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Abstract

Although corporate venturing (CV) is associated with acquiring new skills and competencies and with achieving corporate vitalization, there are limited insights as to how CV activities in small and medium sized enterprises (SMEs) relate to knowledge acquisition and performance. To address these, we utilize survey data of 570 organizational members, up to the top management level, of SMEs in Germany. The results indicate that CV positively affects knowledge acquisition and performance. Additionally, we found positive moderation effects of transformational leadership and technological turbulence on the CV-performance relationship. Further analysis confirmed a strong mediation effect of knowledge acquisition (KA) on the CV-performance relationship. The results also suggest that firms practicing CV in high technology dynamism related industries face *a triangle of tensions* where high technology turbulence supports exploitation of existing competitive advantages, but the former dampens the exploration of future competitive advantages through new knowledge.

Keywords: Corporate venturing, transformational leadership, knowledge-based view, technological turbulence, firm performance

JEL Classifications: L26, O30

1. INTRODUCTION

A research field on the rise – this phrase best describes the domain of corporate venturing (CV) where extant research has witnessed a steep increase in interest and organizations have utilized CV as a means of developing new capabilities, creating shareholder value, refreshing operations, improving performance and renewing strategies (Narayanan, Yang & Zahra, 2009; Urbano, Turro, Wright & Zahra, 2022). CV refers to the "corporate entrepreneurial efforts that lead to the creation of new business organizations" (Sharma & Chrisman, 1999, p. 19). There is a growing body of literature exploring CV in relation to performance outcomes (Zahra, 1996; Wadhwa, Freitas & Sarkar, 2017; Hmieleski, Corbett & Baron, 2013; Battisti, Nirino, Leonidou & Thrassou, 2022) and the extent of knowledge acquired by the firm (Schildt et al., 2005; Wadhwa & Kotha, 2006; Wadhwa, Phelps & Kotha, 2016; Covin, Garrett, Kuratko & Shepherd, 2020). We now know that CV is associated with improving firm performance (Narayanan et al., 2009) and gaining new knowledge (McGrath, Venkataraman & MacMillan, 1994; Schildt et al., 2005; Titus, House & Covin, 2017). Despite the pioneering work of previous scholars, substantial gaps still remain in order to advance the field of CV with regards to its relationship with knowledge acquisition (KA) and firm performance.

Although a small group of studies explore the joint venturing mode in CV (Shortell & Zajak, 1988; Park & Kim, 1997; Inkpen, 2000), majority of studies focus either on single or dual venturing modes, i.e. either on internal or external corporate venturing or a combination thereof (e.g. McGrath, 1995; Park & Kim, 1997; Anokhin, Örtqvist, Thorgren & Wincent, 2011; Basu & Wadhwa, 2013; Covin, Garrett, Kuratko & Shepherd, 2015; Garret & Covin, 2015). In other words, most existing studies do not span the complete domain of CV, which includes internal corporate venturing (ICV), cooperative corporate venturing (CCV) and external corporate venturing (ECV) as outlined by Morris et al. (2011). Morris et al. (2011, p. 86) specifically argue that "a firm's total venturing activity is equal to the sum of the ventures enacted through the internal, cooperative, and external modes". In other words, to assess the total effect of CV in firms, the measurement construct of CV should incorporate all the aforementioned three forms of CV. While researching one of the three forms might be beneficial for elaborating on distinct research questions, it will not allow for generalization of findings when exploring the positive effects of CV.

Furthermore, even though there is a common view that the inflow of new knowledge acquired as a result of firms' involvement in CV is important, to the best of our knowledge there is no extant study that has focused on applying a direct measure for assessing firm level KA in CV research. More specifically, rather than using direct measures, extant studies explore knowledge influx or KA by measuring the constructs in form of their specific outcomes such as applying patent measures operationalized as proxy (Schildt et al., 2005; Wadhwa & Kotha, 2006; Keil et al., 2008; Anokhin et al., 2011; Wadhwa et al., 2016; Cirillo, 2019) or corporate venture capital (CVC) and other knowledge performance measures such as investment in CVC, investment in funded ventures, new CVC partnerships, adoption and termination of CVC units, the relative usage of acquisitions, and venture performance measured in terms of knowledge generated (Dushnitsky & Shaver, 2009; Dushnitsky & Lavie, 2010; Basu, Phelps & Kotha, 2011; Gaba & Bhattacharya, 2012; Basu & Wadhwa, 2013; Covin et al., 2015; Titus, House & Covin, 2017). Although the gains from knowledge inflows through patent citations are fairly well researched (Grant, 1996; Grant, 1997; Erden, Klang, Sydler & von Krogh, 2014), surprisingly no research was found to have been undertaken to assess the direct effect of CV (when measured as a combination of ICV, CCV and ECV) on KA and whether KA mediates the relationship between CV and performance.

Another considerable gap in the CV field, in terms of its relationship with KA and firm performance, pertains to the role of leadership and technological changes. Management teams need to be able to conclusively determine the effect of transformational leadership (TL) and technological turbulence (TT) on the CV-KA/performance relationship in order to make informed decisions. Yet, there is a lack of clarity as to how CV activities and the relationship with KA and performance are influenced by TT and TL. Extant literature has already unfolded how external factors associated with CV – in particular environmental and technology related factors (e.g. dynamism, hostility, competitive intensity, and technology strategy) – influence the KA and performance relationship. However, there is a specific link missing in terms of the need to address how TT affects the CV-performance/KA relationship because we operate in a turbulent environment with rapid technology cycles that are characterized by unpredictable timings (Yang, Ma, Zhao, Cater & Arnold, 2019). Similarly, extant literature is rather silent as to the role of leadership in the CV and performance/KA relationship (Ensley, Pearce & Hmieleski, 2006; Narayanan et al., 2009; Hmieleski, Cole & Baron, 2012; Eva, Newman, Miao, Cooper & Herbert, 2019). Yet, CV activities may require successful leadership in order for the activities to have an impact on acquisition of knowledge and generate new performance differentials. Therefore, theory and practice would benefit from having

a more fine-grained understanding of how the CV and performance/KA relationship are influenced by both TT and TL.

Another area which warrants further investigation is the application of CV in small and medium-sized enterprises (SMEs). Presently, only few studies have explored CV in SMEs and these have predominantly focused on the USA, Sweden, China, India, and the UK (McDougall, Robinson & DeNisi, 1992; Miles & Covin, 2007; Yamakawa, Khavul, Peng & Dees, 2013; Naldi & Davidsson, 2014). Compared to large size firms, the organizational structures, processes, and practices of SMEs tend to differ and might be affected differently by environmental and firm-level factors, which may in turn lead to divergences in KA and performance outcomes. As the number of SMEs make up such an important share (approx. 332 million SMEs worldwide with 1-249 employees) compared to their large size counterparts (approx. 337,000; >250 employees) (Clark, 2022a; Clark, 2022b), it is important to understand how the aforementioned environmental and firm-level factors (i.e. TT and TL) influence SMEs in the CV-KA and performance relationship.

As Schildt et al. (2005) suggest, it is equally important for researchers and practitioners to cross validate findings that apply different measures to assess the inflow of knowledge from CV, by including small to large size companies' perspectives, to make findings more generalizable. Narayanan et al. (2009, p. 64) highlight a similar call, arguing that "given the range of strategic benefits associated with CV (e.g., learning and capability building), more creative measures [of CV] are needed in future research". We therefore argue that it is vital to explore CV through its complete domain stipulated by Morris et al. (2011) – i.e. ICV, CCV, and ECV – and, at the same time, evaluate its impact on KA through a direct measure. We address both of these points in this study.

In order to shed more light on the aforementioned research gaps, this paper is guided by the following research questions: (1) How does CV influence knowledge acquisition and performance in SMEs? (2) How does transformational leadership and technological turbulence affect the CV-knowledge acquisition and performance relationship in SMEs? (3) How does knowledge acquisition mediate the CV-performance relationship in SMEs? To address these, we utilized a quantitative survey of 570 organizational members drawn from management teams of SMEs in Germany, spanning twenty-two different industries. Our study offers a number of important contributions to the literature. First, we develop a measure of CV that spans its whole domain, thereby providing a broader foundation on which future studies can build upon. While extant research focuses either on ICV or ECV, our research explicitly includes all three domains as outlined by Morris et al. (2011), i.e. ICV, CCV, and

ECV, thereby contributing to the development of a new measurement scale. Second, this is the first known study to explore the combined direct effects of CV (ICV, CCV, and ECV) on KA and performance. Third, this is also the first research study to the best of our knowledge to explore the mediating impact of KA on the CV-performance relationship. Fourth, this study enhances our understanding of the effects of TT and TL on the CV-KA and performance relationship. Finally, this research extends knowledge on how the aforementioned relations occur in the SME context in Germany.

In the next section, we provide a holistic review of the theoretical foundations of our hypotheses in exploring the relationship between CV and KA as well as performance, and the moderating influences of TT and TL, as outlined in our research model (Figure 1). After this, we explain the methodology, including the sample, followed by the data analysis and the results of the research. In the final section, we provide a discussion of the research implications and conclusion.

[INSERT **Figure_1_ The effect of CV on KA & performance** Here]

2. THEORY

Corporate venturing

Nested within the broader domain of corporate entrepreneurship (CE), corporate venturing (CV) refers to various methods for creating, adding to, or investing in new businesses (i.e., new product-market combinations) involving the formation of new organizational units (Sharma & Chrisman, 1999; Morris et al., 2011) "in existing or new fields, markets or industries—using internal [, cooperative] and external means" (Narayanan et al., 2009, p. 59). This paper precisely focuses on CV in terms of creating new businesses in established organizations, in order to close the highlighted research gaps in the prior section.

Our research follows the seminal work of Burgelman (1983), which shows how firms create new organizational venturing units in the form of autonomous divisions or departments to operationalize newly created businesses. This view was reinforced by Sharma & Chrisman (1999, p. 19) as they regard CV as "new organizational units that are distinct from existing organizational units in a structural sense (e.g., a new division)". This '*separate unit view*' is echoed by several recent authors and back in the days (von Hippel, 1971; Burgelman, 1985; Shortell & Zajac, 1988; McGrath, Venkataraman & MacMillan, 1992; Burgers et al., 2009; Garrett &

Neubaum, 2013; Dushnitsky & Birkinshaw, 2016). In our view, this is an important differentiation criterion in measuring CV, as measurement models need to cater for this distinction.

Specifically, our research combines the *'separate unit view'* with Morris et al.'s (2011) perspective of CV, which proposes three sub-dimensions – internal corporate venturing (ICV), cooperative corporate venturing (CCV) and external corporate venturing (ECV). "With ICV, new businesses are created and owned by the corporation", different to CCV, which "refers to entrepreneurial activity in which new businesses are created and owned by the corporation together with one or more external development partners" (e.g. joint venture) (Morris et al., 2011, p. 86). The third domain, ECV, "refers to entrepreneurial activity in which new businesses are created by parties outside the corporation and subsequently invested in or acquired by the corporation" (Morris et al., 2011, p. 86). Prior studies imply that all forms of CV (ICV, CCV and ECV) have one thing in common; they all seek revitalization of the firm by means of creating new businesses in established organizations, through the inflow of new knowledge to recombine existing capability and competency sets to achieve competitive advantage, growth and firm survival (Zahra et al., 1999; Covin & Miles, 2007; Burgers et al., 2009; Narayanan et al., 2009; Titus et al., 2017).

Corporate venturing and the knowledge-based view

As outlined by Burgers et al. (2008), in knowledge-based economies, competitive advantages vanish at an ever-increasing rate. Building up and maintaining sets of competitive advantages is at the heart of every firm. Knowledge-based resources form the foundation of performance differentials and firm success (Inkpen, 2000). Having its foundation in the resource-based view, knowledge is regarded as the most strategically important resource of the firm as it is considered a primary input for production (Grant, 1996). The knowledge-based view of the firm is highly relevant to the context of CV as it describes the criticality of knowledge accumulation and transfer for firm success and performance in general (Burgelman, 1983; Thornhill & Amit, 2001; Narayanan et al., 2009).

3. HYPOTHESES

Corporate venturing and knowledge acquisition

The CV domains of internal corporate venturing (ICV), cooperative corporate venturing (CCV), and external corporate venturing (ECV) all have one thing in common – they are all individually concerned with the creation of new businesses. First, with regards to ICV, a study by Covin et al. (2020, p. 2) presents empirical findings from 145 ICVs, which suggest that ICVs and the associated managers need to show their proficiency in "acquiring extensive new … operations-related knowledge". Also, in a longitudinal study of ICVs within a large electronics manufacturer, Keil, McGrath and Tukiainen (2009, p. 601) found that ICVs were "temporary conduits for capability development". In other words, the focus of ICVs was on the development of skills and knowledge, which was subsequently applied elsewhere in the organization (i.e. ICVs served as a vehicle for knowledge acquisition (KA) and internal knowledge transfer) (Keil et al., 2009). Second, with regards to CCV, Inkpen (2000) illustrate how CCV, i.e. through joint venturing, can help firms to exploit learning opportunities through newly acquired knowledge. Also, Lyles & Salk (2007) analyzed 201 SME based two-party joint ventures with 50/50 equity split. They explain that international joint venturing that is characterized by having learning capacity, goal articulation, and active involvement of parent, show a strong impact on KA. Third, as observed with ICV and CCV, a similar picture holds when evaluating the effect of ECV on KA. In a study analyzing a US based sample of 110 ICT firms, Schildt et al. (2005) ascertain that less integrated ECV modes and technology relatedness have significant effects on KA in form of explorative learning. Lai, Chiu and Liaw (2010) argue that ECV helps firms to acquire external knowledge to expand the firms' knowledge base and generate new technological capabilities.

Therefore, the domains of CV can be viewed as a mechanism for how firms build new capabilities and technological competencies. It is expected that the CV construct's association with acquisition of new knowledge, is not only on an individual level (i.e. either through ICV, CCV, or ECV) but also on the aggregated CV-level. Yet, there is no known research that has focused on the direct effect of CV on KA by spanning the whole domain of CV, i.e. ICV, CCV and ECV. This paper examines the expected positive relationship between CV and KA, where CV is operationalized through ICV, CCV, and ECV. Therefore, taken together, we hypothesize that:

Hypothesis (H1). *CV is positively related to KA.*

Corporate venturing and performance

There has been some advancement in extant literature in terms of the different effects of CV on a variety of firm performance outcomes. For example, with regards to CV, some studies evaluate how market aspects (e.g.

market attractiveness, market familiarity, as well as venture offerings that target market fit) influence performance outcomes (Chandler & Hanks, 1994; Covin et al., 2015; Garret & Covin, 2015); some studies also evaluate how strategy in CV, specifically in new ventures, relates to performance outcomes (McDougall et al., 1992; Zahra, 1996; West & Meyer, 1998).

In a study using primary data from 145 ICVs, Garrett & Covin (2015) found that parent-venture market closeness, venture opportunity identification, and planning autonomy moderate the relationship between venture independence and ICV performance. Further, with regard to CCV, Zahra and Hayton (2008) highlight that CCV's effect on performance (i.e. profitability and revenue growth) is dependent on its ability to absorb and successfully exploit new knowledge acquired from markets. Additionally, in terms of ECV, Belderbos, Jacob and Lokshin (2018) demonstrate in a study of 55 corporate venture capital (CVC) active firms that geographically diversified CVC portfolios enhance performance if firms avoid knowledge redundancy in terms of knowledge acquired from technology alliances. In other words, newly acquired knowledge leads to performance enhancements if the acquired knowledge does not have overlaps with technology alliances. All the three corporate venturing domains have a close relationship with performance outcomes. It appears that new businesses may be the underlying mechanism connecting all forms of CV, thereby enabling "companies to revitalize and improve their strategic and financial performance by exploring new opportunities" (Biniari, Simmons, Monsen and Moreno, 2015, p. 351). Despite the growing literature evaluating the effect of CV on firm performance, it is unknown as to how the combined three CV modes (ICV, CCV, and ECV) directly relate to performance outcomes. We believe that CV, comprised of the three modes (ICV, CCV, and ECV), will also positively affect performance outcomes. Thus, we hypothesize that:

Hypothesis (H2). *CV is positively related to firm performance.*

The moderating role of transformational leadership

We examine transformational leadership (TL) as a moderating variable in the CV-KA and performance relationship due to prior research having established a close link between TL, strategic knowledge related variables, and performance (García-Morales, Llorens-Montes & Verdu-Jover, 2008; García-Morales, Jiménez-Barrionuevo & Gutiérrez- Gutiérrez, 2012). "TL can be defined as the style of leadership that heightens

consciousness of collective interest among the organization's members and helps them to achieve their collective goals" (García-Morales et al., 2012, p. 1040).

Although extant literature explores various direct and indirect effects of different leadership styles (i.e. participative, shared authentic, and transformational) on performance (such as new venture top management team (TMT) performance, individual job performance, new venture performance, and product innovation performance) (Hmieleski, Cole & Baron, 2012; Chen, Tang, Jin, Xie & Li, 2014; Eva et al., 2019), to the best of our knowledge, there is no empirical research available in extant literature, which explores the CV-performance relationship moderated by TL. This is especially intriguing as the positive effect of both CV and TL on performance has been widely cited in the literature (Zahra, 1996; Covin et al., 2015). Firms conducting CV activities with the aim to improve financial and non-financial performance metrics need to understand how leadership affects the aforementioned relationship.

Likewise, it is important to examine the effect of TL on the CV-KA relationship. Firms, through different forms of CV, need to acquire and integrate new knowledge for firm survival and renewal of established structures, processes, markets, and products/services (Schildt et al., 2005). Transformational leaders, in turn, are equipped with charisma, and contribute with inspiration and intellectual stimulation (Bass, 1999; García-Morales et al., 2012). These leaders promote knowledge generation, which might lead to increased levels of organizational learning and performance (García-Morales et al., 2012). However, extant research does not shed light on how TL affects the CV-KA relationship. Yet, it is crucial for top managers to understand how CEOs' and TMTs' leadership affect decision-making with regards to the CV-KA relationship.

Leadership, the incorporation of new knowledge, and CV can be an important relational triangle. The studies by García-Morales et al. (2008) and García-Morales et al. (2012) illustrate the strong interrelationship between TL, knowledge, and organizational performance, and how the variables affect each other. We therefore expect that there is a positive moderation effect of TL on the CV-KA and CV-performance relationships. We consequently hypothesize the following:

Hypothesis (H3). *The CV-KA relationship is positively moderated by TL, such that increases in TL lead to stronger positive CV effects on KA.*

Hypothesis (H4). *The CV-performance relationship is positively moderated by TL, such that increases in TL lead to stronger positive CV effects on performance.*

The moderating role of technological turbulence

Despite the contributions of prior studies in advancing the field of research with regards to technological knowledge assimilated from CV activities, important gaps remain within extant literature. Little is known about the moderating effect of technology on the CV-KA, as well as the CV-performance relationships, especially when the exogenous effect of CV on KA and performance is designed as a combined effect of ICV, CCV, and ECV. This is especially surprising since extant research has highlighted the important relationship between CV, technology, performance, and knowledge in numerous studies (Miles & Covin, 2002; Chandler & Lyon, 2009; Yamakawa et al., 2013; Kuratko, Covin & Garrett, 2009; Titus et al., 2017). For example, Titus et al. (2017) explain through a sample of 1,326 firm-year investigations that 'venturing' exploration is positively associated with the relative usage of acquisitions (i.e. the acquisition and usage of the target company's knowledge foundation). The aforementioned authors posit that the relationship between 'venturing' exploration and usage of acquisitions is positively moderated by technological dynamism (i.e. technological turbulence (TT)). Therefore, we include TT as an environmental moderator in this study to shed more light on the foregoing four-variable link. Thus, we follow other researchers (Chandler & Lyon, 2009; Titus et al., 2017) who specifically study, within the context of CV activities, the effect of technological variables on KA (degree of exploration, i.e. relative use of acquisitions) and performance. We expect that the CV-KA and CV-performance relationships will be positively moderated by technological changes in the environment. Thus, we hypothesize that:

Hypothesis (H5). *The CV-KA relationship is positively moderated by TT, such that increases in TT lead to stronger positive CV effects on KA.*

Hypothesis (H6). *The CV-performance relationship is positively moderated by TT, such that increases in TT lead to stronger positive CV effects on performance.*

The mediating role of KA

Earlier we addressed the effect of CV on performance. We argue here that KA should be explored as a potential mediator in the aforementioned relationship. With regards to the relationship of KA on performance, extant literature reveals there is a research field on the rise (Chandler and Lyon, 2009; Sullivan and Marvel, 2011; Naldi

and Davisson, 2014; Cegarra-Navarro, Soto-Acosta and Wensley, 2016; Xie, Zhou and Qi, 2018). The aforementioned studies all confirm that KA or KA related forms positively influence performance. For example, Cegarra-Narvo et al. (2016) found that a specific set, and utilization, of a given knowledge management process, which includes KA, has a positive relationship on performance.

While extant research indicates increased research on the relationship between CV/KA on performance, there is limited knowledge on how KA mediates the relationship between CV and performance. Although there is extant research on the mediating effect of KA in relationships with performance outcomes, these studies include different independent variables (Li, Wei and Liu, 2010; Birasnav, 2014; Geneste and Galvin, 2015). For example, Birasnav (2014) found that the knowledge management process (that includes KA) strongly and positively mediates the transformational leadership-performance relationship. Therefore, it is quite surprising that there is no known available research which specifically explores how KA mediates the CV-performance relationship. We expect that the CV-performance relationship will be positively mediated by KA. Thus, we hypothesize that:

Hypothesis (H7). *KA positively mediates the CV-performance relationship.*

4. METHODS

Sample

We focused on small and medium-sized enterprises (SMEs) in Germany as these firms make up 99.3% of all firms in the German market (Rudnicka, 2024). We especially decided that this is a good field of study given our interest in exploring a market that has not been previously examined, to the best of our knowledge, in empirical research on CV, thereby enabling us to add new knowledge to extant literature. Following prior studies (DeCelles, DeRue, Margolis & Ceranic, 2012; Ng & Feldman, 2015; Courtright, Gardner, Smith, McCormick & Colbert, 2016; Crilly, 2017) we used an online panel data from Qualtrics™ to obtain our research sample. The overall sample and industry characteristics were determined through Qualtrics' random selection of sample participants. The timeframe for data collection (including test runs) was mid-June to mid-December 2020. Participants of the survey were assured strict anonymity and confidentiality. To test our hypotheses, we collected data by focusing on SMEs across twenty-two different industries, which met the following three criteria: (1) firms which were active, (2) with operational activities in Germany, and (3) with a workforce of 1 to 249 employees (Dada & Fogg, 2016). We calculated the response rate based on the number of participants who opened the Qualtrics invitation

to participate in the study in relation to the number who completed it (Hewlin, Dumas & Burnett, 2017; Brown & Robinson, 2011; Dumas, Phillips & Rothbard, 2013; Long, Bendersky & Morrill, 2011). The number of participants that opened the invitation to participate was 5,484 while 1,262 completed the overall survey, leading to a response rate of 23%. We imputed missing values with an 'educated guess' (Tabachnick & Fidell, 2014) and filtered out univariate outliers (speeders, flat liners, consecutive numberings, and responses with substantially missing values) (Meade & Craig, 2012; Tabachnick & Fidell, 2014; Meade, Pappalardo, Braddy & Fleenor, 2020), providing a final sample size of 570 respondents.

Developing the instruments

We used constructs developed in earlier studies and an original construct created for this research. We followed a double back-translation process. All constructs were developed in English, were translated to German for this study, back-translated to English and again translated to German. The overall process was supported by a German based translation company from Berlin. Disagreements in translation and interpretation were mutually discussed and resolved. This approach ensured that questionnaires were consistent across languages and mirror the approach of other authors in the field (Brislin, 1980; Kreiser, Marino, Louis, Dickson & Weaver, 2010; Cai, Chen, Chen & Bruton, 2017). After the completion of the translation process, we pilot tested the questionnaire in two waves. In the first wave, ten participants tested the translated questionnaire. Their comments led to small modifications in the questionnaire, which was then subsequently tested in wave two with another four participants.

Measures

As outlined earlier, we employed existing constructs to measure our hypotheses whenever possible. However, as there is no available measure in extant literature for operationalizing our theorized corporate venturing (CV) construct in line with our definition, we created our own measure, as explained below.

Corporate venturing (CV). This refers to "various methods for creating, adding to, or investing in new businesses" (i.e., new product-market combinations) involving the formation of new organizational units (Morris et al., 2011, p. 86). CV can take three forms: internal corporate venturing (ICV), cooperative corporate venturing (CCV) and external corporate venturing (ECV) (Phan et al., 2009; Morris et al., 2011; Corbett et al., 2013; Dushnitsky & Birkinshaw, 2016). "With *internal corporate venturing*, new businesses are created and owned by

the corporation", while *cooperative corporate venturing* […] "refers to an entrepreneurial activity in which the new businesses are created and owned by the corporation together with one or more external development partners" (Morris et al., 2011, p. 86). "*External corporate venturing* refers to entrepreneurial activity in which new businesses are created by parties outside the corporation and subsequently invested in […] or acquired by the corporation" (Morris et al., 2011, p. 86). We therefore followed Morris et al. (2011) to theoretically develop the construct. The scale development procedures of Hinkin (1998), MacKenzie et al. (2011) and Kapoutsis et al. (2017) were applied to technically create the measurement scale of CV.

Item generation, review assessment and item reduction. A deductive scale development method was utilized, which started with analyzing the theoretical definition of CV (Hinkin, 1998; Kapoutsis et al., 2017). The items were kept consistent, we avoided "double-barrelled" items, designed items to show little variance and eliminated negatively worded ones (Hinkin, 1998, p. 108; see also Kapoutsis et al., 2017). The item pool was enhanced via two rounds of pretests, which included three academics and one practitioner to assess the quality, comprehensiveness and accuracy of the initial item pool of 12 CV items. The activity carried out by these individuals resulted in the deletion of two items; thus, this left a total of ten items to measure CV.

Administration and rater assessment. A matrix was developed in the questionnaire, showing the 'theoretical definitions' at the top of designated columns, and 'item statements' on the left of the questionnaire, positioned in rows (MacKenzie et al., 2011; Hinkin, 1998). Each rater was asked to assess, on a five-point Likert scale ranging from 1 (not at all) and 5 (completely), how much the 'item-statement' on the left of the questionnaire corresponds to the definitions at the top of the questionnaire. Each rater was thoroughly briefed about the task in written and verbal form prior to the questionnaire launch (Hinkin & Tracey, 1999). The final sample for this rater assessment consisted of 30 respondents (18 males, 12 females).

Scale purification, validity and model fit. This three-step purification approach removed another item (i.e. an extra item was removed in addition to the two items removed earlier), giving a final measurement scale for CV comprising nine items. The individual scales showed good item-to-item correlations (ICV $\alpha = 0.919$; CCV $\alpha = 0.826$; ECV $\alpha = 0.865$), composite reliability (CR) is above 0.6 (ICV = 0.919; CCV = 0.869; ECV = 0.876) indicating reliability of the factors (Bagozzi & Yi, 1988), AVE above 0.5 (ICV = 0.791; CCV = 0.690; ECV = 0.640) confirming convergent validity (Hair, Tatham, Anderson & Black, 2006) and square root of the AVE was bigger than any correlation of any latent factor (Fornell & Larcker, 1981; Hair et al., 2006). Fit indices, which

included the 'marker variables'[1] of knowledge acquisition[2], indicated acceptable model fit (Chi-square 1.654, p = 0.000, CFI = 0.959, TLI = 0.953, NFI = 0.904, IFI = 0.960, SRMR = 0.056, RMSEA = 0.066, PCLOSE = 0.021) (Hair et al., 2006). Additionally, we checked for common method bias by including a 'common latent factor' (Dheer & Lenartowicz, 2018) and performing a zero constraints test (Simmering, Fuller, Richardson, Ocal & Atinc, 2015). The null hypothesis could not be rejected and subsumed that specific bias is not present that affects the model. We continued and decided to operationalize CV as a unidimensional first-order reflective construct composed of nine items on a five-point Likert scale (1: strongly disagree to 5: strongly agree).

Knowledge acquisition (KA). We operationalized KA by including a six-item scale used by Geneste & Galvin (2015), inquiring to which extent the firm learned from its entrepreneurial activities. The survey scale has also been used in previous studies in the field of entrepreneurship and general management, proving its validity (Rindfleisch & Moorman, 2001; Lyles & Salk, 2007). The scale was slightly adapted to fit our research context, while the core of each measurement item remained the same. We asked participants to provide their assessment on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Performance. Performance was evaluated by using the three-item scale of Keh, Nguyen & Ng (2007). We asked survey participants to assess the performance of their firms compared to competitors, based on a five-point Likert scale ranging from 1 (much weaker) to 5 (much stronger). A similar setup of the scale was previously applied by other researchers in the field of entrepreneurship and general management (Murphy, Trailer & Hill, 1996; Wiklund, 1999; Butler, Keh & Charmornman, 2000). The scale was slightly adapted to fit our research setting. The overall content of all measurement items remained the same.

Transformational leadership (TL). TL was also measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). We used a well-established scale to assess TL (Podsakoff, MacKenzie & Bommer, 1996; Garcia-Morales et al., 2008), with our intention being to better understand how TL is practiced inside firms. We modified the introduction to every survey item from 'The firm's management' to read 'Our management'. Apart from the change in the introduction, each survey item remained the same.

Technological turbulence (TT). We assessed TT using four out of the five items of the construct developed by Jaworski & Kohli (1993) on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). We selected

[1] Marker variables included knowledge acquisition (KA) as MIMIC-model and strategic entrepreneurship (SE).
[2] The scale development process contained also the development of KA as a MIMIC-model (Diamantopoulos & Winklhofer, 2001), which functioned in the scale development process as marker variables.

the item scale used by Jaworski & Kohli (1993) because it is widely accepted as a measure for TT in the marketing, management, innovation, and strategy literatures.

Control variables. We controlled for firm size, industry, firm age, tenure, age group, and gender (1 = male; 2 = female). These control variables might influence the outcome levels of KA and/or performance. Firm size is measured as a continuous variable (1 to 249 employees). Industry is assessed by following the structure of the United Nations – International Standard Industrial Classification of All Economic Activities (Rev. 4) (United Nations, 2021). Data on industry was gathered through 22 categorical variables. Firm age (the firm founding date up to the survey date) and tenure (the time from joining the company up to the survey date) were measured with a continuous scale, in years. Age group was assessed by using an ordinal scale (1 = 17 or younger; 2 = 18-20; 3 = 21-29; 4 = 30-39; 5 = 40-49; 6 = 50-59; 7 = 60 or older). The roles the individuals had in the organization were also measured with an ordinal scale (1 = owner/president; 2 = C-level (e.g. CEO, CFO, CTO); 3 = senior manager; 4 = middle manager; 5 = first level manager). Table 1 shows the characteristics of the firms and respondents.

[INSERT **Table_1_ Characteristics of firms and respondents** Here]

4. DATA ANALYSIS

We tested our hypotheses using structural equation modeling (SEM) with AMOS Version 26. SEM combines the measurement model (confirmatory factor analysis) and the structural model (path analysis) in a two-stage model approach (Anderson & Gerbing, 1988; Chirico & Salvato, 2014). The first stage (in conducting the confirmatory factor analysis) evaluates validity and reliability of the measurement model, while during the second stage hypothesized relationships among the latent variables are tested (Anderson & Gerbing, 1988; Chirico & Salvato, 2014).

Measurement model - Confirmatory factor analysis. To assess the quality of the measurement model, we conducted a confirmatory factor analysis with all five constructs involved. We adopted a Maximum Likelihood extraction method with ProMax rotation to develop our factor structure. A clear five factor structure evolved with no cross loadings greater than 0.287. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) leveled out at 0.946 (Runst & Thomä, 2022). Following Dheer & Lenartowicz (2018), we utilized several indices to assess the fit of our model with the following thresholds: CMIN/DF <3.0 (Rivers, Meade & Fuller, 2009; Nye, Joo, Zhang & Stark, 2020), CFI >0.90 (Bentler, 1990; Hu & Bentler, 1995), TLI >0.90 (Chirico & Salvato, 2016), IFI >0.90

(Bollen, 1989), SRMR <0.09 (Hair et al., 2006), RMSEA <0.08 (Hair et al., 2006). Our measurement model provided overall good/acceptable fit with the data (CMIN/DF 3.774, CFI 0.908, TLI 0.897, IFI 0.908, SRMR 0.055, RMSEA 0.070).

Validity and reliability. Table 2 includes all items grouped by measurement constructs used in this research and their corresponding standardized factor loadings (SFL), Cronbach's alphas, composite reliability (CR), average variance extracted (AVE) and maximum shared variance (MSV) (Dada & Watson, 2013). We validated our constructs using the following procedure. All standardized factor loadings were above the cut-off criteria of 0.4 (Stevens, 1992). Five loadings were at fair to good levels while the rest of the 22 factor loadings were at very good to excellent levels (Comrey & Lee, 1992; Tabachnick & Fidell, 2014) (min: 0.424; max: 0.978). To assess convergent validity, we applied the cut-off criteria of 0.50 for the AVE, which were all above the threshold (min: 0.561; max: 0.633) (Fornell & Larcker, 1981; Hair et al., 2006). Also, the square root of the AVE was greater than the correlations between the pairs of constructs, indicating discriminant validity among the constructs (Fornell & Lacker, 1981; Dada & Watson, 2013). We additionally assessed the AVE-MSV relationship. All MSV values were below their AVE counterparts, confirming discriminant validity (Hair et al., 2006; Dheer & Lenartowicz, 2018). We used Bagozzi & Yi's (1988) cut-off criteria of 0.60 for assessing Cronbach's alpha and CR. The Cronbach's alpha (min: 0.809; max: 0.921) and CRs (min: 0.811; max: 0.921) were greater than the threshold. We therefore concluded that all constructs in our study achieved the necessary validity and reliability levels.

[INSERT **Table_2_ Constructs and measurement items** Here]

Test of normal distribution. Normal distribution of the data in our study was checked by evaluating the level of skewness and kurtosis. Generally, skewness (SK) greater ±2 and kurtosis (KU) exceeding ±7 suggest non-normal distributions (Hansen, 1995; Schütte et al., 2018; Schuster, Nicolai & Covin, 2020). Skewness and kurtosis showed acceptable levels (SK: min: -1.132, max: 1.349; KU: min: -1.756, max: 1.806), except for firm age which was slightly skewed and in excess of kurtosis (SK: 3.546; KU: 19.345).

Common method variance. We assessed common method variance by carrying out a Harman's one-factor test (Podsakoff, MacKenzie, Lee & Podsakoff, 2003) by including all reflective items and constructs of the study in a principal components analysis. The analysis concluded with a five-factor structure with the first factor

leveling out at 42.41% (Podsakoff et al., 2003; Dada & Watson, 2013). This is below the cut-off criteria of 50%, indicating that common method variance is not a substantial threat to our results (Dheer & Lenartowicz, 2018).

Multicollinearity. We analyzed multicollinearity using the variance inflation factor (VIF) as an indicator. We tested multicollinearity with all exogenous variables included (i.e., corporate venturing (CV), technological turbulence (TT), and transformational leadership (TL)) and modeled on the endogenous variable knowledge acquisition (KA). In our study, factor scores were distributed from 1.388 to 1.794, which were below the cut-off point of 10 (Hair et al., 2006; Dheer & Lenartowicz, 2018; Gimenez-Jimenez, Edelman, Minola, Calabrò & Cassia, 2020).

Structural model – model fit. After developing the structural model, we assessed model fit once again, against the same thresholds. Also, in this case, the model fit of the structural model provided good fit with the data (CMIN/DF 1.069, CFI 1.000, TLI 0.998, IFI 1.000, SRMR 0.004, RMSEA 0.011).

5. RESULTS

The correlations, means and standard deviations are presented in Table 3. An overview of the results of the SEM is shown in Figure 2. Overall, the majority of the hypotheses were supported. As specified in *H1*, we found significant and positive effect of corporate venturing (CV) on knowledge acquisition (KA) ($\beta = 0.315$, $p < 0.001$). This indicates that the focus of corporate ventures may lie in gaining new knowledge to develop, for example, new products (i.e. CV is associated with greater KA). The results also supported *H2*, demonstrating the significant and positive effect of CV on performance ($\beta = 0.256$, $p < 0.001$). In other words, successfully practicing CV subsequently leads to increased performance. Interestingly, *H3* was not supported. It might be explained that in times of high dynamism, such as in a technologically turbulent environment, smaller firms solely focus on exploitation instead of acquiring new knowledge as a foundation for new competitive advantages. However, H4 was supported, indicating that transformational leadership (TL) positively moderates the CV-performance relationship ($\beta = 0.111$, $p < 0.010$) as outlined in more detail in Figure 3. Contrary to our expectation, although the result for *H5* was significant, it had a negative relationship in terms of the moderating effect of technological turbulence (TT) in the CV-KA relationship. This suggests that the relationship of CV and KA is dampened by TT. The relationship is illustrated in more detail in Figure 4. As predicted, we found support for *H6*, with the results showing a significant and positive moderating effect of TT on the CV-performance relationship. The

relationship is illustrated in more detail in Figure 5. Also, as predicted, we found support for H7 that KA positively mediates the CV-performance relationship ($\beta = 0.315$, $p < 0.001$). We further conducted a bootstrapping exercise, illustrated in Table 4, which confirmed our analysis. We also analyzed the effect of our control variables, i.e. firm size, industry, firm age, tenure, age group and gender on KA and performance. None of the paths revealed a significant influence, whether positive or negative, on either of the two variables (Dada & Watson, 2013). We illustrated all standardized direct, indirect, and total effects in Table 5.

[INSERT **Table_3_ Correlations, means and standard deviations** Here]

[INSERT **Table_4_Bootstrap Confidence Intervals for Path Coefficients of CV on Performance mediated by Knowledge Acquisition** Here]

[INSERT **Table_5_Standardized Direct, Indirect, and Total Effects of CV and Moderators on KA and Performance** Here]

[INSERT **Figure_2_ Structural equation model analysis results** Here]

[INSERT **Figure_3_ The Moderating Effect of Transformational Leadership on the Relationship between Corporate Venturing and Performance** Here]

[INSERT **Figure_4_ The Moderating Effect of Technological Turbulence on the Relationship between Corporate Venturing and Knowledge Acquisition** Here]

[INSERT **Figure_5_ The Moderating Effect of Technological Turbulence on the Relationship between Corporate Venturing and Performance** Here]

Similar to other studies (Monsen, Patzelt & Saxton, 2010; Lu & White, 2014; Prandelli, Pasquini & Verona, 2016), we validated our results by running a robustness check. We used STATA for a multivariate multiple regression analysis (mvreg) to estimate our model including all control variables. We observed slight differences in the magnitude of the parameter estimates on the level of the control variables. Slight deviations in results of

the robustness check can be expected (Monsen et al., 2010). As hypothesized, CV is significant and positively correlated to the dimensions of KA ($\beta = 0.313$, $p < 0.001$) and performance ($\beta = 0.259$, $p < 0.001$). Also, the moderating effect of TT on the CV-KA relationship turned out to be negative ($\beta = -0.067$, $p < 0.050$). As predicted, TT affects the CV-performance relationship significantly and positively ($\beta = 0.067$, $p < 0.050$). Moreover, when assessing the effect of TL on the CV-KA relationship, it is highly similar to our original evaluation ($\beta = 0.016$, p = n.s.). The results obtained above are also robust when analyzing the effect of TL on the CV-performance relationship ($\beta = 0.088$, $p < 0.050$). Overall, the results of the robustness check provide strong support for the results previously obtained in AMOS.

6. DISCUSSION AND IMPLICATIONS

This article examines how corporate venturing (CV) influences knowledge acquisition (KA) and firm performance, and how transformational leadership (TL) and technological turbulence (TT) affect the aforementioned relationship. Additionally, this article addresses how KA mediates the CV-performance relationship. We address these research questions by developing a reflective measurement instrument (MacKenzie et al., 2011; Hinkin & Tracey, 1999) spanning the domain of CV, covering internal corporate venturing (ICV), cooperative corporate venturing (CCV) and external corporate venturing (ECV), thereby allowing for direct measurement of the phenomena.

With regards to our first research question on how CV affects KA and performance, we find comparable results to other scholars (Schildt et al., 2005; Wadhwa & Kotha, 2006; Hill & Birkenshaw, 2008; Keil et al., 2008; Marchisio, Mazzola, Sciascia, Miles & Astrachan, 2010) that CV has a significant positive relationship to KA and performance. Schildt et al. (2005), for example, found that firms employ less integrated external venturing modes[3] to conduct exploration activities and to increase interorganizational learning, thereby positively influencing performance indirectly. Also, Wadhwa & Kotha (2006) explain that investment in corporate venture capital (CVC), as part of external corporate venturing, positively influences knowledge creation rate. Our research extends the findings of the aforementioned studies by showing that not only external venturing modes are associated with higher influx of knowledge but that this holds true as well for all venturing modes, suggesting

3 Less integrated external corporate venturing modes include the formation of non-equity venturing alliances and corporate venture capital investments. Both of the aforementioned forms are not extensively integrated in the existing firm compared to acquisitions and internal corporate ventures (Schildt et al., 2005).

that internal and cooperative CV are also associated with new knowledge acquisition. In extending the findings of Schildt et al. (2005), our results shed new light on the fact that all three modes of CV can be integrated and governed by the parent company. This is an important extension as the firm's total CV activity is equal to the sum of all ventures enacted through ICV, CCV, and ECV. To build on this perspective, this paper extends the research of Keil et al. (2009) who found that CV, specifically ICV, functions as a temporary mechanism for capability development. Our study empirically confirmed that all three domains of CV are strongly characterized by acquiring new knowledge. Through the lens of the knowledge-based view (KBV), the results indicate that, since knowledge is of paramount importance and an underlying factor for the production of all goods and services (Grant, 1997; Uotila, Maula, Keil & Zahra, 2009; Titus et al., 2017), firms strive to acquire new knowledge to form *recombined- knowledge lakes*[4] in order to enhance their abilities, skills and competencies. These knowledge lakes form the basis for new competitive advantages, which in turn are the prerequisite for superior performance and wealth.

Our second research question, with regards to how TT and TL affect the CV relationship with KA and performance, suggests mixed results. With respect to the moderation effects of TT on the CV-KA relationship, the literature on CV suggests that it is necessary for firms to balance behaviors that are concerned with the exploration of new knowledge, technology and capabilities with behaviors that are concerned with the exploitation of the existing knowledge, technology and capabilities (Schildt et al., 2005). Our research results with regards to TT are somewhat surprising, indicating a significant but negative relationship of TT on the CV-KA relationship. In other words, if the environment is characterized by high technological disruptions, this may consequently lead to a negative impact on the CV-KA relationship for SMEs. This is unexpected as we argue that firms need to absorb new knowledge to stay ahead of the game and ensure firm survival. Our results might be best explained through the findings of other scholars on the interplay of technological dynamism and a firm's focus on exploration and exploitation, where results indicate that in environments characterized by low dynamism, balance of exploration and exploitation might not be needed (Uotila et al., 2009). Translating this to our research, it might be the case that in technologically turbulent environments, smaller firms with limited resources switch

[4] In this study, we use the term 'knowledge lake' to describe the overall existing and acquired sum of explicit and tacit knowledge through the firms' activities. Precisely, 'knowledge lakes' can include the overall sum of all explicit (codified) and tacit knowledge held through the firm's employees. Similar to the discipline of Information System, we view these 'lakes' as a source and repository of new valuable knowledge (Jiménez, Roldán & Corchuelo, 2022).

from a dual focus (i.e., a focus on both exploration and exploitation) to a more exploitation-related focus. Extending Uotila et al.'s (2009) study, our research shows that in technologically turbulent environments, firms concentrate on their core competencies to the downside of developing new competencies founded on new knowledge. March (1991) argued that firms focus on dual application of exploration-exploitation activities to ensure continuous long-term performance. However, our research advances March's (1991) seminal work by showing that firms do not necessarily focus on dual application in all circumstances, but they carefully align their strategies and operations to the influence of the environment.

With regards to the moderation effects of TT on the CV-performance relationship, our results support prior studies, highlighting that firms practicing CV in technologically vibrant industries (i.e. hostile and dynamic industries) are associated with higher performance levels (Zahra, 1996; Dushnitsky & Lenox, 2006; Wadhwa et al., 2016). Limited studies have evaluated the effect of venturing and technological factors on firm performance. We add to the extant literature, especially to the work of Zahra (1996) and Dushnitsky & Lennox (2006), by showing how all three venturing modes comprised as a single direct factor positively influence firm performance moderated by TT.

We now address the second part of our second research question, i.e. how TL moderates the relationship between CV and KA as well as performance. As outlined above, CV in general is associated with higher levels of performance. Extant research also confirms the positive effect of TL on organizational performance (García-Morales et al., 2008; Garcia-Morales et al., 2012; Engelen, Gupta, Strenger & Brettel, 2015). However, the literature does not offer much insights on how TL moderates the relationship of CV on either KA or performance. Our research found no evidence that the CV-KA relationship is positively moderated by TL. In line with Ling, Simsek, Lubatkin & Veiga (2008), one explanation might be that the aforementioned relationship is influenced by the fact that in these SMEs, the CEO founders might have already left the company, as the effect of TL in SMEs is especially influenced by CEO founders.

As expected, our findings show that TL positively affects the CV-performance relationship. This result is consistent with the findings of other researchers from the adjacent EO research field. For example, Engelen et al. (2015) confirm that TL positively impacts the EO-performance relationship. Our paper extends the findings of the aforementioned authors by showing that TL positively moderates the venturing-performance relationship.

However, in general, prior studies reveal substantially little insights on how leadership experience affects the CV-performance relationship. Our research closes this gap and provides new insights.

Theoretical contributions

Our study makes five contributions to theory and research. First, following a call from Schildt et al. (2005) and Narayanan et al. (2009), we develop a generalizable measure of CV. Previous authors (Narayanan et al., 2009) argue that research findings in the existing CV literature do not build on each other. Our CV measure, designed to span all firm sizes and industries, contribute to generalizability of findings. Although the focus of this study is on SMEs, a novelty provided by our research is that the newly created measure of CV is not limited to SMEs, but it has been intentionally kept broad to cater to all firm sizes and industries.

Second, this is the first direct measure in extant literature that spans the complete domain of CV, directly measuring CV with regards to ICV, CCV and ECV (Morris et al., 2011) and thereby evaluating the effect on KA and firm performance. This is a substantial departure from the proxy oriented, and sometimes narrowly focused application of, existing measures. We thoroughly pre-tested the created the measurement scale through an iterative cycle of development, validation, exploratory and confirmatory factor analysis. The focus of our study does not only contribute to all modes of CV but also sheds light on the firms' overall approach towards CV. As hypothesized, the results show that CV directly affects KA and firm performance. Knowledge accumulation and creation are vital for firms to renew strategies and adapt to the external environment (Titus et al., 2017). Our findings enhance this understanding that a firm's central strategy is to acquire and absorb new knowledge to improve the firm's skill and competency sets.

Third, this research contributes to extant literature by shedding more light on organizational and environmental moderators in the CV context. In this regard, our findings show how TT affects the CV-performance relationship. Technology takes a prominent place in the CV literature in general. Scholars argue that CV is especially useful in hostile environments (Zahra & Covin, 1995; Narayanan et al., 2009). While other studies found that hostility and environmental dynamism are negatively related to firm performance outcomes (Kuratko et al., 2009). In this study, we found that the CV-performance relationship is positively moderated by TT. In other words, rapidly changing technology provides big opportunities in each respective industry and the findings suggest that a number of new product and service ideas might have been made possible through new technological breakthroughs in the

industry. In turn, this means that SMEs are able to keep up the pace with technological change and actively integrate new technological changes in their business models.

Somewhat unexpected is the negative moderation effect of TT on the CV-KA relationship. We hypothesized that in technologically turbulent environments, firms need to update skills and competencies at a faster pace compared to industries where technological change is not transforming industries at a rapid pace. It seems that firms operating in technologically turbulent environments focus on existing advantages and exploit known certainties (March, 1991).

Although few research studies focus on how leadership influences CV in general (Ensley et al., 2006; Marchiso et al., 2010; Naldi & Davidsson, 2014), there remains a substantial gap on what role leadership plays in the CV-performance relationship. To our knowledge, this research is one of the first studies to evaluate how TL affects the CV-performance relationship empirically. Our findings support prior research indicating that leadership is positively associated with firm performance (e.g. García-Morales et al., 2008; García-Morales et al., 2012).

Fourth, extant research helps us to understand the effect of CV on KA and also how KA affects performance (Lyles & Salk, 2007; García-Morales et al., 2008; Keil et al., 2009; García-Morales et al., 2012; Covin et al., 2020). However, to the best of our knowledge, there is no research available, which evaluates the effect of CV on performance mediated by KA. We close an important gap as we argue that acquired knowledge is the foundation for future competitive advantages.

Finally, in the SME context, CV research is mainly conducted in the USA, Sweden, China, India, and the UK (McDougall, Robinson & DeNisi, 1992; Miles & Covin, 2007; Yamakawa et al., 2013; Naldi & Davidsson, 2014). This study enhances understanding of how the CV-KA/performance relationship is affected by organizational and environmental variables especially in the SME context in Germany. This is an important advancement as SMEs make up the vast majority of Germany-based firms.

Implications for practice

Our findings show that CV is a viable means for updating knowledge, skills and competencies. This can help firms not only to adapt to external environmental conditions, but also to ensure firm survival. The knowledge, skills and competencies acquired through venturing activities ensure a recombination of resources in new ways.

These differentiated product and service offerings enable firms to stay ahead of the competition, leading to superior performance.

"Today's information and knowledge society requires new leaders who can confront a reality based on knowledge and foster innovation to achieve improvements in organizational performance" (García-Morales et al., 2008, p. 299). A general implication of the findings from this study for practice is that when CV is undertaken together with TL, it is more likely to produce positive organizational performance outcomes (Howell & Avolio, 1993).

Despite the general positive impact of CV on KA, top management teams in SMEs need to be aware that the positive relationship is dampened in technologically turbulent environments when conducting venturing activities. Industries that are characterized by rapidly changing technologies, where future technological influences are difficult to predict, might not yield the same KA benefits, when undertaking CV, relative to industries with low technological dynamism. As the influx of new knowledge is critical for future competitive advantages, CV activities need to be closely aligned with the external environment. This means that SMEs need to make conscious decisions when investing in CV with a focus on gaining new knowledge. When the technological environment in a given industry is considered to be turbulent or even hostile, firms might foster internal R&D activities or strategic entrepreneurship activities over leveraging CV. Firms need to assess influential technological factors, arising out of the environment on a case-by-case basis. The findings in this paper suggest that SMEs need to be selective about their strategies when maneuvering in turbulent environments. In other words, SMEs should be selective in terms of when to focus on a knowledge acquisition strategy (exploration) and when to focus deliberately on a performance utilization strategy (exploitation), in line with our findings that the effect of CV on performance moderated by TT is positive. The tension top management teams face is that TT positively relates to the CV-performance link, but negatively relates to the CV-KA link. This is a difficult *relational triangle* for SMEs in specific industries as new knowledge is needed for future competitive advantages.

7. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

In line with extant research, we acknowledge that our study is not free from limitations. First, our study focuses on a multi-industry perspective. Although this approach ensures higher levels of generalizability, it does

not account for research questions related to specific industries. Extant research in the field of CV is dominated by research findings related to high technology industries (e.g. information and communication technology (ICT)) (Schildt et al., 2005; Keil et al., 2008; Cirillo, 2019; Yamakawa et al., 2013), electronics (Park & Kim, 1997), pharma/biotechnology (Zahra, 1996; Van den Vrande et al., 2012; Yamakawa et al., 2013), software products, machinery and equipment (Schildt et al., 2005; Keil et al., 2008; Yamakawa et al., 2013), and traditional chemicals (Yamakawa et al., 2013) or specific technological aspects, such as industry technological change (Basu et al., 2011), industry technological intensity (Basu & Wadhwa, 2013), or technological proximity (Van den Vrande & Vanhaverbeke, 2012). Future research can examine if our findings are comparable in other specific industries using our measures.

Second, our study applies cross-sectional research design, providing insights which relate to a specific point in time. Although our results show evidence that CV, measured through its three forms, is correlated with KA and performance, further studies could substantiate our evidence. Future research might employ longitudinal research design to analyze the findings over a longer period of time, in different contexts and industries.

Third, we approach the topic of CV from the perspective of the knowledge-based view, arguing that new knowledge is necessary to build future competencies, skills and advantages. Future research could employ different theoretical lenses (such as social capital perspective) by using our CV measure to test its viability in different theoretical settings. An area where future research is necessary is how leadership relates to CV. By drawing on a social capital perspective, CV as a research field would benefit from more studies investigating how leadership styles, e.g. charismatic, authentic, or transactional leadership, might influence different CV relationships. Additionally, our research evaluates how TT relates to the link between CV and KA as well as performance. Future research can examine the role of other environmental moderators (e.g. competitive intensity, environmental dynamism) (Jaworski & Kohli, 1993; Jansen, Van Den Bosch & Volbreda, 2006), or environmental complexity (Branzei & Thornhill, 2006) in this relationship.

8. CONCLUSION

Existing competitive advantages are temporary in nature (D'Aveni, Dagnino & Smith, 2010; Chen & Miller, 2015). CV represents a viable means of how SMEs can leverage the influx of new knowledge and update existing resource combinations, skills and competency sets. Our study confirms not only the strong effect of CV

on both KA and performance but also the strong mediation effect of KA on the CV-performance relationship. Our results are in line with the knowledge-based view of the firm, which suggests that knowledge plays a central role in the development of idiosyncratic resources central for future competitive advantages. Our results are a 'two-edged sword' with regard to the roles of TL and TT in the CV context. While they both enhance CV-performance, TL is insignificant in the CV-KA relationship and the effect of TT on the CV-KA relationship is negative. This is a 'triangle' that is difficult to manage as KA is a central building block in generating new competitive advantages. Nevertheless, this research produced several novel findings. It presents the first known direct measure of CV, which spans its complete domain – ICV, CCV and ECV. Another novelty includes the fact that the measure supports not only the investigation of the SME context but could be adapted to all firm sizes. Additionally, to our knowledge, this is the first study of its kind to investigate how leadership, i.e.TL, relates to the CV-performance relationship. We anticipate that our study would generate more research on CV.

AUTHORS' DECLARATION OF COMPETING INTERESTS

There are no competing interests to declare for this paper.

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Tables and Figures

Figure 1. The effect of CV on KA & performance

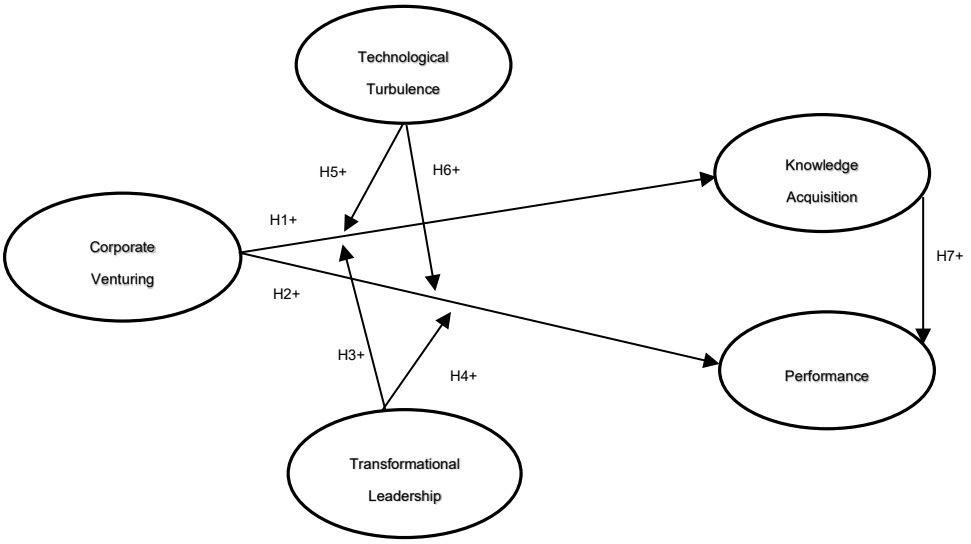
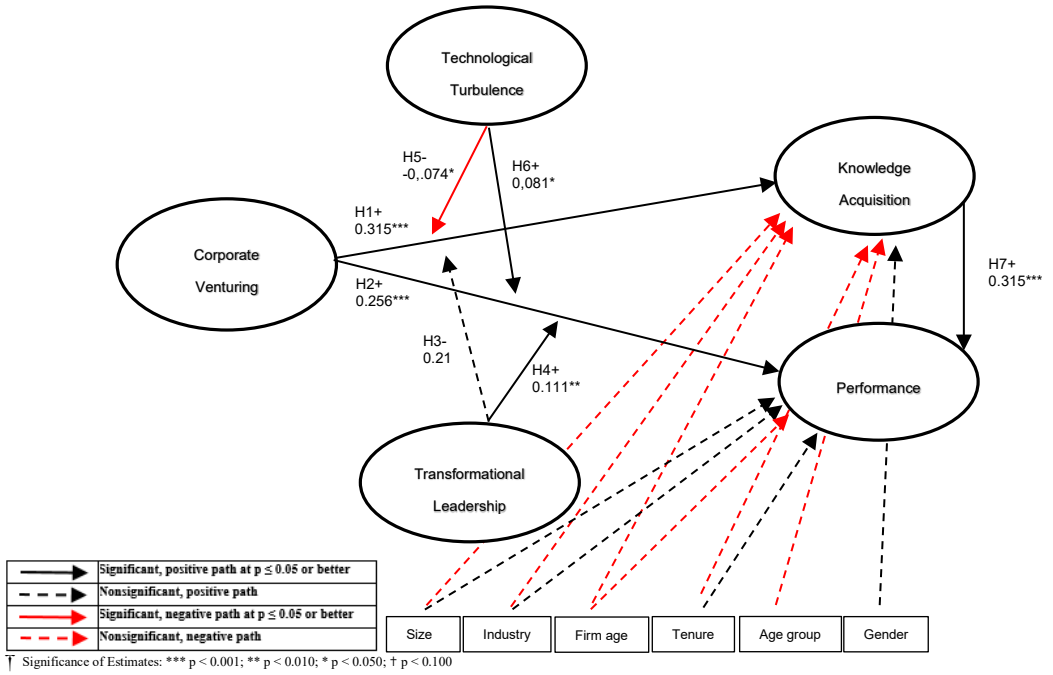


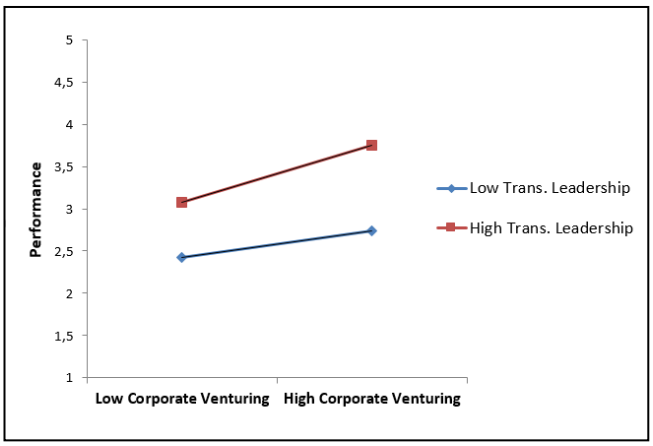
Figure 2. Structural equation model analysis results



† Significance of Estimates: *** p < 0.001; ** p < 0.010; * p < 0.050; † p < 0.100

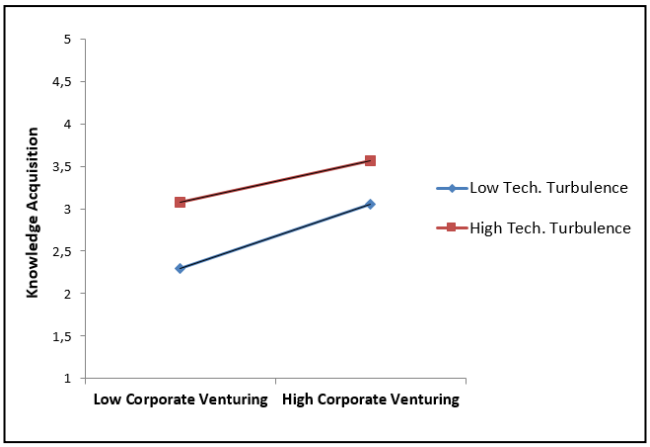
(Structure of the figure based on Sirén, Kohtamäki & Kuckertz, 2012)

Figure 3. The Moderating Effect of Transformational Leadership on the Relationship between Corporate Venturing and Performance



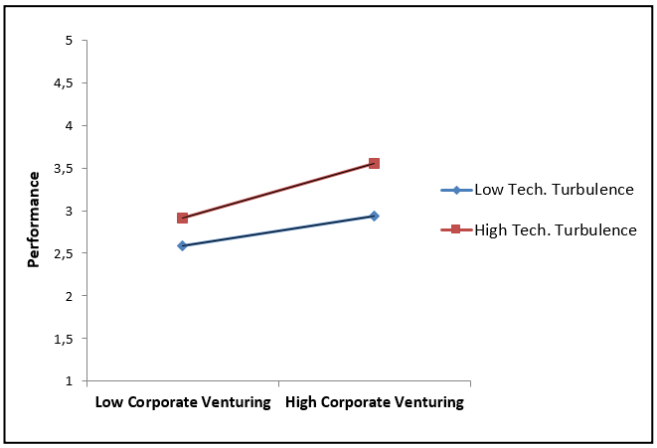
Structure of the figure based on Hewlin et al. (2012); Courtrigh et al. (2017).

Figure 4. The Moderating Effect of Technological Turbulence on the Relationship between Corporate Venturing and Knowledge Acquisition



Structure of the figure based on Hewlin et al. (2012); Courtrigh et al. (2017).

Figure 5. The Moderating Effect of Technological Turbulence on the Relationship between Corporate Venturing and Performance



Structure of the figure based on Hewlin et al. (2012); Courtrigh et al. (2017).

Table 1. Characteristics of firms and respondents (n = 570)

Group	Ratio	Group	Ratio
Role		**Industry***	
Owner/President	29.1%	Agriculture, Forestry	1.9%
Executive/C-Level	11.6%	Mining, quarrying	0.5%
Senior Manager Level	16.8%	Manufacturing	7.7%
Middle Manager Level	30.0%	Electricity, gas, steam	2.1%
First Manager Level	12.5%	Water supply, sewage	0.9%
Senior Specialist	0 %	Construction	10.0%
		Wholesale, retail	13.3%
		Transportation, storage	3.9%
		Accommodation, food service	3.5%
		Information & communication	10.4%
		Financial & insurance activities	4.0%
		Real estate activities	2.1%
Gender		Professional, scientific et al.[5]	10.4%
Male	62.1%	Admin. & support services	5.1%
Female	37.9%	Public admin. & defense	1.9%
		Education	3.5%
Tenure	Mean: 11.35	Human health & social work	4.7%
	Std. Devi.: 8.756	Arts, entertainment, recreation	4.9%
	Min.: 1	Other service activities	7.4%
	Max.: 45	Activities of households	1.2%
		Activities of extraterritorial org.	0.5%
Firm age	Mean: 27.68		
	Std. Devi.: 29.01		
	Min.: 0		
	Max.: 265		
Age group		**Firm size**	
18-20	2.8%	1-4	22.5%
21-29	15.1%	5-9	10%
30-39	33.9%	10-19	10%
40-49	21.9%	20-49	16.1%
50-59	15.4%	50-99	26.5%
60 or older	10.9%	100-249	14.9%

*Source: Industry classification based on United Nations (2021), International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4

[5] Professional, scientific and technical activities

Table 2. Constructs and measurement items

Constructs	Measurement items	SFL	α	CR	AVE	MSV
Knowledge acquisition	(1) My company has acquired new technological knowledge.	0.500	0.888	0.889	0.572	0.488
	(2) My company has acquired new marketing and sales knowledge.	0.646				
	(3) My company has acquired new ideas for new products.	0.735				
	(4) My company has acquired new product development knowledge.	0.909				
	(5) My company has acquired new managerial knowledge.	0.718				
	(6) My company has acquired new operations process knowledge.	0.783				
Performance	(1) Sales growth compared to those of competitors.	0.978	0.809	0.811	0.590	0.436
	(2) Market share compared to those of competitors.	0.651				
	(3) Profitability compared to those of competitors.	0.515				
Corporate venturing	(1) My company develops new businesses in the form of new organizational units, which are solely owned by my company.	0.511	0.921	0.921	0.566	0.488
	(2) My company continuously strives to create new businesses, which are independently owned by my company.	0.424				
	(3) My company often pursues new businesses through newly established organizational units, which are fully owned by my company.	0.497				
	(4) My company often pursues new businesses together with an external venture partner by establishing new organizational units.	0.792				
	(5) My company often enters into joint ventures with shared ownership, focusing on the creation of new businesses.	0.844				
	(6) My company collaborates with external organizations to establish and own new businesses.	0.790				
	(7) My company often obtains licenses from parties outside my company to strengthen the focus on new businesses.	0.737				
	(8) My company frequently invests in new businesses (e.g. young ventures, early-growth stage firms or start-ups), which were created by 3rd parties outside of my company.	0.832				
	(9) My company is actively acquiring new businesses, which were previously built and owned by parties outside my company.	0.845				
Technological turbulence	(1) The technology in our industry is changing rapidly.	0.876	0.830	0.835	0.561	0.480
	(2) Technological changes provide big opportunities in our industry.	0.862				
	(3) It is very difficult to forecast where the technology in our industry will be in the next 2 to 3 years.	0.579				
	(4) A large number of new product ideas have been made possible through technological breakthroughs in our industry.	0.507				
Transformational leadership	(1) Our management is always on the lookout for new opportunities for the unit/department/company.	0.644	0.894	0.896	0.633	0.389
	(2) Our management has a clear common view of its final aims.	0.813				
	(3) Our management succeeds in motivating the rest of the company.	0.867				
	(4) Our management always acts as the company's leading force.	0.868				
	(5) Our company has leaders who are capable of motivating and guiding their colleagues on the job (masters).	0.806				

† SFL, standard factor loadings; α, Cronbach's alpha; AVE, average variance extracted; CR, construct reliability; MSV, maximum shared variance

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Table 3. Correlations, means and standard deviations

		Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10	11
1	Corporate venturing	2.99	1.02	**1**										
2	Knowledge acquisition	3.54	0.90	0.718**	**1**									
3	Performance	3.43	0.80	0.601**	0.673**	**1**								
4	Technological turbulence	3.43	0.96	0.600**	0.695**	0.526**	**1**							
5	Transformational leadership	3.82	0.91	0.511**	0.677**	0.593**	0.416**	**1**						
6	Gender	1.38	0.49	0.096*	0.092*	0.042	0.041	0.115**	**1**					
7	Industry	10.63	5.12	-0.091*	-0.082	-0.028	-0.097*	-0.030	0.068	**1**				
8	Tenure	11.35	8.77	-0.175**	-0.126**	-0.044	-0.122**	0.007	-0.167**	0.020	**1**			
9	Firm age	27.68	29.01	-0.052	-0.041	-0.026	0.024	-0.009	-0.114**	-0.139**	0.440**	**1**		
10	Organ. size	54.10	59.31	0.352**	0.243**	0.237**	0.247**	0.157**	-0.001	-0.142**	0.045	0.219**	**1**	
11	Age group	4.65	1.29	-0.322**	-0.244**	-0.112**	-0.210**	-0.097*	-0.157**	0.126**	0.593**	0.174**	-0.103*	**1**

† Pearson correlations based on SPSS 26; n = 570 *Correlation is significant at the .05 level (two-tailed); **Correlation is significant at the .01 level (two-tailed)

Table 4. Bootstrap Confidence Intervals for Path Coefficients of CV on Performance mediated by KA

From…	Mediator	To …	Lower	Path Coefficient	Upper	P-Value
CV	Knowledge Acquisition	Performance	0.060	0.097	0.147	0.000
CV x TT	Knowledge Acquisition	Performance	-0.048	-0.020	0.000	0.053
CV x TL	Knowledge Acquisition	Performance	-0.016	0.005	0.030	0.614

Table 5. Standardized Direct, Indirect, and Total Effects of CV and Moderators on KA and Performance

	Knowledge Acquisition			Performance		
	Direct	Indirect	Total	Direct	Indirect	Total
CV	0.317	0.000	0.317	0.155	0.100	0.255
CV x TT	-0.074	0.000	-0.074	0.105	-0.023	0.081
CV x TL	0.020	0.000	0.020	0.105	0.006	0.111