systems (Nacke and Deterding, 2017). Recently, considerable research attention has been paid to the use of game design elements to reinvent and improve human resource management (HRM) practices and tools. In this vein, a number of recent scholars are devoted to look at the effects of game design elements on the behavior of

employees, as well as ways on how to implement gamification in HRM (e.g. Araújo and Pestana, 2017; Ęrgle, 2015; Kumar and Raghavendran, 2015).

To move research on gamification in HRM toward a greater understanding of research findings in past studies, this article aims at summarizing the existing research landscape about gamification in HRM, including approaches to meaningful gamification design, as well as discussing possible risks of gamifying HRM practices and tools. Hence, the first part of this article focuses on the “what” of gamification in HRM, answering the research question, “In which areas of HRM is gamification applied and what are the reported outcomes of it?” The second question, “How can gamification be applied in HRM?” moves on to consider the “how” of gamification design, examining which elements of gamification should be combined, and pointing to risks of gamification in HRM. To answer these questions, the current paper utilizes a systematic literature review. Analyzing and synthesizing recent research findings, methodologies, and possible applications of the use of game design elements in HRM allows scientists to critically assess the use of gamification in HRM.

Methodology

Following the study purpose, this article adopts a systematic literature review method to probe into existing scholarly articles on gamification in HRM. The literature search was performed using the best-known digital libraries regarding the fields of management: Web of Science, Scopus, and EBSCO. These databases cover a large number of full-text materials in the area under study. They also involve almost all peer-reviewed business and management journals that typically publish high quality research. The selected databases offer the possibility to filter high quality contributions in the search settings. This article includes research papers that have been published in peer-reviewed journals, which means that the literature has been reviewed by external experts (Bornmann, 2013). Contributions from books and publications without peer re-

view, as well as literature that has not or not yet been classically published, so-called gray literature, are excluded. Contributions from specialist journals that represent empirical studies, secondary analyses, or literature reviews are included in the analysis. To address an international public, and to make the research comprehensible, the search is limited to English language publications. The literature to be examined is not filtered by year, as gamification research has continued to be a popular topic in academic circles since around 2010 (Deterding et al., 2011). To perform the automated searches in the digital libraries selected, Boolean operators were used. The following search string was inserted in every database: “gamif*” AND (“learn*” OR “train*” OR “motivati*”) AND (“organization” OR “management”). The search term gamif* was chosen because it considers all possible forms derived from the root (i.e. the noun gamification and the verb gamify, in all its forms). To ensure that widely comparable studies are included in the analysis, this review builds on the definition of gamification as “the process of making activities in non-game contexts more game-like by using game design elements” (Sailer et al., 2017: 372). This definition suits best because Sailer and colleagues (2017) combine different foci of gamification by drawing on the definitions according to Werbach (2014) and Deterding and colleagues (2011). Thus, gamification is considered the integration of game design elements that evoke user experiences typical of games (Deterding et al., 2011; Sailer et al., 2017; Werbach, 2014). Building on previous reviews on gamification, this article assumes effects of gamification on learning processes, training, and motivation (Hamari et al., 2014; Sailer and Homner, 2020). Hence, to review current literature of gamification referring to HRM, the terms “organization” and “management,” were added.

In summary, Table 1 outlines the inclusion and exclusion criteria for evaluating and identifying the most relevant studies of those retrieved.

Table 1. Inclusion and exclusion criteria for the literature search

Criteria	Inclusion	Exclusion
Results of the literature search	Boolean search string: “gamif*” AND (“learn*” OR “train*” OR “motivati*”) AND (“organization” OR “management”)	Other
Literature Study	Published in peer-reviewed journals	Other
Language	English	Other
Investigation Object	Application of gamification in organizations (i.e. relevant topics for HRM)	Serious games; no application of gamification in HRM (i.e. research subjects other than employees of a company)
Context	Organizational, managerial context	Other

The literature search was conducted on 17 January 2020. Figure 1 describes the procedure and the selection of relevant research contributions for the analysis conducted in this study.

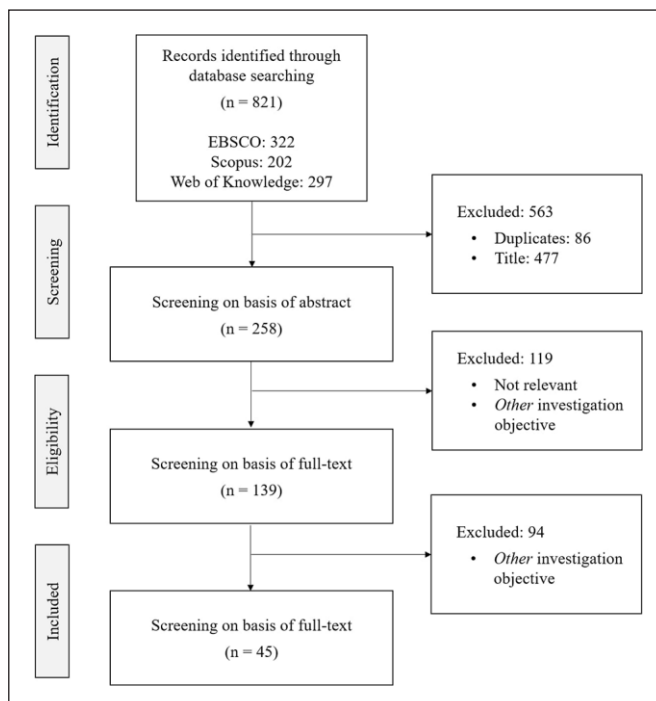


Figure 1: Process diagram of the literature review

Results

After an initial review of titles and the exclusion of duplicates, 258 papers were examined on the basis of their abstracts. A further 119 articles were excluded. The most frequent reason for exclusion in the course of the screening of the titles, abstracts, and full texts was the research objective not matching the research interest of this paper (e.g. the use of gamification in education or students as research subjects). The final 45 articles eligible for review were then classified into category, research type, empirical research type, addressed issue/research field, and, if applicable, game design elements, participants and measured impact (see Table 2).

Areas of application

Increase employee motivation, engagement and performance. More than a third ($n = 18$) of studies examine the role of game design elements for employee motivation, engagement, and performance. Previous research has demonstrated that gamification seems to be a powerful way of engaging employees and motivating them to further develop work-related skills (Dubey et al., 2016; Ęrgle, 2015; Jabagi et al., 2019; Ruhi, 2015). Current literature argues that game design elements can contribute to the employees' opinions of their jobs as more challenging and interesting (Liu et al., 2018; Sarangi and Shah, 2015). A number of studies consider the increased degree of digitization in organizations when assessing the use of gamification to enhance motivation, engagement, and performance (e.g. Herranz et al., 2018; Kumar and Raghavendran, 2015; Yin et al., 2013). Kumar and Raghavendran (2015) discuss that today's world of work no longer demands the simple performance of activities, but innovative thinking and the sharing of knowledge within the organization. Likewise, Shahri and colleagues (2019) suppose that the latest "digital incarnation of motivation" (Shahri et al., 2019: 2) increases pressure and stress within the workplace. In their experiment, Shahri and colleagues (2019) found that game design elements lead to higher digital motivation (i.e. to the "use of software-based solutions to change, enhance, or maintain people's attitude and behavior

Table 4. Full paper details

Author(s)	Year	Category	Research type	Empirical research type	Addressed issue/research field	Game elements	Participants	Impact
Abedi et al.	2018	Talent Management	Solution proposal	Case Study	Enhancing performance	Rankings, points, leaderboard		
Adams and Makramalla	2015	Training	Solution proposal	Conceptual Research	Gamification in cybersecurity awareness trainings	Points, leaderboard, badges, avatar, shared purpose/goal, story		
Ahmed and Sutton	2017	Knowledge Management	Review	Conceptual Research	Overview of gamification in knowledge management			
Algashami et al.	2017	Team Work	Solution proposal	Case Study	Risks of gamification in enterprise team work			
Araujo and Pestana	2017	Knowledge Management	Solution proposal	Case Study	Enhancing knowledge sharing			
Armstrong and Landers	2018	Training	Solution proposal	Conceptual Research	Value of gamification in trainings			
Buil et al.	2019	Talent Management	Solution proposal	Experiment	Gamification for talent acquisition	Competition, team work	<i>n</i> = 239	<i>Measured</i> (
Chamorro-Premuzic et al.	2017	Talent Management	Solution proposal	Conceptual Research	Discussion about gamified assessment tools that focus on enhancing the user-experience in personnel selection			
Clegg et al.	2018	Training	Solution proposal	Case Study	Conceptual requirements for a gamified learning environment			
Dessureault	2019	Motivation/Engagement/Performance	Solution proposal	Conceptual Research	Modernization of fleet management in mining	Points, levels, competition, collaboration		
Dubey et al.	2016	<i>Other</i>	Review	Conceptual Research	Enhancing motivation for trainings			
Èrgle	2015	Motivation/Engagement/Performance	Solution proposal	Case Study	Increasing employee engagement, employee motivation, and performance	Points, badges, ranks, levels, time pressure, tasks, virtual worlds, virtual trade		
Friedrich et al.	2020	Knowledge Management	Review	Conceptual Research	Enhancing motivation for knowledge sharing activities	Points, badges, leaderboard		

Table 4. (Continued)

Author(s)	Year	Category	Research type	Empirical research type	Addressed issue/research field	Game elements	Participants	Impact
Georgiou et al.	2019	Talent Management	Evaluation research	Experiment	Gamification in employee selection in order to support organizations to map out prospective employees' soft skills	Storylines, feedback, avatars, voice overs	<i>n</i> = 97	<i>Measured</i>
Herranz et al.	2014	Motivation/Engagement/P performance	Evaluation research	Case Study	Description of the implementation/process of a gamification introduction	Points, voting systems, rewards, team work, progress bars, leaderboard		
Herranz et al.	2016	Motivation/Engagement/P performance	Evaluation research	Case Study	Description of the implementation/process of a gamification introduction	Game elements of the Octalysis framework (Chou, 2015)		
Herranz et al.	2018	Motivation/Engagement/P performance	Evaluation research	Case Study	Description of the implementation/process of a gamification introduction	Game elements of the Octalysis framework (Chou, 2015)		
Ivan et al.	2019	Motivation/Engagement/P performance	Solution proposal	Experiment	Employee motivation for SPI initiatives	Points, badges, leaderboard, progress, levels, missions, quiz, event feeds		
Jabagi et al.	2019	Motivation/Engagement/P performance	Solution proposal	Conceptual Research	Enhancing gig-workers' motivation	Social features (forums, chatting), ratings, badges		
Jain and Dutta	2019	Talent Management	Solution proposal	Conceptual Research	Conceptual model to support gamification to meet the challenges of Millennials	Challenges, evaluation, leaderboards, badges, level, digital certificates		
Jorge and Sutton	2019	Training	Review	Conceptual Research	Model that evaluates game-based learning environments			

Table 4. (Continued)

Author(s)	Year	Category	Research type	Empirical research type	Addressed issue/research field	Game elements	Participants	Impact
Kalyanaraman and Anuncia	2015	Training	Review	Conceptual Research	Integration of gamification in e-learning systems			
Kananen and Akpinar	2015	Motivation/Engagement/P performance	Solution proposal	Case Study	Enhancing motivation of salespeople	Goals, points, rewards, leaderboards, progress, levels, challenges, achievements, badges, feedback (i.e. the use of social feeds and profiles)		
Kornevs et al.	2019	Training	Solution proposal	Case Study	Training in procurement processes	Points, leaderboard		
Kumar and Raghavendran	2015	Motivation/Engagement/P performance	Solution proposal	Case Study	Increasing employee engagement and employee motivation and to form organizational culture	Points, social media tool	<i>n</i> = 506	<i>Measured</i>
Liu et al.	2018	Motivation/Engagement/P performance	Evaluation research	Experiment	Increasing job motivation, satisfaction, and performance of employees in manufacturing	Points, badges, achievements (bonus points), leaderboard	<i>n</i> = 30	<i>Measured</i>
Marache-Francisco and Brangier	2015	Motivation/Engagement/P performance	Review	Conceptual Research	Discussion about gamification at work			
Marlow et al.	2016	Team Work	Review	Conceptual Research	Review and research agenda on gamification in team work			
Miller et al.	2018	Training	Evaluation research	Case Study	Improving training outcomes for IT desk service	Storyline, levels, points, leaderboards, team work, rewards, achievements, challenges, documentation		

Table 4. (Continued)

Author(s)	Year	Category	Research type	Empirical research type	Addressed issue/research field	Game elements	Participants	Impact
Park and Kim	2019	Training	Review	Conceptual Research	Establishing a badge design framework for gamified learning			
Petruzzi and Amicucci	2015	Training	Solution proposal	Case Study	Preventing corruption through gamified training that enables employees to recognize prohibited actions at an early stage	Points, rankings, levels, time pressure, tasks, quests		
Pflanzl and Vossen	2018	Other	Solution proposal	Case Study	Comparison of games and the creation of a business process model			
Ruhi	2015	Motivation/Engagement/P	Evaluation Research	Case Study	Introducing a descriptive framework for enterprise gamification	Points, levels, badges, quests, time pressure, documentation of behavior		
Sarangi and Shah	2015	Motivation/Engagement/P	Solution proposal	Conceptual Research	Overview on gamification for engaging employees			
Author(s)	Year	Category	Research type	Empirical research type	Addressed issue/research field	Game elements		
Shahri et al.	2019	Motivation/Engagement/P	Solution proposal/Proof of Concept	Experiment	Changing, enhancing, or maintaining people's attitude and behavior towards specific tasks, policies, and regulations	Leaderboard, points, achievement, badge, progress bar	<i>n = 40</i>	<i>Measured</i>
Shi et al.	2017	Motivation/Engagement/P	Solution proposal	Conceptual Research	Building conceptual propositions to explore the impact of gamification in order to transform the adoption of servitization			

Table 4. (Continued)

Author(s)	Year	Category	Research type	Empirical research type	Addressed issue/research field	Game elements	Participants	Impact
Shpakova et al.	2017	Knowledge Management	Review	Conceptual Research	Enhancing interaction for knowledge workers and promoting a collaborative environment	Points, badges, rates		
Sox et al.	2014	Talent Management	Evaluation research	Experiment	Identifying best practices, opportunities, and barriers in meeting planning for Generation Y	Challenges		
Stadnicka and Deif	2019	Training	Solution proposal	Experiment	Facilitating lean manufacturing knowledge acquisition	Teams compete against each other and present their solutions	<i>n</i> = 114	Measured
Swacha	2015	Knowledge Management	Solution proposal	Conceptual Research	Enhancing motivation for knowledge sharing	Points, badges, ranks, virtual trade		
Tansley et al.	2016	Talent Management	Evaluation research	Case Study	Enriching assessment centers in order to enhance transparency in decision-making processes and to enhance the interactivity of the potential recruits	Feedback, transparency, goals, badges, levels, competition, points		
Trees	2015	Talent Management	Solution proposal	Case Study	Increasing engagement and higher retention rates			
Tsourma et al.	2019	Knowledge Management	Solution proposal	Case Study	Increasing motivation and participation in knowledge sharing	Social media platform, levels, badges, points		
Wozniak	2017	Motivation/Engagement/P performance	Solution proposal	Experiment	Hypothetical acceptance of the introduction of gamification in the existing incentive system	Points	Survey: <i>n</i> = 100/ <i>n</i> = 73	Measured
Yin et al.	2013	Motivation/Engagement/P performance	Evaluation research	Case Study	Reducing the complexity of monitoring and controlling data center for system administrators	Documentation of behavior		

towards specific tasks, policies, and regulations”) that can lead to higher well-being at the workplace (Shahri et al., 2019: 1). More specifically, Herranz and colleagues (2018) examine the impact of gamification in software process improvement (SPI), assuming that the primary issue regarding SPI is employee motivation. They point to the use of game design elements as a tool to help employees better understand the relevance of SPI initiatives through communication between the teams and the company (Herranz et al., 2018). In discussing competitions in organizations, Ęrgle (2015) argues that these can foster innovative, participatory thinking, and action, as well as improve internal communication. The author presents a gamified application that contains information on internal projects, pending decisions, and business ideas. News from the company, which are linked to the application, enable employees to have the logic behind strategic decisions. Building on a comprehensive analysis, the author found that this leads to an increase in employee engagement and work motivation (Ęrgle, 2015). These findings are congruent with the work of Kumar and Raghavendran (2015), who found that the use of competitions in organizations can lead to a change in organizational culture (i.e. towards a sense of pride). As an example of implementing gamification to increase salesforce motivation, consider the study of Kananen and Akpınar (2015) who argue that game design elements such as point systems, rewards, leaderboards, and badges (i.e. the use of social feeds and profiles) lead to an increased work motivation. In a similar vein, Woźniak (2017) found that professionals would endorse the introduction of gamification in an existing incentive system with deferred rewards through later redemption of points instead of receiving financial bonuses (Woźniak, 2017).

Moreover, a number of past studies have yielded some important insights into the use of gamification to cope with the challenges Millennials face (e.g. Jain and Dutta, 2019; Sox et al., 2014; Trees, 2015). Current literature points to meaningful work experiences, learning, and developmental opportunities as well as the possibility to engage in learning activities as predominant expectations of Millennials (e.g. Eddy et al., 2010; Howe and Strauss, 1991; Skiba

and Barton, 2006). As Jain and Dutta (2019) point out, the core traits of Millennials are high confidence, team orientation, and a striving for achievement. Sox and colleagues (2014) argue that a strong desire for self-actualization and comprehensive feedback coupled with a weakness of not being able to deal attentively and intensively with tasks, will comprise key challenges of satisfying Millennials at work. According to Jain and Dutta (2019), game design elements in learning environments will appear to Millennials as a familiar opportunity to actively contribute to learning processes. The authors argue that gamified HR tools will enable Millennials to participate in corporate decisions and processes, as well as to develop individually, creatively, and intellectually (Jain and Dutta, 2019). Jain and Dutta (2019) conclude that gamification can lead to higher acceptance of HR practices, because game design elements such as badges can meet the need for achievement and the desire for technology driven tools at work. Trees (2015) presents a social networking tool that allows frequent feedback, social learning, and teamwork in organizations. Based on the analysis of current research contributions and survey results, the author found that gamified platforms can help in onboarding Millennials and promoting the knowledge exchange of experienced employees and young colleagues. Moreover, Trees (2015) notes that the use of social networking represents a potential tool to satisfy Millennials and provide them the feeling of belonging inside the company, so as to increase retention rates. However, the author state that older colleagues were skeptical towards the tool, as social media at work can distract employees from their work (Trees, 2015).

Improve training in organizations. Considerable research attention has been devoted to the use of gamification to improve training outcomes ($n = 10$). Recent research shows that gamification enables employees to feel confident with succeeding in tasks, and increases motivation within a learning environment (e.g. Jorge and Sutton, 2017; Stadnicka and Deif, 2019).

A number of studies review current literature to introduce models and frameworks that describe the use of gamification in trainings (e.g. Armstrong and Landers, 2018; Jorge and

Sutton, 2017; Kalyanaraman and Anuncia, 2018; Park and Kim, 2019; Stadnicka and Deif, 2019). Jorge and Sutton (2017), drawing on the flow theory according to Csikszentmihalyi (2014), stress the importance of making the workplace more fun. They argue that gamification provides a promising opportunity to change behavior with regard to organizational strategies and goals, as well as to increase engagement and retention within the learning environment by fostering the feeling of being in a flow (Jorge and Sutton, 2016). In a similar vein, Miller and colleagues (2018) emphasize that gamified training increases employee loyalty and customer satisfaction through increased training effectiveness. The authors present a gamified software tool, including game design elements such as levels, points, leaderboards, teamwork, and rewards to improve IT training outcomes. Park and Kim (2019) claim that badges, as a scale for measuring learner knowledge and skills, increase the engagement within a learning environment. Petruzzi and Amicucci (2015) confirm the use of game design elements to establish a self-reflective attitude towards one's own behavior through immediate feedback on the knowledge learned (Petruzzi and Amicucci, 2015). Kornevs and colleagues (2019) went even further. They discuss the increasing complexity of the procurement process and the need for improved training for specialists. They found that the use of gamification can motivate employees to obtain and apply new knowledge (Kornevs et al., 2019). Moreover, drawing on the ARCS (attention, relevance, confidence, and satisfaction) model of motivational design (Keller, 1987), Stadnicka and Deif (2019) suggest that gamified training sessions should not only include knowledge creation but also increase motivation to deal with specific topics. As such, Adams and Makramalla (2015) discuss the use of avatars that allow employees from departments outside the field of IT to see a cyber-attack through the eyes of a hacker. By applying gamification in trainings, the authors suggest an increased awareness of employees from all areas of the company for cybersecurity (Adams and Makramalla, 2015). Clegg and colleagues (2018) confirm that gamified learning environments can serve as information platforms to improve customer service (Clegg et al., 2018).

Optimize talent management measures. A number of studies ($n = 8$) have studied game design elements in talent management measures (Buil et al., 2019; Chamorro-Premuzic et al., 2017; Georgiou et al., 2019; Tansley et al., 2016). Recent literature deals with the use of gamification in assessment centers and talent identification (e.g. Georgiou et al., 2019; Tansley et al., 2016). Specifically, Georgiou and colleagues (2019) report that game design elements can help identify the soft skills of employees and reduce the costs of bad hires. The authors argue that the choice of avatars, storytelling, rewards, and progress bars can be a supporting measure for the identification of soft skills (Georgiou et al., 2019). Chamorro-Premuzic and colleagues (2017) confirm the opportunity to use game design elements for talent identification. Drawing on past studies that investigate cognitive skills and the mental processes required to win in video games (e.g. Foroughi et al., 2016; Quiroga et al., 2015; Unsworth et al., 2015), Chamorro-Premuzic and colleagues (2017) claim that individuals who enjoy playing online games and role-playing possess increased coordination and leadership skills that employees utilize in everyday work.

Enhance knowledge management activities. A number of studies ($n = 6$) consider the use of game design elements in knowledge management activities (e.g. Abedi et al., 2018; Shpakova et al., 2017; Swacha, 2015; Tsourma et al., 2019). According to recent studies, game design elements such as points, badges, and potential rewards for knowledge sharing are helpful tools to enhance the quality of knowledge sharing and cooperative behavior, when the corporate culture is characterized by feedback and openness (e.g. Araújo and Pestana, 2017; Friedrich et al., 2020; Tsourma et al., 2019).

Outcomes of gamification in HRM

In total, seven articles use quantitative research measuring the effectiveness of gamification in HRM whose reported outcomes are described below (Buil et al., 2019; Georgiou et al., 2019; Kumar and Raghavendran, 2015; Liu et al., 2018; Shahri, et al., 2019; Yin et al., 2013; Woźniak,

2017). Researchers find empirical evidence that gamification can enhance employee engagement (Kumar and Raghavendran, 2015), as well as employee motivation, and job satisfaction (Liu et al., 2018; Shahri et al., 2019). Moreover, it has been noted that the use of game design elements can improve talent acquisition (i.e. increase the candidates' attitude toward the organization and perceiving it as an attractive place to work) (e.g. Buil et al., 2019; Georgiou et al., 2019). Current research also attempted to examine the role of gamification in transforming organizational cultures. Kumar and Raghavendran (2015) found that gamification has a positive impact on organizational attributes such as “networking opportunity, fun and engaging environment, and teaming opportunity” (Kumar and Raghavendran, 2015: 10). Likewise, Georgiou and colleagues (2019) claimed that game design elements can elicit desired behaviors and predict job performance versus the control group (Georgiou et al., 2019). Empirical research that measures the impact of gamification on employee training and knowledge management could not be identified.

Applying gamification in HRM

So far, this paper has focused on the “what” of gamification in HRM, investigating areas of applications and reported outcomes. Moving on to the “how” of gamification design, the second research question “How can gamification be applied in HRM?” is being answered in the following.

Designing gamification in HRM

This review reveals that HRM-related literature on gamification mostly applies badges, leaderboards, levels, achievements, and points in HRM (e.g. Araújo and Pestana, 2017; Dessureault, 2019; Ęrgle, 2015; Liu et al., 2018). However, recent studies seem to agree that the mere implementation of gamification mechanisms does not automatically lead to improved HR practices and tools (e.g. Hamari et al., 2014; Herranz et al., 2018; Marache-Francisco and Brangier,

2015). Rather, current literature suggests that meaningful gamification design (i.e. that evokes intended behavior) considers the employees' characteristics and needs (e.g. Georgiou et al., 2019; Ivan et al., 2019; Sailer et al., 2017; Sox et al., 2014; Stadnicka and Deif, 2019). Hunicke and colleagues (2004: 5) confirm the centrality of human-centered gamification design by suggesting, "by understanding how formal decisions about gameplay impact the end user experience, we are able to better decompose that experience, and use it to fuel new designs, research and criticism respectively." Moreover, numerous scholars have stressed the importance of designing games through iterative approximation and continuous improvement (e.g. Georgiou et al., 2019; Ivan et al., 2019). Hence, most researchers working in the area of gamification in HRM agree that gathering feedback on gamification environments from as many individual employees as possible, and adapting the design likewise ensures an ever-increasing effectiveness of the use of gamification (e.g. Georgiou et al., 2019; Ivan et al., 2019). Against this backdrop, researchers establish models and frameworks specifically customized to the situation and needs of both the employees and the company which evoke intended behavior through iterative approximation and continuous improvement (e.g. Georgiou et al., 2019; Ivan et al., 2019; Pflanzl and Vossen, 2018; Sox et al., 2014).

Risks of using gamification in HR practices and tools

While the characteristics and needs of the employees initially determine the choice of game design elements, it is generally accepted wisdom that potential risks should also be considered when designing and implementing gamification in HRM (e.g. Algashami et al., 2017; Lai, 2001; Marlow et al., 2016; Sailer and Homner, 2020). Sailer and Homner (2020) found that game design elements that provide positive feedback can increase motivation, but otherwise, when the feedback is negative, it can be perceived as controlling and can reduce motivation. Likewise, referring to the study of Forsyth (2018) and Shahri and colleagues (2019), Algashami and colleagues (2017) argue that performance transparency (i.e. achieved through leaderboards)

can reduce perceived unfairness, on the one hand, but can trigger pressure and counterproductive comparison, on the other hand (Algashami et al., 2017). Moreover, introducing game design elements in large teams can yield social loafing through collective performance measures (Kumar and Raghavendran, 2015). As an example of using gamification in teamwork, consider the study of Algashami and colleagues (2017) that suggests that leaderboards can lead to intimidation, as well as clustering within teams and the separation of high-performance team members. According to the authors, game design elements that provide feedback can lead to a separation of high-performance team members and a decline of self-esteem of individuals who often receive poor feedback (Algashami et al., 2017).

Discussion

This paper set out to explore the seemingly multifaceted research landscape about gamification in HRM through a systematic literature review. This article summarized existing HRM-related literature of gamification, and systemized the findings in this regard into four potential application areas of gamification, being (1) supporting employee motivation, engagement, and performance, (2) improving training outcomes, (3) supporting talent management measures, and (4) fostering knowledge management activities. Within these categories, the use of game design elements to enhance motivation, engagement, and performance within the workplace is the most used area of focus. Current proponents of gamification emphasize the importance of holistic approaches to gamification design, considering the employee's needs and characteristics, as they have major impact on the effectiveness of the use of game design elements. Furthermore, numerous scholars point to the existence of potential risks when using game design elements in HRM. In this regard, there have been many attempts in the HRM-related literature on gamification to overcome these issues. Scientists develop frameworks and models that iteratively approach gamification design through gathering feedback from as many recipients as

possible, being aware of and avoiding potential risks, as well as continuously improving and adapting the design.

However, although the advantage of using quantitative approaches to assess the use of game design elements in HRM is well-documented (Mekler et al., 2015; Rapp et al., 2019; Sailer and Homner, 2020), only seven of the identified scholars use empirical research to measure the actual effects of gamification in HRM. Notwithstanding, taking a closer look at indicator-based findings on the effects of gamification in HRM, the current review yields interesting patterns. In contrast to some reports in the literature (e.g. Mekler et al., 2015; Sailer and Homner, 2020), this review provides convincing evidence in favor of positive behavioral and motivational outcomes on employees through gamification. Recent scholarship provides empirical evidence to suggest that the use of game design elements can improve HR practices and tools (e.g. Buil et al., 2019; Kumar and Raghavendran, 2015; Woźniak, 2017). A possible interpretation of this finding is that HR scientists are already aware of potential risks of gamification and consider these when implementing gamification (e.g. Araújo and Pestana, 2017; Jorge and Sutton, 2016; Park and Kim, 2019; Ruhi, 2015). Besides, the studies identified in this literature review focus on the circumstances under which gamification works in the specific area of application (e.g. Abedi et al., 2018; Chamorro-Premuzic et al., 2017; Dubey et al., 2016), rather than on “how” it works in particular contexts. This is in contrast to the findings of Nacke and Deterding (2017), who found that research on gamification is shifting from exploring systems, designs, and architectures to investigating the effects of gamified systems.

However, research on gamification in HRM lacks rigor in a few major aspects. Although HR scientists consider potential risks of gamification (e.g. Georgiou et al., 2019; Ivan et al., 2019; Sox et al., 2014), long-term effects have not been fully explored yet. Moreover, other than what Rapp and colleagues (2019) highlight in their elaboration on how to strengthen gamification research in general, HR scientists tend not to reflect on the ethics of the use of game design elements to influence the employees’ behavior and motivation (i.e. whether gamification

exploits the inherent play instinct of human beings). While it is generally agreed that gamification positively influences employee behavior and motivation, there is less consensus on indicators and aspects describing gamification. Although researchers frequently refer to Deterding and colleagues (2011) when defining gamification (Liu et al., 2018), views differ on which game elements represent a gamified system. If there is no consensus on the definition of game design elements that form a gamification system, research results on the effectiveness of gamification continue to be hardly comparable, transferrable, and therefore generalizable. Hence, HR scientists will have to deepen our understanding on how the gamified system (i.e. a composition of several game design elements), and the design of a single game design element determine whether potential risks of gamification occur (e.g. Algashami et al., 2017; Armstrong and Landers, 2018; Marache-Francisco and Brangier, 2015; Mekler et al., 2015; Sailer and Homner, 2020). Thus, this review highlights the need for indicator-based studies that examine the effects of gamification in HRM to further understand “how” and “when” the use of game design elements adds value to organizations.

However, although this systematic literature review contributes to HR research and offers important insights into the ongoing research on gamification in HRM, the current review has limitations. Systematic literature reviews should always be kept up to date to take the steadily increasing number of research findings in this field into account, and represents only a snapshot of HRM-related literature of gamification. Besides, the relatively low number of studies found could relate to the quite strict criteria of this review. However, these criteria ensure the rigor of the study, or at least make it more probable.

This study has shown that HR scientists are at the beginning of a journey to explore the phenomenon of gamification. So far, there is broad agreement that the use of gamification can improve HR practices and tools. Nevertheless, researchers should continue to apply and re-search the effects of individual game design elements, and gamification systems on employee behavior in as many areas of applications possible. Based on this broad range of cause-effect

relationships, more general statements can be derived on “how” and “when” gamification adds value to HRM. Accordingly, further literature reviews like the current will help summarize the results, allowing researchers to embed their research in the existing research landscape.

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Essay 3: A gamified approach for enhancing employee entrepreneurial behaviors in new ventures

Title	A gamified approach for enhancing employee entrepreneurial behaviors in new ventures
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Abstract	Gamifying work activities can be beneficial as it can better engage employees in acting and thinking entrepreneurially and improve organizational performance. However, incorporating game elements into work activities can be difficult because it requires a thoughtful understanding of motivation and design. Using design science research that can potentially reduce the existing gap between theory and practice, this exploratory study develops a gamification framework for increasing employee motivation to engage in entrepreneurial behaviors. The tool was tested in a high-tech venture in Germany and evaluated using on-site observations and exploratory interviews. Findings show that the gamified tool motivates employees to engage in entrepreneurial behaviors at work and new ventures can take advantage of the new opportunities in gamification to discover, and explore creative solutions.
Keywords	gamification, entrepreneurial behavior, new venture, new venture growth

Introduction

Employees’ entrepreneurial behaviors are increasingly essential for new venture performance (Lumpkin et al., 2006). Recent studies have reported the positive effects of employee entrepreneurial behaviors to exploit opportunities appearing in the market and develop products continuously (Chrisman et al., 1998; West & Noel, 2019; Zahra et al., 2002). Although researchers and experts recognize these behaviors as a decisive factor for economic success (Mustafa et al., 2018) and allowing a firm to adapt to changing internal and external needs (Hernandez, 2019; Lukeš, 2012), less attention is paid to strategies on how to motivate employees to engage in entrepreneurial behaviors at work (Chen et al., 2015; Mustafa et al., 2018). Thus, entrepreneurship researchers call for future research to investigate how these behaviors can be fostered in organizations (Davis & Simpson, 2017; Hernandez, 2019; Kuratko et al., 2015; Mustafa et al.,

2018; Stull & Singh, 2005; ul Haq, 2018). Existing research on gamification provides some insights into this question.

A recent line of research shows that gamification increases the likelihood of nascent behavior (Kumar & Raghavendran, 2015; Patricio, 2017; Patricio et al., 2018; Patricio et al., 2020). For example, studies have shown that game design elements enhance perceived self-efficacy and, in turn, entrepreneurial behaviors (Gawke et al., 2017; Ho et al., 2021; Mustafa et al., 2018). In this vein, ample evidence exists to suggest that high self-efficacy, i.e., the extent to which individuals are confident about their skills to complete tasks and projects (Bandura, 1994, 1997), increases the likelihood of nascent behavior (McGee et al., 2009; Palmer et al., 2019; Steward et al., 2021). Yet, existing studies offer less insight into how to use game mechanics to meet the employee's self-efficacy to perform entrepreneurial activities at work. Furthermore, current scholarship tends to explore gamification theoretically, failing to adapt gamification design into practice and thereby overlooking the importance of measuring the effects of gamification tools (Gudiksen, 2015; Murawski, 2020; Patricio et al., 2018; Patricio et al., 2020). Thus, there is a gap between theoretical approaches to identify antecedents of employee entrepreneurial behavior and the lack of knowledge on using this understanding in practice (Mustafa et al., 2018). Hence, this paper asks: How can concepts provided by gamification be used to increase the employee's motivation to participate in entrepreneurial activities at work? The present study employs a design science research approach intended to develop, demonstrate, and evaluate design theories (Hevner, 2007). More specifically, Hevner and Chatterjee (2010: 5) define design science research as "a research paradigm in which a designer answers questions relevant to human problems via the creation of innovative artifacts, thereby contributing new knowledge to the body of scientific evidence." Against this background, this method is commonly used to explore the use of gamification frameworks in various contexts (Cheong et al., 2013; El-Masri et al., 2015; Silic & Lowry, 2020) because it allows researchers to develop theories and artifacts and to ensure practical utility (Donnellan, 2012; Gregor & Hevner, 2013;

Hevner, 2007; Holmström, 2009; Morschheuser et al., 2017a, 2017b). In this research, the artifact is a method for developing a tool that enhances employees' motivation to engage in entrepreneurial behaviors at work. Hence, this article first synthesizes current scholars on gamification in the context of entrepreneurial behaviors. This study takes a behaviorist learning perspective, arguing that motivation results from past positive and negative reinforcements, which influence the probability of future behavior (Sailer et al., 2013). In this vein, the concept of self-efficacy is considered as a psychological perspective on motivation through gamification (Banfield & Wilkerson, 2014; Ortiz Rojas et al., 2017). Second, I suggest a list of features required to successfully implement gamification in this context and develop a gamification tool intended to enhance employee entrepreneurial behavior. Third, I evaluate the proposed tool via on-site observations of the gamification tool in a new venture in Germany and exploratory interviews with users. This allows me to merge observational and interview data and to study the effects of the gamification design, as recommended by Morschheuser and colleagues (2017a: 1303), who state that "observing user behavior is more effective than interviewing, as users often have problems to describe experiences verbally."

This article contributes to the literature in several ways. First, this study extends research on gamification by supporting the view that gamification enhances employees' motivation to engage in entrepreneurial behaviors at work. More specifically, these findings suggest that game-design elements that provide positive feedback enhance employees' self-efficacy and, in turn, increase their motivation to engage in entrepreneurial behaviors. Second, these findings contribute to a call for gamification studies employing design science research to build a more robust understanding of how gamification tools can be designed, implemented, and evaluated (Hassan et al., 2018; Mora et al., 2017; Morschheuser, 2017a). This study emphasizes that iteratively adapting gamification designs by observing pre- and post-implementation and conducting exploratory interviews maximize user engagement and motivation. Third, the article responds to calls in the entrepreneurship literature to examine strategies that encourage employee

entrepreneurial activities (Davis & Simpson, 2017; Hernandez, 2019; Kuratko et al., 2015; Mustafa et al., 2018; Stull & Singh, 2005; ul Haq, 2019). This study reveals that employees help firms cope with growth-related organizational challenges, focusing on collaboration and teamwork, adhering to a trustful organizational culture, and building informal relationships among colleagues. The findings also yield managerial implications. A gamification tool is introduced, intended to be a guideline for researchers and practitioners to apply principles from gamification to the specific context of employee entrepreneurial behavior. Managers and founders of new ventures can use these findings to better design gamification frameworks which address entrepreneurial behaviors held by employees.

The remainder of this article is structured as follows. Section one reviews current literature on gamification used within organizations to enhance entrepreneurial behaviors. Section two proposes a list of features required for meaningful gamification design to encourage entrepreneurial behavior. The third part provides a detailed account of a gamification project adopted in a new venture operating in the IT sector in Germany, describing its design process and implementation. A concluding discussion is provided below.

Gamification and entrepreneurial behavior

Gamification refers to the integration of game-design elements in non-gaming contexts (Deterding et al., 2011). The application of game-design elements, such as points, badges, and leaderboards, is widely used in a multitude of areas throughout society (Rapp et al., 2019). Over the years, gamification has become a well-established technique to promote an engaged workforce to improve performance in organizations (Murawski, 2020). To motivate employees to be highly engaged at work and, thus, to increase organizational performance, organizations are experimenting with the concept of gamification and the use of game elements (Murawski, 2020). Proponents have pointed out that gamification can increase motivation and engagement

and change behaviors and attitudes (Agogué et al., 2014; Deci & Ryan, 1985; Gimenez-Fernandez et al., 2021; Kumar & Raghavendran, 2015; Murawski, 2020). A recent line of research has established that gamification increases perceived self-efficacy, i.e., the extent to which individuals are confident about their skills to complete tasks and projects (Bandura, 1994, 1997) and the likelihood of entrepreneurial behavior (Boyd & Vozikis, 1994; Caines et al., 2019; Chen et al., 1998; Hmieleski & Corbett, 2008; Mauer et al., 2017; Mustafa et al., 2018; Polo-Peña et al., 2020; Sequeira et al., 2007). Bandura (1997) was one of the first to define self-efficacy as the domain- and situation-specific belief about one's capabilities, determining the extent to which individuals are confident about their skills to complete tasks and projects. Bandura (1994, 1997) outlined four distinct sources to instill people's beliefs about their efficacy: mastery experiences, vicarious experiences, social persuasion, and emotional and physiological states. For instance, mastery experiences can increase self-efficacy when someone takes a new challenge and succeeds. This experience builds a robust belief in one's efficacy. Vice versa, experiences of failure undermine one's self-efficacy. Role models provide vicarious experiences. A role model can encourage an individual to perform a specific task when the role model succeeds by a sustained effort. Hence, the personal belief to master comparable activities increases. When an individual receives positive verbal feedback for undertaking a complex task, the person believes in having the skills and capabilities to succeed. Furthermore, a person's emotional, physical, and psychological well-being can influence their belief in their abilities to perform a specific action.

Overall, and considering the sources of self-efficacy, the impact of game mechanics on self-efficacy becomes clear: game design elements that provide positive feedback for engaging in entrepreneurial behaviors, either individually or from peers, stimulate the individual's self-efficacy (Banfield & Wilkerson, 2014; Rachels & Rockinson-Szapkiw, 2018). In particular, points can address these motivational mechanisms, being virtual rewards and providing performance-related immediate feedback (Sailer et al., 2013). Moreover, recognition and rewarding,

and championing the employee's initiatives foster their motivation to perform entrepreneurial activities (Globocnik & Salomo, 2015; Rutherford & Holt, 2007; Wakkee et al., 2008).

Designing gamification

Numerous scholars have researched designing gamification to create meaningful gamification systems in the context of human resources (Murawski, 2020). Recent studies point out that the mere implementation of gamification mechanisms does not automatically lead to improved human resources practices and tools (Hamari et al., 2016; Herranz et al., 2018; Marache-Francisco & Brangier, 2015) and suggest that meaningful gamification design, i.e., that evokes intended behavior, considers the employees' characteristics and needs (Sailer et al., 2013; Sox et al., 2014; Stadnicka & Deif, 2019). For example, Hunicke and colleagues (2004: 5) confirm the centrality of human-centered gamification design by suggesting, "by understanding how formal decisions about gameplay impact the end-user experience, we can better decompose that experience, and use it to fuel new designs, research and criticism respectively." Furthermore, most of the research on gamification design agrees that iterative approximation and continuous improvement ensure the ever-increasing effectiveness of gamification (Georgiou et al., 2019; Ivan et al., 2019; Morschheuser et al., 2017a). For example, Morschheuser and colleagues (2017a) propose a stages method for the systematic development of gamified systems. The authors note that this provides many advantages such as reuse of knowledge, adaptive to changing needs, and optimal results guaranteed by evaluation and monitoring (Morschheuser et al., 2017a). More specifically, their framework for gamification implementation includes seven main phases: (1) Project preparation, (2) Analysis of context and users, (3) Ideation, (4) Design, (5) Implementation, (6) Evaluation, and (7) Monitoring. According to Morschheuser and colleagues (2017a), a gamification design process begins with discussing and clarifying the objectives of the gamification application, followed by building an understanding of the target group, which will be addressed by gamification needs (Morschheuser et al., 2017a). The authors claim

that characterizing and segmenting the target group is necessary to include attributes of the users, their motivational factors, needs, and user goals in the design. Notwithstanding, the authors argue that the granularity of the user analysis depends on the context, pointing to the risk of inefficient user analysis if the user group is large and heterogenic. Subsequently, brainstorming and consolidating ideas are valuable tools to ideate and design the gamification application. This design process will be used in the following research for the analysis and development of suitable gamification strategies for enhancing employees' motivation to engage in entrepreneurial behaviors at work.

Gamification Framework to Enhance Employee Entrepreneurial Behaviors

Background Information and Data Collection

This project was conducted in a new venture operating in the IT sector in Germany. The investigated firm was founded in 2016 by a team of four entrepreneurs. The firm operates in the IT sector and provides static application security testing to national and international customers. At the time of this study, in early 2019, the company had 23 employees. Data collection took place between June 2019 and March 2020 and was divided into three phases. In the first phase, in June 2019, I carried out preliminary field work to familiarize myself with the company and its business model. I talked to the founders (N=4) to understand the firm's strategic orientation. I supplemented the interview data with field notes from observations of the employees. In the second phase, between July and September, I planned and designed the gamification tool, following the 7-step approach according to Morschheuser and colleagues (2017a). In the third phase, in October 2019, the tool was implemented. On-site observations and interviews with employees working in the new venture were conducted to examine the effects of the gamification tool. The design process is described below in detail.

Design Process

The design process follows the 7-step approach by Morschheuser and colleagues (2017a):

Project Preparation. The gamification tool is designed to enhance users' motivation to engage in entrepreneurial behaviors. Thus, the more employees show entrepreneurial behaviors and attitudes, the greater the use of the application.

Analysis and context of users. Morschheuser and colleagues (2017a) suggest that a detailed user analysis may lead to inefficiency and is not always necessary. Hence, in this project, the focus is on gathering user feedback to iteratively adapt the design after the prototype is implemented.

Ideation. Traditional ideation tools, i.e., canvases and decision trees, are used to brainstorm and consolidate ideas on the application. More specifically, the conceptual stage of the design process includes a literature review on the use of gamification in the context of entrepreneurial behaviors.

Design. The tool focuses on using game-design elements providing feedback, including a point system, a leaderboard, a trophy, as well as the company's internal chat program. Each game-design element is described below:

- Point System and Leaderboard: Employees get points for introducing new and valuable ideas, processes, or procedures to change and improve the work environment. A display in the office hallway shows the point system, respectively, the leaderboard.
- Trophy: The winner of a game round, lasting three months, achieves a trophy and a company-branded seat cube.
- Internal Chats: Users can access information (i.e., announcements regarding awarding of points, current leaderboard) through a chat program and a webpage solely built for this tool.

Moreover, employees are provided with a digital manual that provides the rules that are summarized below:

- Fair play.

- The points are awarded through the nomination of a colleague or by reporting to the referee.
- The referee accepts nominations.
- You can get 1 to 3 points for each entrepreneurial action.
- Points will be deducted in the event of a rule violation.
- The collection of points runs over three months.
- After the end of the game period, all points expire, and the game starts again.
- There are no rules except the ones mentioned here.
- Be creative.
- Group work is possible.
- In the case of group work, each of you gets points (1-3 points).

Implementation and monitoring. The gamification tool was designed for and implemented in a high-tech venture operating in the IT sector in Germany. Data from on-site observations and user interview data will help iteratively adapt the gamification design. Interviews with employees (N=8) will help understand the gamification tool's effects on their behaviors. As suggested for exploratory interviews, interviews were guided by open-ended questions (Aaker & Day, 1983). Face-to-face interviews with randomly selected employees lasted between 10 and 30 minutes. Participants are asked to express their opinion on the gamification tool freely. Reviewing field notes taken after interviews and informal conversations also helped me analyze the interviews. Moreover, I was present at the company and provided ethnographic insight into operational activities, tensions, and engagement across the enterprise. This allowed me to be part of the firm, working with the employees and building a trusting relationship to encourage their willingness to share personal insights in the study. I took field notes based on on-site observations to gain an abstract understanding of employee entrepreneurial behaviors. Employees began to collect points one week after the game was announced. In total, 16 initiatives were started, one of which has been initiated in group work. Seven initiatives relate to integrating new employees, having events after work with colleagues (1, 2, 6,

8, 11, 13, 15). Three initiatives refer to sustainability, introducing structured waste collection in the office (3, 7, 10). Three initiatives are intended to enhance the fun at work (4, 9, 12). Two initiatives related to knowledge sharing within the company, creating handbooks for new employees working in the venture (5, 14). Initiative number 16 goes even further, introducing a social media game that is intended to be connected to our project, awarding one point to the one who shares the most company-related content on his or her private social media profile. An overview of the ideas and projects is summarized in table 1.

Table 1. Overview on employee entrepreneurial behaviors

No.	Employee(s)	Initiative	Points
1	1	Organizing a bicycle tour through the city to give an overview of sightseeing spots	3
2	2	Inviting everyone to visit a festival on the weekend together	2
3	3	Collecting bottle caps for charity	2
4	4	Having birthday serenade on birthdays	2
5	5, 6	Creating a handbook with first-hand tips for relocating to Germany	3
6	7	Organizing a movie night in the office	3
7	1	Collecting electronic waste	2
8	7	Organizing a game night in the office	3
9	5	Organizing a Christmas gift game	3
10	1	Collecting battery waste	2
11	7	Organizing a poker tournament in the office	3
12	8	Having 'Smoothie Friday' where smoothies will be made out of leftover fruits	3
13	8	Organizing a Christmas movie and a game night in the office	3

After six months of running the project, the project was monitored and recapped. According to a manager, the project succeeded, stating,

“We have several employees engaging in the game. I feel that the gamification project enables employees to have space and the opportunity to behave entrepreneurially”.

The employees welcome the opportunity to contribute to a collaborative work environment. One employee emphasizes,

“I like the team aspect, although it is a competition between the colleagues. It is fun to have the opportunity to influence the work environment and to do good for my colleagues by having fun playing the game”. (employee 1)

Notwithstanding, the employees seem to struggle with the competition linked to the project. One employee states,

“I do not want to be the first one collecting points since competitive thinking is completely new to us. For example, when I set out the invitation for the game night, I became number one on the leaderboard. I felt bad because the last employee to collect points wins, even if points tie”.

An employee criticizes that the point system was not transparent at the beginning, stating,

“When the first game round started, I did not understand what I could do to receive points. But the more points were awarded, the more ideas I got on which initiatives to drive”.

Evaluation. Considering the feedback from the employees and the experiences and observations made by the managers, the initial design of the gamification project already contributed to a successful project. However, employees note that the game’s rules need to be communicated more precisely. Furthermore, other game-design elements that foster collaboration will be implemented to test whether negative feelings about the gameplay reduce the employees’ motivation to engage in entrepreneurial behaviors.

Discussion

The gamification framework presented in this study was designed to enhance employee entrepreneurial behaviors in new ventures. The findings first unfold that gamification can enhance employees' motivation to engage in entrepreneurial behaviors. More specifically, this study finds that game-design elements that provide immediate feedback are helpful in this context. Secondly, this study suggests that employees' entrepreneurial behaviors help firms cope with growth-related organizational challenges, focusing on collaboration and teamwork, adhering to a trustful organizational culture, and building informal relationships among colleagues. In the following, I discuss the implications of these findings for theoretical debates on gamification and employee entrepreneurial behaviors.

First, this research contributes to gamification research by providing a tool that can be employed and implemented in organizations to enhance employees' motivation to engage in entrepreneurial behaviors. While existing studies suggest that gamification plays a role in entrepreneurial behaviors, my findings unfold that game-design elements providing feedback can foster employee entrepreneurial behaviors. Following recent gamification research (Boyd & Vozikis, 1994; Caines et al., 2019; Chen et al., 1998; Hmieleski & Corbett, 2008; Mauer et al., 2017; Mustafa et al., 2018; Polo-Peña et al., 2020; Sequeira et al., 2007), this study assumes that points, leaderboards, and trophies can increase self-efficacy, and, thus change behaviors and attitudes. Hence, these findings emphasize that gamification is suitable for increasing nascent behavior and enhancing employee motivation to engage in entrepreneurial behaviors. Thus, my findings draw attention to the relevance of gamification tools that increase self-efficacy to enhance employees' motivation to engage in entrepreneurial behaviors.

A second implication offered by the findings of this study concerns a refinement of our understanding of how gamification can create value in organizations (Deterding, 2019; Landers et al., 2017; Sarangi & Shah, 2015). My study reveals that employees help firms cope with growth-related organizational challenges, focusing on collaboration and teamwork, adhering to

a trustful organizational culture, and building informal relationships among colleagues. As such, my study aligns with work in the entrepreneurship literature that emphasizes that entrepreneurial behaviors held by employees can improve organizational performance (Chrisman, Bauerschmidt, & Hofer, 1998; Hughes et al., 2018; West & Noel, 2019; Zahra et al., 2002). These behaviors refer to coping with growth-related organizational challenges, intended to improve internal structures and processes.

Third, this article directly responds to the recent call for additional design science studies in the gamification literature (Hassan et al., 2018; Mora et al., 2017; Morschheuser et al., 2019). More specifically, and using the 7-step approach of gamification design according to Morschheuser and colleagues (2017a), this study emphasizes the need to turn our attention from a theory-oriented course to more practice-oriented approaches to gamification design.

A final important implication surfacing from my findings is that competition may hamper employees to engage in the gameplay. In this study, employees note that the rules and the gamification design (i.e., using competitive game-design elements) promote competition among the employees that, in turn, may have negative effects on collegial relationships. This is in line with previous research on gamification that reports on mixed effects of gamification on cognitive and motivational outcomes (Morschheuser et al., 2019; Sailer & Homner, 2020; Santhanam et al., 2016; Papp & Theresa, 2017). This leads to the assumption that other forms of competition, i.e., team competition (Morschheuser et al., 2019), or combining competition with collaboration (Sailer & Homner, 2020) are more effective within gamification for fostering entrepreneurial behaviors in new ventures.

For future research, it would be interesting to examine other gamification frameworks and their implications for employees' motivation. A helpful approach would be to use other gamification design processes and include user analysis and context. How do player types (Lopez & Tucker, 2015) affect gamification performance? More specifically, Hunicke and colleagues (2004: 5) confirm the centrality of human-centered gamification design by suggesting,

“by understanding how formal decisions about gameplay impact the end-user experience, we can better decompose that experience, and use it to fuel new designs, research and criticism respectively.” Moreover, how do environmental conditions (e.g., organizational culture, organizational resources) or the individual’s job affect employee entrepreneurial behaviors? Examining these questions will allow researchers to understand the effects of gamification on employee entrepreneurial behaviors and how this affects organizational performance.

Thus, research on gamification to enhance entrepreneurial behaviors will lead to a more robust interpretation of findings on how employees respond to various gamification designs. Furthermore, research on different gamification frameworks will help build more generalizable findings on the use of game-design elements in the context of new ventures. Moreover, it would be of great value to examine how single game-design elements influence employee motivation and to assess which role other collaborative or competitive gamification environments might play in this context. The gamification literature has frequently emphasized that competition might be detrimental to satisfaction and motivation (Hamari & Parvinen, 2019; Sepehr & Head, 2013). Nevertheless, some have also argued that gamification turns individuals’ intrinsic to extrinsic (Chee & Wong, 2017; Mitchell et al., 2020; Witt et al., 2011). In this regard, my findings sensitize us to the fact that gamification does not necessarily add value to the organization or help enhance employee motivation. However, understanding how extrinsic motivation and competition might hamper gamification effectiveness would be of great value to provide evidence of the degree to which gamification enhances employee entrepreneurial behaviors.

This study also has its limitations. Methodologically, this study was a design science research. This method and analysis has been widely adopted by prior gamification research and explored the use of gamification to enhance entrepreneurial behaviors from multiple perspectives. Notwithstanding, further research needs to be conducted to exclude alternative explanations for the employee’s entrepreneurial actions. To address this limitation, I suggest conducting observa-

tions, interviews, and surveys in the long term to monitor the employees' behaviors and attitudes towards entrepreneurship. This also allows researchers to adapt the proposed framework likewise to ensure the ever-increasing effectiveness of the use of gamification

Despite these limitations, I believe this paper offers fresh and relevant insights into the link between gamification, self-efficacy, and employee entrepreneurial behavior. More specifically, this study represents a first step on how new ventures can use gamification to cope with growth-related organizational challenges. I conclude that researchers should continue to apply and research the effects of gamification on employee behavior in as many areas of applications as possible. Accordingly, other design science approaches like the current will help build a more thorough understanding of how gamification works and how gamification can serve as a favorable tool to promote organizational success.

Conclusion

In this study, I explored how gamification can help firms enhance employee entrepreneurial behaviors. Drawing on a design science approach, building on recent research on gamification and using observational and interview data, I develop a gamification framework to increase employees' motivation to engage in entrepreneurial behaviors in a new venture operating in the IT sector in Germany. I built on Morschheuser and colleagues' (2017a) study and proposed a list of features required for meaningful gamification design. Besides showing that game-design elements that provide feedback enhance employees' motivation, my findings reveal how gamification enabled the firm to cope with organizational growth-related challenges. In doing so, this paper offers two theoretical contributions. First, it widens our understanding of gamification for self-efficacy and, in turn, entrepreneurial behaviors. Second, I highlight that employee entrepreneurial behaviors can improve collaboration and teamwork and build a trustful organizational culture and informal relationships among colleagues.

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