Employees' Entrepreneurial Behaviour: The influence of employees' socio-cognitive traits and country-level institutional context

A Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy (Business Studies) of Cardiff University

By

Mohammad Sameer Alasadi

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Abstract

Firm-level entrepreneurship, referred to as corporate entrepreneurship (CE), is a strategic choice for firms' vitality and competitiveness. Over the last five decades, research focused on CE's firm-level or group-level antecedents to determine factors fostering organisations' entrepreneurial activities. Research also established that, at the individual-level, employees' entrepreneurial behaviour (EEB) influences an organisation's entrepreneurial growth and overall performance. However, research on the individual-level antecedents of EEB is disparate and scarce.

In Stage 1, this thesis applies a multi-level meta-analysis to aggregate findings from 102 independent samples from 97 articles from 1994 up to 2022. This meta-analysis, the first to assess CE's antecedents, combines empirical findings on the antecedents of CE across the top management team (TMT) and firm levels. The cumulative evidence, examined through a meta-regression, shows that a TMT's entrepreneurial human capital, transformational leadership and firm's building blocks, resources, and capabilities are positive drivers of CE.

Stage 2 focuses on the employee level and answers recent calls to study EEB as a multi-level phenomenon. Based on the integrative framework of social cognitive theory (Bandura 1988) and institutional economics theory (North 1990), it investigates the associations among EEB, employees' socio-cognitive traits and country-level institutional factors using a multi-level logistic regression. A sample of 225,640 employees from 70 countries representing various institutional contexts was created by merging data from the Global Entrepreneurship Monitor, the Economic Freedom Index, the Global Competitiveness Index, World Bank and the International Labour Organisation.

The results suggest that employees' entrepreneurial self-efficacy and opportunity perception, along with supportive managerial attitudes and norms, promote EEB, while fear of failure and rigid employment regulations discourage it. The results also suggest that country-level institutional factors influence the likelihood that employees will mobilise their socio-cognitive resources to pursue high-growth entrepreneurship.

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Chapter 1 INTRODUCTION

1.1 Introduction

This chapter is considered as the foundation of this study. It presents an overview of the corporate entrepreneurship (CE) phenomenon and its importance to researchers and practitioners. It also presents the study's rationale, objectives, questions, scopes, methodologies, contributions, and thesis's outlines. More precisely, the chapter describes this study's division into two main stages, each of which serves its objectives and the overall objectives of this study.

Figure 1.1 presents an outline of Chapter 1. The chapter starts with a preface to corporate entrepreneurship, then a brief background on how CE has been practised, followed by a brief literature review. (For a detailed literature review, please refer to chapters 2, 3 and 4) Next is an explanation of the rationale behind this research, along with the research objectives, questions, scope, methodology, and contributions. The chapter concludes by presenting an outline of the thesis followed by chapter conclusion.

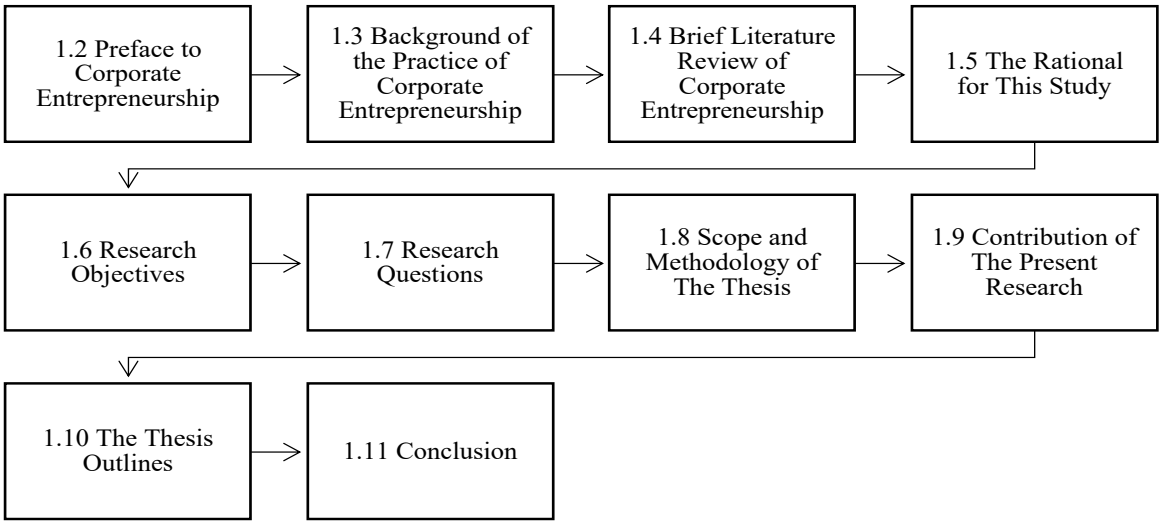


Figure 1.1 Outline of Chapter 1

1.2 Preface to Corporate Entrepreneurship

Firm-level entrepreneurship, which is often referred to as CE, is a critical strategic choice for firms' vitality and competitiveness in a global economy (Dess et al. 2003; Kuratko et al.

2015). CE encompasses internal firm activities that focus on exploring and exploiting new business opportunities through the strategic renewal, innovation, and corporate venturing (Sharma and Chrisman 1999) that lead to organizational growth (Fini et al. 2012), updated firm strategy (Phan et al. 2009; Crawford and Kreiser 2015), and improved financial performance (Bierwerth et al. 2015) and non-financial performance (Yang et al. 2007; Fis and Cetindamar 2009; Ağca et al. 2012; Simsek and Heavey 2016). The benefits of CE extend to nations' economic development as well (Zahra et al. 1999a; Antoncic and Hisrich 2003). CE is employed as a tool for both large multi-national enterprises (e.g., Zahra 1996b) and small- and medium-sized enterprises (SMEs) (Heavey and Simsek 2013) to sustain competitive advantage, pursue strategic change by adapting to changing environments, and increase profit and growth (Zahra 1996a; Jahanshahi et al. 2018; Boone et al. 2019a).

CE has attracted significant research attention, so the research field has evolved significantly since the 1970s (Kuratko 2017). CE emerged as a valid and effective area of research that has real and tangible benefits for scholars, managers and politicians, and the expanding theoretical and empirical knowledge related to CE has led to contributions from multiple disciplines, various theoretical perspectives and units of analysis, and differing or partially incompatible methodologies (Schindehutte et al. 2018). Despite—or perhaps because of—the extensive contributions, the field suffers from some fragmentations and a lack of common ground in concepts, definitions, terminologies, and methodologies (Pirhadi and Feyzbakhsh 2021). This lack of agreement was pointed out more than 23 years ago by and Covin and Miles (1999, p.48) when they stated:

> There is no consensus on what it means for firms to be entrepreneurial. This situation is exacerbated by the proliferation of labels for entrepreneurial phenomena in organisations. Thus, when management theorists talk about corporate entrepreneurship, they are often talking about different phenomena

This disagreement about the CE phenomenon makes it challenging to engage with the CE literature. For instance, over the last five decades, scholars have conceptualised CE as the firm's strategic posture or 'bundles' of internal and external attributes that lead to industry leadership (Covin et al. 1994; Stopford and Baden-Fuller 1994; Ireland et al. 2009; Hosseini et al. 2018; Kuratko and Morris 2018). In contrast, others have connected CE to firms' activities, such as innovation (Covin and Miles 1999; Ahuja and Morris Lampert 2001; Kuratko et al. 2014a), strategic renewal and corporate venturing (Guth and Ginsberg 1990; Schildt et al.

2005; Covin et al. 2010; Covin et al. 2016). The literature has also continually introduced new terms and labels to describe CE, whether as internal CE (Schollhammer 1982), intrapreneurship (Pinchot 1985; Bogatyreva et al. 2022), CE strategy (Kreiser et al. 2021), entrepreneurial activities (Zahra and Neubaum 1998), or collective entrepreneurship (Yan and Yan 2017), all of which have been used to refer to the same thing. Similarly, scholars have presented definitions that include overlaps—and even contradictions—between the attributes that are linked to these definitions and terms (Schindehutte et al. 2018). These fragmentations increase the difficulty of assessing and linking the findings of studies in the field (Yang et al. 2009) and limit the overall understanding of CE, thus negatively impacting the ability to produce efficient research contributions (Shepherd et al. 2015).

Despite the fragmentations, a growing body of CE literature suggests that organisations' entrepreneurial activities are usually fostered at the organisation level (e.g., structure and culture), the function level (e.g. accounting and marketing) or the group level (the top management team (TMT)). Research also establishes that, at the individual level, employees' entrepreneurial behaviour (EEB), the micro foundation of CE (Zahra et al. 2013), also affects an organisation's entrepreneurial growth (Guerrero and Peña-Legazkue 2013; Blanka 2018), innovativeness (Niemann et al. 2022), and overall organisation's performance (Goosen et al. 2002; Rauch et al. 2009; Hoeltgebaum, Dra. et al. 2018), so it emphasises giving employees more scope to pursue entrepreneurial opportunities (Mustafa et al. 2018). However, comparatively few studies explore what drives EEB, so the research on the individual-level antecedents of EEB remains disparate and scarce (Neessen et al. 2019).

Therefore, understanding the multidimensional nature of CE and its antecedents, the evolution of the phenomena, and how it has been conceptualised and defined is central to constructing the theoretically grounded understanding of CE that must be constructed before conducting research (Kuratko 2017). Such a practice must be considered to avoid using inappropriate approaches and measurements or providing incomplete conclusions by neglecting the multi-level aspect (Urbano et al. 2022). In addition, firms must understand who is engage in EEB and what leads to it (Gawke et al. 2019) in order to adopt and assess the internal practices that enhance such behaviour. Therefore, CE researchers have called for investigations that facilitate a comprehensive understanding of EEB (e.g., Monsen and Boss 2018; Schindehutte et al. 2018; Pirhadi and Feyzbakhsh 2021; Urbano et al. 2022). This thesis

responds to these calls by building a solid picture of the CE phenomena that considers the multidimensional nature of CE and its micro foundation EEB.

1.3 Background of the Practice of Corporate Entrepreneurship

Since the 1970s the world has witnessed a revolution in various fields of technology and knowledge that has generated unique opportunities and challenges for organisations of all kinds. Factors like rapid market changes, increases in consumers' expectations, increased competition, and the increasing need for effective and efficient use of resources have led to an increasing desire to change the traditional methods of organisations' management and operation (Zahra et al. 2000). For example, a firm that is purely product-oriented and is administrated using a classic bureaucratic management approach, where authority and decisions lie exclusively in the hands of senior managers, has difficulty competing under constant markets changes (Kuratko et al. 2015). Focusing on short-term goals and sustaining the status quo without investing in innovation and expansion projects is also not enough to survive in the long run (Tzabbar and Margolis 2017). No matter how high the firm's market value, any one of many current issues could bring a firm's life to an end, such as occurred in Nokia's case. As Frank Nuovo, who was Nokia's chief of design from 1995 to 2006, stated when asked about the fall of Nokia, "I look back, and I think Nokia was just a very big company that started to maintain its position more than innovate for new opportunities" (*Financial Review* 2013).

Many firms have applied CE's concepts successfully since the 1970s. (see Table 1.1 for some examples of successful CE executions). One of the earliest examples is Toyota's Just-in-time (JIT) inventory system, which Taiichi Ohno developed in the 1970s to meet increasing consumer demand without incurring delays. The JIT system resulted in smaller inventory between production stages, lowered costs, and minimised physical inventory (Taylor 2017). Another example is the Post-it Note, which a 3M employee, Spencer Silver, invented and commercialised in April 1980. 3M realised the importance and value of promoting CE activities to enhance profitability and sustainability, so the firm established an environment that encouraged CE activity based on five pillars. First, 3M encouraged its employee to allocate 15 percent of their working time to developing ideas that interested them and, second, encouraged its employees to exchange their ideas and seek advice from other employees outside their division and organised and hosted social events for employees to ensure the flow

of information and ideas. 3M's third pillar was Genesis Grants, which provide employees up to $100,000 to fund their ideas. Fourth, to overcome the sluggishness of the bureaucratic system, 3M adopted the Pacing Plus system, which gave feasible idea with potential markets priority access to all of the firm's resources and capabilities. Finally, 3M set a corporate goal for 30 percent of its income to come from products developed in the past five years. (See chapter 3 for more details on the building blocks of innovation.)

Similarly, in 1984, Apple introduced its first computer, the Mac, which was invented by a team that included Steve Jobs and twenty Apple computer engineers. The team isolated themselves and, with Steve Jobs' leadership, intrapreneurially and autonomously operated with no interference. Likewise, in 1987, Texas Instruments started an internal venture after its employee, Larry Hornbeck, invented the Digital Micromirror Device to be used in projection display for cinema and office environments. In 1991, before it merged with Oracle, Sun Microsystems presented a programming language called Oak (later known as JAVA), which is now used in most of modern devices. Oak was developed by Patrick Naughton, who was employed by Sun Microsystems during the 1990s. In 1994, with the support of one of the top management team members, Ken Kutaragi, a designer employed by SONY, invented the PlayStation video game console, which become a separate venture in 2016 (Leone 2018).

Table 1.1 Examples of Corporate Entrepreneurship

	Company	Year	Products	Initiated by	CE activity
1	Toyota	1970	JIT inventory system	Employee	Strategic renewal
2	3M	1980	Post-it Note	Employee	Innovation
3	Apple	1984	Macintosh Computer	Employees	Innovation
4	Texas Instruments	1987	Digital Micromirror Device	Employee	Innovation and venturing
5	Sun Microsystems	1991	Oak (JAVA)	Employee	Innovation and venturing
6	SONY	1994	PlayStation	Employee and Senior manager	Innovation and venturing
7	Xerox	2001	--	CEO	Venturing and Strategic renewal
8	Google	2004	Gmail	Employee	Innovation
9	Wal-Mart	2005	In-store health clinics	Manager	Venturing

10	Kodak	2006	Inkjet printer division	Manager	Innovation and venturing
11	iRobot	2007	The Looj	Employee	innovation
12	Toyota	2007	Scion17	Employee	Innovation and venturing
13	Bosch	2016	Bosch IERO	Senior managers	Venturing
14	Maersk	2018	Dhruv	Firm	Venturing

In 2001, Xerox was behind its competition after a loss of $273 million. Xerox's new CEO, Anne Mulcahy, implemented CE through venturing activities in which Xerox acquired firms with new technology and access to customers. Mulcahy also implemented a strategic renewal process in which the research and development program was renewed. Likewise, Google's employee, Paul Buchheit, invented the widely used Google application Gmail in 2004, which accounted for 21 percent of Google's revenue in 2014 (Davila 2016). Google announced in 2009 the allocation of a $100 million venture fund to invest in potential start-ups that did not always have to be directly connected to Google's core activity, such as healthcare or biotechnology. Amazon also recognised the benefits of applying CE. To address the uncertainty of relying on external partners to deliver customers goods and to increase the efficiency of its delivery system by reducing the delivery time to one day, Amazon presented its delivery service partner programme (Perez 2019). Through the programme, Amazon adopted an internal corporate venturing concept and invested $10000 in each delivery start-up, as well as providing three months' salary to motivate employees to participate in the programme. Firms like Toyota, Kodak, and Wal-Mart have also engaged with CE activities, as outlined in Table 1.1.

Other firms have also been involved in various activities to embrace CE. For instance, many firms have held hackathons, where the firm's employees share their innovative ideas with employees from other divisions. The 'Like' button on Facebook, which was invented by its employee, Justin Rosenstein, was a result of the Facebook's 2007 hackathon. To foster CE activities, Zalando held Hack Weeks, where Slingshot was invented. Slingshot is a platform that allows employees to pitch their intrapreneurial ideas and access the needed resources to take their ideas forward. Similarly, to increase the chances of a breakthrough in technology, Siemens has its Intrapreneurial Bootcamp, which is divided into three stages: In stage 1, which is two days long, employees explore and define an idea. In stage 2, the participants refine their

ideas through prototypes and evaluate their ideas' feasibility with actual consumers. Finally, in the three days of stage 3, the participants refine their ideas and pitch them on stage.

The Global Entrepreneurship Monitor (GEM) project, which is the world's foremost study of entrepreneurship, has gathered information about independent and employee-based entrepreneurial activities worldwide since 2001. In 2011, it dedicated questions in its surveys to capturing information about employees' entrepreneurial activities, as separate from independent entrepreneurship. Through their reports, GEM researchers align with the efforts of other CE scholars to focus on EEB as part of CE and which is referred to as intrapreneurship. Figure 1.2 shows the rate of employee involvement in entrepreneurial activities in firms, as captured by GEM.

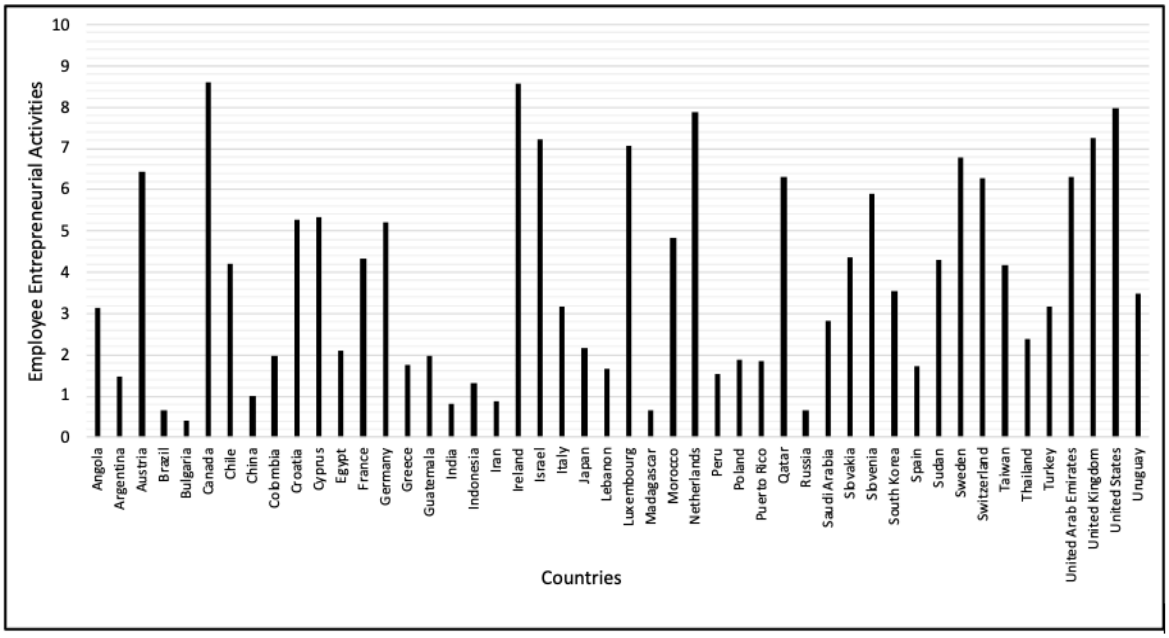


Figure 1.2 Rate of Entrepreneurial Employee Activity Worldwide (GEM 2019)

1.4 Brief Literature Review of Corporate Entrepreneurship

Researchers have always been motivated to explore and investigate the activities and challenges businesses face daily to improve productivity, increase profitability, and survive crises. Scholars from a variety of business research fields have introduced solutions and concepts like employee empowerment and transformational leadership and have called for more flexibility in organizations to adapt to changes in the external environment. Nevertheless, more comprehensive and efficient solutions for firms to cope with rapid and ongoing change are still needed. Based on the concept of independent entrepreneurship, defined as the act of

opportunity exploration and exploitation (Bygrave and Hofer 2018), scholars and practitioners have found that sustained engagement in entrepreneurial activities at the firm level is one of the keys to success. Hence, CE became a practical research field that has appreciable benefits for scholars. As it will be discussed in Chapter 2, the CE research field has developed theoretically and empirically over the last five decades, at first at a slow pace but then more rapidly because of CE's increased importance.

The early CE research, in the 1970s, was phenomenon-driven and concentrated on the evolution of entrepreneurial activities in established firms and how to distinguish these activities from those of independent entrepreneurs (e.g., Peterson and Berger 1971). At that early stage, research was scattered because businesses did not extensively recognise the CE concept. In the 1980s, some scholars argued that entrepreneurship in established firms was not possible because of the broad use of Max Weber's bureaucratic management theory, which emphasises concepts like centralisation, hierarchy, and formality (Clegg 2012). Even so, some research carried on exploring entrepreneurship in established firms and defined as a method of organisational renovation (e.g., Burgelman 1983a). By the 1990s, more comprehensive definitions of CE focused on regenerating and improving the firm's ability to promote innovation. At that time, most researchers suggested that the creation of a new venture (i.e., corporate venturing) and changes in firms (i.e. strategic renewal) were the major CE activities (e.g., Covin and Slevin 1991; Zajac et al. 1991). Researchers also suggested that CE might involve formal or informal actions to create new businesses in existing firms or entrepreneurial innovations in firms' products, processes and market initiatives, which may occur at any of the firms' divisions or levels (Zahra 1991). Based on the research through the previous decades, today's scholars argue that CE is central to establishing sustainable competitive advantage because it provides the foundation for profitable growth (Bierwerth et al. 2015).

Scholars' focus has shifted, then, from traditional innovation to pioneering innovation in all of the firm's activities, including productivity, business models, and operational and managerial functions (e.g., Govindarajan and Trimble 2005), as a response to the need to keep up with rapid market changes. All firms are experiencing a new factual basis, which demands suitable strategies and activities, such as innovation, willingness to change and entrepreneurship (Kuratko and Morris 2018). Therefore, scholars have indicated that, especially now, firms must recognise the vital importance of CE (Kuratko 2009) as a stimulator of competitive advantage (Ireland et al. 2009). Implementing CE allows firms to be more

dynamic, flexible and ready to execute new opportunities when they arise (Goodale et al. 2011).

Even though CE is vital for firms' survival, some firms are more entrepreneurial than others, and many firms have failed to implement CE successfully (Kuratko et al. 2014a), so a need for more research regarding CE in organisational settings remains. The evolution of knowledge related to CE has been rapid, and the essential components for establishing a theoretically grounded knowledge of CE's domains can now be considered. Through significant researcher efforts in the CE field, new and valuable areas for examination and exploration have arisen, such as cognitive processes in CE (Corbett and Hmieleski 2007), the role of social capital (i.e., networks) at the individual and firm levels in CE (Hayton and Kelley 2006; Kelley et al. 2009), and the impact of institutional factors on CE (Hayton et al. 2002; Dess et al. 2003). However, the need for global research on CE's moderators and mediating processes, related CE outcomes, and CE's impact on the economy remains (Kuratko 2017; Mudambi and Zahra 2018). Therefore, although the CE research field has evolved, the theoretical and empirical understanding of CE and EEB are still research areas that warrant a deeper understanding.

1.5 The Rational for This Study

Key scholars in the CE research field have said that a researcher must understand the nature of CE, the evolution of the phenomenon, and how it has been conceptualised, defined and measured before constructing a theoretically grounded understanding of CE they can use in conducting a research (Zahra et al. 2013; Schindehutte et al. 2018). An initial literature review revealed some of the knowledge gaps in the CE research field that require further investigation. The literature review conducted in Chapter 2 indicates that, over the last five decades, the CE research field has witnessed extraordinary work in two main streams: conceptual developments and implementations (Kuratko 2017). The review of research in these two main streams reveals several critical limitations in the existing CE literature. Those limitations and gaps, which are highlighted in the following sub-sections, and a more profound discussion presented later in the related chapters drive this thesis.

1.5.1 Corporate Entrepreneurship's Conceptualisation

Because of the various approaches and contexts in which CE has been examined, scholars have used different terminologies and definitions to refer to the same phenomena, leading to ambiguous nature of CE. For example, some scholars argued that CE must be limited to activities in which the entire firm engages and exclude entrepreneurial activities of individuals or departments (e.g., Covin and Miles 1999), while others have argued that CE starts from individual initiatives within a firm, thus their role cannot be neglected (Dalton et al. 1998; Åmo 2010; Blanka 2018; Mustafa et al. 2018). However, CE is a comprehensive, multidimensional phenomenon influenced by factors such as employees, top management teams, firm and institutional-level factors (Garrett and Welcher 2018). This lack of common ground about CE's conceptualisation, which will be further discussed in section 2.2, has led to some methodological issues.

1.5.2 The Domination of Top-Down Approach

The top-down approach, which dominates the CE literature, focuses only on the role of firm-level or top-management-team-level factors in implementing CE. Chapter 3 of this thesis shows evidence of this domination by presenting a meta-analysis of the most frequently studied CE antecedents in the literature. It concludes that studies that are based on the role of employees, who are considered one of the primary antecedents of CE, remain significantly underexplored in the CE research field (Mustafa et al. 2018; Pirhadi and Feyzbakhsh 2021). The literature's extreme bias towards adopting the top-down approach has limited the understanding of micro foundation of CE and presented an incomplete picture by analysing factors only from the levels of the top management team or the organisation (Zahra et al. 2013). This domination influences organisational entrepreneurial activities' conceptualisation, definitions, and levels of analysis, which are discussed further in section 2.2.

1.5.3 Corporate Entrepreneurship's Methodological Issues

The lenses scholars have used to explore CE-related phenomena have attributed these phenomena to factors from the individual or groups level, the organisational level, and Schumpeterian innovation, which changes the rules of the game at the industrial level (Stopford and Baden-Fuller 1994; Soleimanof et al. 2019). However, increasing numbers of organisational phenomena and constructs, of which several are multi-dimensional and which

are often multi-level themselves, have emerged into the CE field (Kuratko and Hoskinson 2018). Despite some scholars' efforts to use multi-level analysis when studying CE (e.g., Behrens and Patzelt 2016) investigating the impact of variables from different levels in influencing organisational entrepreneurial activities has not received sufficient attention in CE research (Hughes and Mustafa 2017; Schindehutte et al. 2018; Demirkan et al. 2019). In addition, a debate among scholars on the proper analysis level of CE and its related activities is ongoing (Urbano et al. 2022), and because of methodological issues, such as measurements of CE, its dimensions, or antecedents, variations in similar studies' findings are common. These methodological issues are discussed further in section 2.3.

1.5.4 Bottom-up Studies' Issues

Few studies adopt a bottom-up approach, and those few have critical limitations and gaps. For example, some studies focus on personality traits and conclude that certain traits might have positive influences on EEB (e.g., Woo 2018). However, the influence of personality traits on entrepreneurial behaviour remains ambiguous (Shepherd and Patzelt 2018). As Bager et al. (2010, p.340) observe, "an attempt to study the personality traits of different entrepreneurial groups" is "a dead-end research trajectory." The entrepreneurship literature has long argued that personality traits alone are deficient predictors of behaviour (Pidduck et al. 2021). For instance, Ardichvili et al. (2003) find that personality traits have a weak association with opportunity recognition, a crucial construct in entrepreneurship (Schumpeter 1934). Personality traits also suffer from inconsistency in predicting entrepreneurial behaviour across situations (Acs and Audretsch 2010). Hoyte (2019) finds that the components of personality traits, such as neuroticism, extraversion, openness, agreeableness, and conscientiousness, have varying effects on entrepreneurial behaviour. For example, Zhao et al.'s (2010) meta-analysis reveals that agreeableness does not have a significant influence on either entrepreneurial activity or firm performance. In contrast, (Nader et al. 2017) find that agreeableness has a significant effect on entrepreneurship in highly economically developed countries. To address this issue, Rauch and Frese's (2007) perform a meta-analysis that indicates that only the personality traits that match with the task correlate with entrepreneurial behaviour. However, although personality traits are essential for entrepreneurship, they are subject to change over time (Specht et al. 2011), so they cannot predict entrepreneurial success (Hatten 2018).

Similarly, while Afriyie et al. (2019) find a positive effect of employees' self-efficacy on their intrapreneurial behaviour, especially when they have easy access to the firm's resources,

their sample was limited to only 53 small enterprises in Ghana. Their study also neglects country-level institutional factors and considers no control factors at the individual, firm or external environment levels.

Guerrero et al. (2021) use GEM 2012-2013 data to find a positive influence of employees' attitudes towards entrepreneurship (employees' abilities/skills, self-efficacy, perceptions of role models, and risk aversion) on corporate venturing. A critical limitation of this influence is that the relationship between the individual's internal factors, such as entrepreneurial attitudes and cognitions, and the output of these internal factors, such as EEB, must be explored before such internal factors can be linked to outcomes at the firm level (i.e., CE or its activities, such as corporate venturing). Guerrero et al. (2021) operationalises corporate venturing based on individual-level measurements that capture employees' involvement in venturing activity, but corporate venturing is a CE activity and should be measured at the firm level (Sharma and Chrisman 1999); it results from interactions among all the activities and parties in the firm and appears as a firm-level output. Hence, the CE literature usually measures corporate venturing in terms of acquisition and alliances (Zahra 2010), internal and external venturing (Basu and Wadhwa 2013; Ma et al. 2016), and corporate venture capital investments (Lin and Lee 2011), all of which are firm-level measures.

1.5.5 How this thesis will tackle these issues

This study sees corporate entrepreneurship in existing firms as a comprehensive, multi-dimensional phenomenon that influenced by factors from the employee, top management team, firm, and institutional levels (Garrett and Welcher 2018). Although the top-down approach dominates the CE literature, empirical evidence drawn from top-down studies illuminates only one part of a larger puzzle and lacks quantitative integration across the various levels. Schindehutte et al. (2018) noted that a researcher must address CE's multi-dimensional nature. The resulting emergence of fragmented research limits the understanding of the relative importance of CE's drivers (Phan et al. 2009). Thus, Chapter 3 presented a multi-level framework for the meta-analytic examination of CE's antecedents from individual/group-, firm- and country context-level.

Social cognitive theory (SCT), which is widely used to explain the mechanisms behind individual behaviour, suggests that individuals' cognition influences their career choices (Bandura 1988). Research on independent entrepreneurs suggests that entrepreneurial socio-

cognitive traits like entrepreneurial self-efficacy, opportunity perception and fear of failure affect independent entrepreneurs' decisions to engage in entrepreneurial action (e.g., Yousafzai et al. 2015; Lu et al. 2018; Rehman et al. 2020). Furthermore, as North (1990, p.3) indicates, institutions mould "the subjective mental constructs that individuals use to interpret the world around them and make choices." Accordingly, SCT suggests that socio-cognitive traits and their impact on individuals also depend on the context in which they operate (Wood and Bandura 1989). Thus, to comprehend the phenomena of entrepreneurial behaviour, research must focus more on the relationships between the antecedents at the individual (micro) and contextual (macro) levels (Zahra and Wright 2011; Bjørnskov and Foss 2013).

The extent to which socio-cognitive traits influence behaviour depends on the country-level institutional context (Baumol 1990; North 1990; Williamson 2000). Formal (e.g., rules and laws) and informal institutions (e.g. culture and norms) are shown to play important roles in promoting or hindering independent entrepreneurs' decisions to engage in entrepreneurial actions by controlling the socio-cognitive resources an entrepreneur is willing to allocate and invest (Boudreaux et al. 2019; Schade and Schuhmacher 2022). Nevertheless, the critical role that individual- and country-level factors may play in the likelihood that employees will engage in entrepreneurial action—and their motivations—receives less scrutiny in the literature (Kuratko 2017; Kreiser et al. 2021). Furthermore, while country-level institutional factors are found to affect a firm's entrepreneurial actions (e.g., Vanacker et al. 2021), exploring the impact of and the mechanisms for how the institutions influence such actions tend to be assumed rather than deeply investigated (Perlines et al. 2022), which may lead to substantial errors in the conclusions drawn (Wennberg et al. 2013). Finally, the influence of institutions varies substantially between the outcomes and behaviours in the firm and individual contexts, so it requires further investigation (Kostova et al. 2020).

This thesis addresses these gaps and issues in the current CE literature by embracing the multi-dimensional nature of the CE phenomenon. Hence, by moving away from the dominant approach, this thesis focuses on EEB as a micro-foundation of CE. As discussed in Chapter 4, the focus is on the role of employees' socio-cognitive traits in promoting EEB and how the country-level formal (i.e., rigidity of employment regulations) and informal institutional factors (i.e., managerial attitude and norms) influence EEB and its relationships with the three socio-cognitive traits.

1.6 Research Objectives

The first research objective is to determine how, over the last five decades, CE scholars have integrated CE and its implementations using theories that focus on antecedents at various levels. For instance, the extant research has used upper echelons theory, which views top management as a key determinant of strategic decisions and organisational outcomes, to examine the influence of top-management-team-level factors on CE (Hambrick and Mason 1984; Finkelstein and Hambrick 1996). At the firm level, researchers have used organisational theory, the CE assessment instruments (CEAI) model from Kuratko et al. (1990), and the resource-based view to examine the influence of firm-level factors on the successful implementation of CE.

The second objective is to provide a better understanding of individual- and country-level contextual factors that shape EEB. Under the integrative framework of the SCT (Bandura 1988) and institutional economics theory (North 1990; Williamson 2000), this thesis presents and tests a systematic multi-level framework of EEB. The present study investigates theoretically the associations among EEB, employees' socio-cognitive traits (entrepreneurial self-efficacy, opportunity perception and fear of failure), and country-level institutional factors (i.e., formal: rigidity of employment regulations, and informal: managerial attitude and norms) and structures them into a coherent and parsimonious model that explains the extensive set of interrelationships among these variables and their comparative effect on EEB.

1.7 Research Questions

To achieve the research objectives , research questions are formulated that are answered in three stages.

1.7.1 Stage One

Aim of Stage 1: Review and analyse the current knowledge related to CE based on the research by CE's scholars over the last five decades.

1. *What is entrepreneurship in established firm?*
2. *How has it been defined, conceptualised and measured?*
3. *What are the most commonly investigated antecedents of CE?*
4. *What are the gaps in the CE literature?*

1.7.2 Stage Two

Aim of Stage 2: To explore the interactions between employees' key socio-cognitive traits (entrepreneurial self-efficacy, opportunity perception and fear of failure) and EEB, as well as the direct and moderating effects of country-level institutions (i.e., formal: rigidity of employment regulations, and informal: managerial attitude and norms) on these relationships.

5. *What is the role of the employees' socio-cognitive traits in promoting employees' entrepreneurial behaviour?*
6. *How do country-level institutional factors influence employees' entrepreneurial behaviour?*
7. *How country-level institutional context interacts with individual-level socio-cognitive traits to promote or hinder employees' entrepreneurial behaviour?*

1.8 Scope and Methodology of the Thesis

The study is carried out in two stages. In stage 1, a meta-analysis systematically evaluates and summarises the results from many individual studies in the CE literature and tests a proposed model. In stage 2, a secondary data analysis explores the influences of various factors on the EEB from 70 countries and tests an interaction model between individual- and country-level institutional factors (i.e., formal and informal) and EEB. Figure 1.3 shows a snapshot of the thesis' scope.

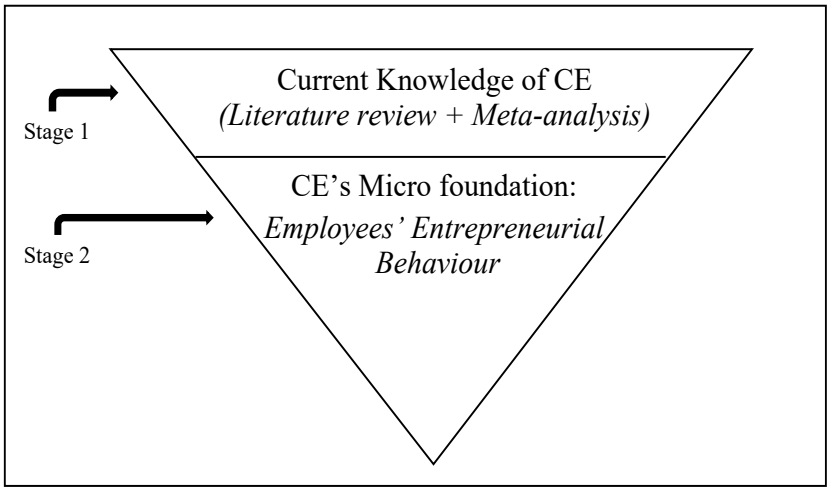


Figure 1.3 The scope of Thesis

1.8.1 Stage 1

Scope. Theoretical and empirical research across disciplines has been devoted to studying the factors that affect CE. However, the fragmented and inconclusive nature of the research limits the knowledge in this area and hampers the development of the field. This stage presents a systematic literature review, focusing on the entrepreneurship phenomena in established organisations from a broad angle to provide a detailed overview of the field. Then, using a multi-level framework and a meta-analysis that aggregates findings from 102 independent samples obtained from 97 articles published between 1994 up to 2022, this stage combines empirical findings on the antecedents of CE across the individual/group and firm levels. The cumulative evidence, examined through a meta-regression, shows that a top management team's entrepreneurial human capital and transformational leadership and its firm's building blocks, resources, and capabilities are positive drivers of CE. This stage also uses moderator analyses to determine how the relationships vary based on their informal institutional contexts. This meta-analysis, the first to assess the relative importance of CE's antecedents at multiple levels, demonstrates that several of the relationships between the antecedents and CE are contingent on the informal institutional context. Hence, based on the results of this stage, the gaps in the literature for stage 2 were identified, along with recommendations for future research and managerial implications.

Methodology. It was suggested by many CE scholars (e,g,. Kuratko 2017), that it is important for a researcher to build an understanding of the CE phenomena evolution, its multidimensional nature, its antecedents, and how it has been conceptualised and defined before conducting research. Thus, using keywords such as corporate entrepreneurship and firm entrepreneurship, the researcher engaged with the literature in a systematic way by identifying the key authors and studies over the last five decades. The purpose is to gather all available empirical research to organise and review the current state of knowledge in the CE research field (Mulrow 1994; Arshad 2018; Higgins and Thomas 2019). More precisely, the researcher wanted to have a comprehensive understanding of CE conceptualisation and its nature before going deeper into the research.

Through engagement with the literature to understand the CE concept, the researcher has noticed that scholars have devoted several theoretical and empirical research across disciplines to explore the impact of many CE antecedents. With the CE literature described as "fraught with ambiguities, confusion, inconsistencies, compromised methodologies, and

conflicting findings" (Schindehutte et al. 2018, p.13), the necessity of an advanced systematic literature review has arisen. Bearing in mind that quantitative methods dominate the CE research field, meta-analysis is the proper approach to a systematic review (Borenstein et al. 2009; Cooper 2017; Eisend 2017). Therefore, guided by previous scholars' research (e.g., Field and Gillett 2010; Pigott 2012; Koricheva et al. 2013), the meta-analysis process started by systematically collecting, analysing, and extracting conclusions from the literature. Studies were identified using keywords such as corporate entrepreneurship, firm entrepreneurship, and strategic entrepreneurship. Also, specific inclusion and exclusion criteria were implemented to enhance the accuracy of the analysis process. On completion of the search process in April 2022, 585 effects from 97 studies published by April 2022 were obtained, representing a sample of 2,77,337 firms. For the individual/group-level antecedents of CE, findings from 44 studies (45,202 firms) were identified and coded, while 95 studies (232,038 firms) were consulted for effects of firm-level antecedents of CE.

1.8.2 Stage 2

Scope. Based on the extensive literature review in stage 1, stage 2 focuses on the micro-foundations of CE at the employee level and examines the influence of three socio-cognitive traits— entrepreneurial self-efficacy, opportunity perception and fear of failure —on EEB, followed by an examination of how the country-level context influence that relationship. To do these examinations, SCT and institutional theory were blended to develop a multi-level model of EEB. Data from the GEM surveys, the Economic Freedom (EF) index, the Global Competitiveness Index (GCI), World Bank (WB), and the International Labour Organisation (ILO) were merged for 70 countries from 2015 to 2018.

The results, which are based on a multi-level random-effects model, suggest that entrepreneurial self-efficacy and ability to perceive opportunities, as well as high managerial attitude and norms promote EEB, while fear of failure and rigidity of employment regulations discourage it. In addition, the strength of the relationships between socio-cognitive traits and EEB depends on the institutional context, as employees who have a high level of entrepreneurial self-efficacy, a strong ability to perceive opportunities, and a low fear of failure but are in countries with rigid employment regulations are less likely to practice EEB than if they were in countries with more flexible labour market regulations. Employees' entrepreneurial self-efficacy and opportunity perception are also substantially more likely to lead to EEB in countries that have higher labour market norms. These results suggest that

employment regulations and managerial attitude and norms have a direct influence on employees' engagement in EEB and influence the probability that employees will mobilise their socio-cognitive resources to engage in entrepreneurial activities.

Methodology. In this stage, data from the GEM surveys, EF, GCI, WB, and ILO are merged and quantitatively analysed to explore the phenomena of EEB and how individual and institutional level factors influence these behaviours. The data represent a sample of 225,640 employees from 70 countries, covering the period from 2015 to 2018. Since the interactions are between variables from two levels using multi-level modelling in which individual employees are nested within nations, data that reflect both levels efficiently must be obtained. In the entrepreneurship, CE, and other business literature, GEM is considered a reliable and efficient source for capturing entrepreneurship activities worldwide (i.e., at the individual level) (Pindado and Sánchez 2017; Bogatyreva et al. 2022), while EF, GCI, WB, and ILO are considered the proper sources for data related to formal and informal institutions (i.e. at the country level).

1.9 Contribution of The Present Research

This research contributes to both theory and practice by providing a thorough analysis of CE and EEB, which are subjects of considerable academic and managerial interest.

1.9.1 Stage 1

The meta-analysis contributes to research that focuses on synthesizing and generalising evidence that addresses the multi-dimensional and multi-level nature of CE's antecedents. The meta-analysis also integrates the fragmented research into one study to provide fine-grained insights into the nomological network that surrounds the influence of group- and firm-level factors on CE. Finally, by uncovering the moderating role of the institutional environment and the type of firm in the relationships between individual/group- and firm-level factors and CE, this study contributes to the emerging research that has argued that CE phenomena is context-dependent

1.9.2 Stage 2

By adopting the bottom-up approach and focusing on the individual level of analysis, this thesis contributes to an under-researched area of the CE literature and fills a critical gap in

understanding who is developing and engaging in firms' entrepreneurial activities and why (Gawke et al. 2019). Theoretically sound and empirically tested models can assist firms and their managers in determining whether a reinforcing effect of similar socio-cognitive traits can increase the likelihood that their firms' employees will pursue entrepreneurship.

By examining the possibility of a direct relationship between country-level formal (i.e., rigidity of employment regulations) and informal (i.e. managerial attitudes and norms) institutional factors and EEB, this study also responds to calls for investigations on the role of country-level institutional contexts in promoting or hindering EEB (Zahra and Wright 2011; Arz 2017) and addresses the multidimensional nature of EEB and its antecedents (Schindehutte et al. 2018). More precisely, it answers calls to explore the interactions between individual-level factors (i.e., EEB and employees' socio-cognitive traits) and contextual-level factors (i.e. country-level formal and informal institutions) (Urbano et al. 2022). While the possibility of interactions between micro- and macro-level antecedents is increasingly acknowledged as key to undertaking a multi-level approach (Rauch et al. 2009; Wallace et al. 2016), determining the interaction effect of employees' socio-cognitive traits and the contextual environment on EEB remains challenging (Mustafa et al. 2018; Sugandini et al. 2018).

Finally, by investigating the moderating influence of country-level factors on the relationship between employees' socio-cognitive traits and EEB, this study provides integrative theoretical mechanisms related to where the macro-level factors (i.e., formal and informal) interact with the micro-level social-cognitive traits to influence EEB. By doing so, this thesis strengthens the argument that institutions' effects are context-related and may vary substantially, depending on the context. Furthermore, by exploring the extent to which both types of institutions encourage EEB and rely on employees' socio-cognitive traits, the thesis contributes to understanding the application of SCT in the EEB research field.

1.10 The Thesis Outlines

To accomplish the research objectives outlined in section 1.5, the thesis is divided into seven chapters. Figure 1.4 presents a road map to the thesis.

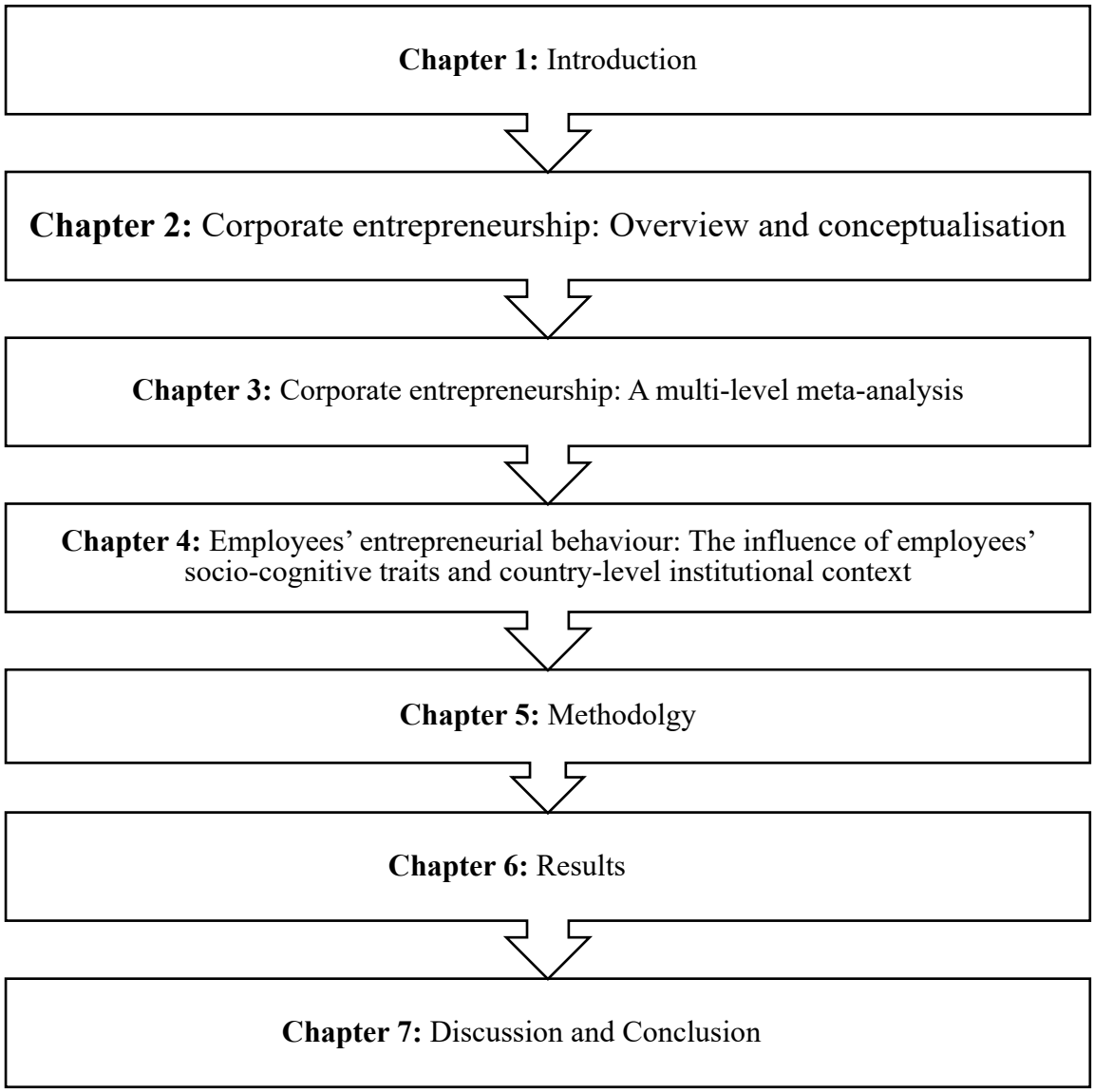


Figure 1.4 A Roadmap to the Thesis

Chapter 1 lays out the research setting, explains the rationale, and the research objectives, questions, scope, methodology, and contributions.

Chapter 2 presents a thorough literature review and discusses the research development and trends over the last five decades. The chapter reveals that two main streams dominate the CE literature: conceptualisations of CE and implementations of CE. (The latter is discussed in Chapter 3.) Hence, this chapter sheds light on how CE has been conceptualised and defined, the terminologies used to refer to CE, and some methodological issues.

Chapter 3 uses a multi-level framework and a meta-analysis that aggregates findings from extant studies to combine empirical findings on the antecedents of CE across the individual/group and firm levels. This chapter also uses moderator analyses to determine how

the relationships vary based on their informal institutional contexts. This meta-analysis, the first to assess the relative importance of CE's antecedents at multiple levels, demonstrates that several of the relationships between the antecedents and CE are contingent on the informal institutional context. Based on the results of this chapter, several recommendations for future research and managerial implications are offered.

Chapters 1 and 2 show that scholars in the CE research field have given some critical factors insufficient, so **Chapter 4** focuses on the micro-foundations of CE at the employee level and examines the influence of three socio-cognitive traits—entrepreneurial self-efficacy, opportunity perception, and fear of failure—on EEB and examines how the country-level institutional context moderates those relationships. SCT and institutional theory were blended to develop a multi-level model of EEB.

Chapter 5 covers the method used to gather and analyse the data utilised to investigate the study's research questions. It also shows how this study fits with the main scientific research paradigms. This chapter seeks to connect the conceptual model that has been proposed and the associated hypotheses that have been generated in Chapter 4 with the empirical findings that have been given in Chapter 6.

Chapter 6 presents the results of stage 2's: summary statistics and correlation matrix, the primary multi-level regressions results, graphs for interaction plots and robustness tests results.

Chapter 7 summarizes the empirical findings of both stages and explains their implications for research and practice. In addition, limitations and contributions of this thesis are discussed, along with guidance for future research.

1.11 Conclusion

This chapter introduced the research background, discussed the motivation behind it, and presented the main objectives that this study seeks to achieve. The chapter first provided a snapshot of firm-level entrepreneurship, its dimensions, benefits and consequences. The chapter also acknowledged the research field's evolution and the role of scholars from various disciplines in explaining the CE phenomenon. In addition to acknowledging the researchers' efforts, the chapter mentioned that the field suffers from conceptual, terminological and methodological issues that may be attributed to scholars' disagreement concerning the nature

of CE and the approaches they adopt when studying it. The chapter also presented some well-known examples of CE practice in business and employees' engagement in entrepreneurial activities worldwide based on the GEM 2019 report. The chapter's brief review of the last five decades of CE-related literature will be expanded in the following chapters.

The chapter discussed the rationale for this study based on the knowledge and methodological gaps that the literature review in chapters 2 and 3 revealed. In particular, the lack of common ground about CE's conceptualisation, the domination of the top-down approach, failure to address the multi-dimensional nature of CE and its antecedents, improper levels of analysis, and the use of unfit measurements are critical gaps that this study seeks to fill. This study sees CE as a comprehensive, multi-dimensional phenomenon that is influenced by factors from the employee level, the top management team level, the firm level, and the institutional level.

The chapter laid out the research's two main objectives: (1) to determine how CE scholars for the last five decades have addressed CE and its implementations using theories that focus on antecedents at various levels and (2) to propose and test a conceptual model that determines the barriers and drivers of EEB, a determinant of CE, at the individual and institutional levels.

To reach these two objectives, the chapter explained how this study is divided into two stages, the goals and research questions for which were presented in section 1.5. The chapter discussed the scope and methodology of each stage: Stage 1 combines empirical findings on the antecedents of CE across the individual/group and firm levels using a multi-level framework and a meta-analysis that aggregates findings from 102 independent samples obtained from 97 articles published between 1994 up to 2022. Stage 2 focuses on the micro-foundations of CE at the employee level and examines the influence on EEB of three socio-cognitive traits—entrepreneurial self-efficacy, opportunity perception, and fear of failure—followed by an examination of how the country-level institutional context directly impacts EEB and moderates the relationship between employees' socio-cognitive traits and EEB. Finally, the chapter presented the study's contributions, followed by the thesis outline, which acts as a roadmap for the study.

Chapter 2 Corporate Entrepreneurship Literature Review: conceptualisation and methodological issues

2.1 Introduction

This chapter uses a literature review to discuss the development and trends in the CE literature over the last decades. It explores the current stage of knowledge, defines potential research gaps, and sheds light on some of the vital issues in the CE research field. In doing so, it addresses research question 1 (*What is entrepreneurship in established firms?*), research question 2 (*How has CE been defined, conceptualised, and measured?*) *and research question 4* (*What are the potential knowledge gaps in the CE literature?*).

As shown in Figure 2.1, the rest of the chapter is organised as follows. First, it provides an overview of the CE literature over the last five decades, which indicates that two main streams dominate the CE literature: conceptualisations of CE and its implementations using theories that focus on antecedents at various levels. This chapter focuses on the first stream—Chapter 3 discusses the second—so it focuses on the conceptualisation, terminologies, definitions, and methodological issues of CE. The chapter concludes by discussing how to address these issues through a lens that sees CE as a multi-dimensional entrepreneurial phenomenon.

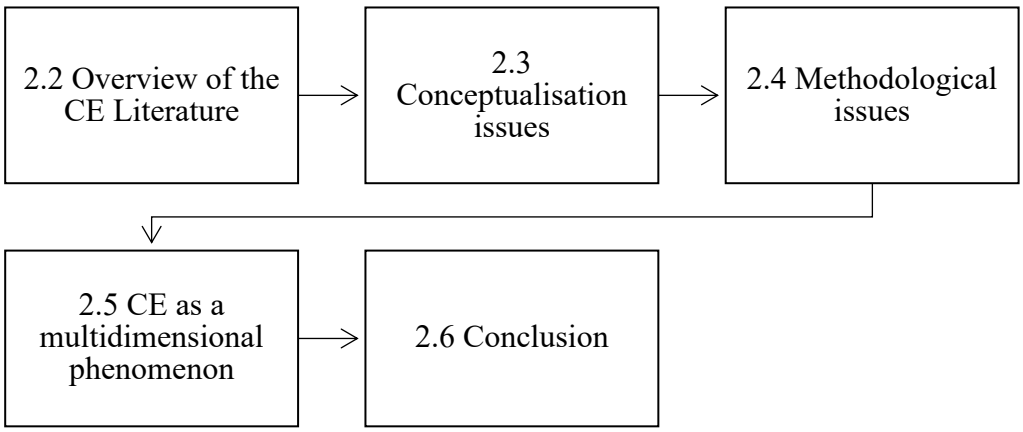


Figure 2.1 Outline of Chapter 2

2.2 Overview of the Corporate Entrepreneurship Literature

CE was first introduced as a tool that aids firms in keeping up with the competition in various business environments (Peterson and Berger 1971). By the early 1980s, more researchers were attracted to CE, and their work contributed to distinguishing CE from the strategic management research field (Burgelman 1983; Miller 1983). Since then, researchers have explored firms' entrepreneurial efforts to harness their resources and capabilities to innovate, enter new markets, and change their strategies to cope with market turbulence and the global economy (Calisto and Sarkar 2017b).

Once firms' entrepreneurial activities became essential in all types of organisations (Dess et al. 1999; Ireland et al. 2009), these activities were commonly referred to as CE. Scholars have used other terms, such as organisational entrepreneurship, intrapreneurship, corporate venturing, and strategic entrepreneurship (Schindehutte et al. 2018), as well. CE is generally based on the same principles as those of the independent entrepreneur, such as exploration and exploitation of opportunities. For example, Drucker (2012) adopts a comprehensive understanding of entrepreneurship:

> Entrepreneurship is based on the same principles, whether the entrepreneur is an existing large institution or an individual starting his or her new venture singlehanded. It makes little or no difference whether the entrepreneur is a business or a non-business public-service organisation, nor even whether the entrepreneur is a governmental or non-governmental institution. (p. 131).

As Figure 2.2 shows, the research field developed slowly theoretically and empirically in the 1970s and 1980s but then developed more rapidly because of the increasing importance of CE to firm success. Derived from the most cited articles in the CE research field (Acs and Audretsch 2010; Zahra et al. 2013; Hill and Georgoulas 2016; Kuratko 2017), the following sub-sections provide an overview of some of the critical studies in the CE literature over the last five decades.

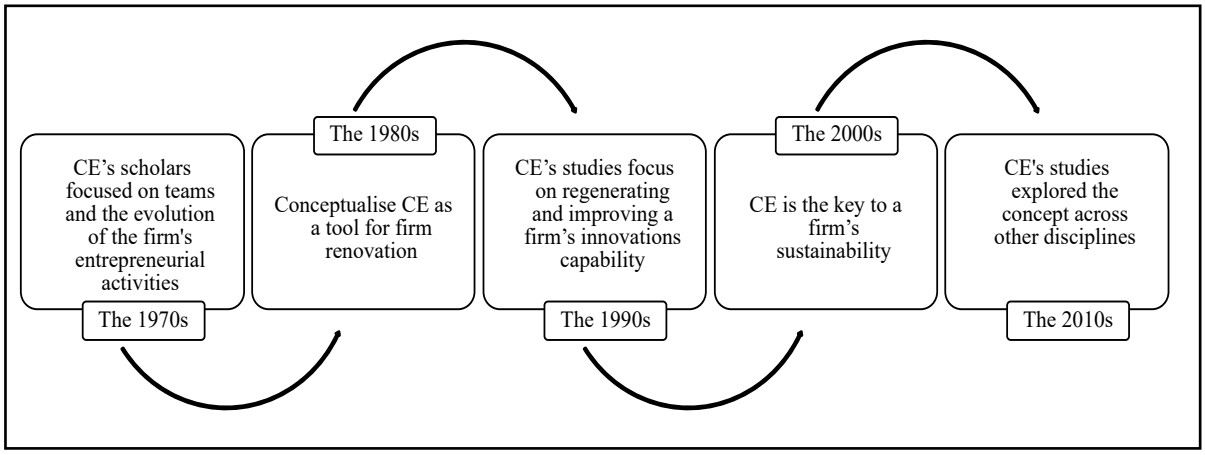


Figure 2.2 The trends of CE research over the last five decades

2.2.1 Corporate Entrepreneurship Research in the 1970s

The year 1971 witnessed Intel's invention of the microprocessor, IBM's invention of the floppy disk, and the first email. Also in that year, Tomlinson, Peterson and Berger (1971) were among the first scholars to examine CE as a strategic choice to boost innovation and growth in large organisations and as a method with which to face increasing levels of market instability. Shortly thereafter, CE's effectiveness in different types of market environments attracted several scholars' attention. Hill and Hlavacek (1972) explored the role of teams within organisations to enhance product innovation and concluded that such teams must be separated from other units to ensure the establishment of the entrepreneurial culture within the team. In 1976, Hanan used the idea that large organisations should learn from small businesses' strategies to develop a tool to assess venturing performance that revealed that entrepreneurial venturing activities could become more attractive and profitable than traditional acquisition activities. As the CE concept began to take shape, Von Hippel (1977) examined the role of the venture team, its manager, and its sponsors on internal ventures' success or failure and found a strong positive relationship between the success of the internal venture and the team's and its manager's experience.

2.2.2 Corporate Entrepreneurship Research in the 1980s.

In the 1980s, the CE research field started to gain more attention. Miller and Friesen (1982), one of the fundamental studies in the CE research field, introduced the entrepreneurial model of innovation and clarified the differences between the entrepreneurial model and the traditional innovation model. In the traditional model, innovation is seen as a reaction to market

changes, whereas in the entrepreneurial model, it is seen as a natural proactive activity in which firms are continuously engaged. The authors' conclusion was that, to be successful in the long run and capable of surviving rapid market changes, the firm should implement the entrepreneurial model and view innovation as a tool for success.

Meanwhile, based on strategic management research, Burgelman (1983a) presented a model of the strategic process of entrepreneurial activity in large and complex firms, and argued that CE is a source of diversification that enables firms to increase their opportunities. After Burgelman's work, CE became a separate research field (Sakhdari 2016). As the field evolved and attracted more researchers, the factors of successful innovation for firms of various sizes were explored, and Quinn (1985) found that, in larger firms, factors like market orientation, organisational structure, and organisational learning are central to innovation success.

In 1985, Pinchot used a new term, 'intrapreneurship', to refer to employees' entrepreneurial activities in firms, which had become a trending subject. The author defined the term as "dreamers who do. Those who take hands-on responsibility for creating innovation of any kind, within a business" (Pinchot 1985). The notion was that employees or managers do not have to leave their organisations to commercialise their entrepreneurial ideas if their firms adopt a system that enhances autonomy and provides rewards that support these ideas and help to execute them. Among other research, (Fry 1987) used the term to explore 3M's entrepreneurial activities during the 1980s . However, the term 'intrapreneurship' did not prevent scholars from developing the initial term, 'CE'. For instance, Jennings and Lumpkin (1989) redefined CE as firm output, that is, the degree to which the firm develops new products and markets. This definition provided the basis on which to develop an operational measurement for CE that is used to distinguish between the entrepreneurial firm and the traditional firm.

Even though the 1980s are considered as the real beginning of CE—see Calisto and Sarkar (2017b)—several scholars in this decade criticised CE in general and intrapreneurship in specific (e.g., Duncan et al. 1988). For example, Morse (1986, p.92) concluded that "intrapreneurship is not a formula for successful innovation in large companies as a bureaucratic system cannot provide the rewards and the personal autonomy which the true entrepreneur requires." Therefore, by the end of the 1980s, some scholars had concluded that

CE by itself may not be the golden goose, yet that did not prevent researchers from investing effort in developing the field.

2.2.3 Corporate Entrepreneurship Research in the 1990s.

Because of the criticisms that the CE research field faced in the late 1980s, the use of the term 'intrapreneurship' declined, and 'CE' became the most popular term with which to refer to firms' entrepreneurial activities. In this decade, scholars redefined CE as a new concept that is still common today. The first re-conceptualisation of CE, Zahra (1993), examined the relationship between the external environment and the firm's financial performance via CE activities. The study classified CE activities in two main dimensions: corporate innovation and venturing, and corporate renewal activities. Based on the CE and strategy literature, Stopford and Baden-Fuller (1994) categorised CE into three types: corporate venturing, business renewal, and strategic renewal, where a firm changes the rules of competition for its industry. The authors concluded that all three of these types of CE shared five attributes: proactiveness, aspiration to exceed current capabilities, team orientation, the ability to resolve dilemmas, and learning capability. Stopford and Baden-Fuller also investigated the motivations for pursuing CE by exploring triggers from the internal and external environment. By adopting the approach of previous scholars, such as Stevenson and Jarillo (1990), who defined CE as a pursuit of opportunities, Krackhardt (1995) explored the key roles that firms' informal networks play in generating opportunities and concluded that, although informal network 'friendships' are fundamental to CE activities, success is conditional on the larger structure in which those network ties are embedded. Birkinshaw's (1997) fundamental CE study explored CE activities in multi-national firms, classified four types of multi-national corporations' initiatives, and introduced a conceptual framework with which to categorise a firm's subsidiaries.

As the CE research field evolved, scholars addressed more issues to emphasise the importance of CE. For example, Zahra et al. (1999) found that CE is central to value creation through financial variety and to enhancing the firm's capabilities. Their study presented a model based on the firm's knowledge and capabilities, which provided a tool with which to understand the mechanism of gaining skills through CE activities. At the end of the decade, Dess et al. (1999) investigated the integration of CE's concepts into established firms' practices and suggested a holistic approach that combines strategic approaches and structural approaches and leads to more entrepreneurial strategies, structures, and processes. In the same year, Floyd and Wooldridge (1999) introduced an integrative model that included knowledge dynamics

and social structure and that explained how firms deal with inertia in the process of capability development. The authors concluded that CE is a multi-stage process based on different kinds of EEB from individuals at different levels at different points in time.

Also late in the 1990s, The journal Entrepreneurship Theory and Practice dedicated an issue to CE that included some of the significant CE studies to date that coordinated various definitions and approached the field of CE from a broadened perspective. Those papers provided a comprehensive summary of CE research at the end of the twentieth century. For instance, Sharma and Chrisman (1999, p.18) redefined CE as "the process by which an individual or a group of individuals, within an existing organisation, create a new organisation or instigate renewal or innovation within that organisation." Their study also introduced standards for corporate venturing activities and a hierarchical classification for terminologies used to describe firms' entrepreneurial activities. Sharma and Chrisman's definition is one of the most common definitions used by CE researchers to date (e.g., Bierwerth et al. 2015). Covin and Miles (1999) investigated the CE typology and evaluated the robustness of the classification that proposed that CE contains domain redefinition, persistent regeneration, organizational revitalization, and strategic renewal. Finally, Zahra et al. (1999a) identified important trends and issues in the field and suggested six streams for CE research to focus on in the twentieth century, such as behavioural, cognitive, and organisational variables.

2.2.4 Corporate Entrepreneurship Research in the 2000s.

Because of the significant research efforts during the late twentieth century, by the beginning of the twenty-first century, the CE research field was in a much better position as a separate research field. In addition to the ongoing work on themes from previous decades, the development of CE's instruments received attention during the 2000s. Thus, research on a firm's pursuit of CE to develop its capabilities was foremost during this decade. For instance, Ahuja and Morris Lampert (2001) presented a model for breakthrough innovation and concluded that leaning towards the familiar, the mature or solutions near to existing solutions are the three obstacles that prevent firms from developing breakthrough innovations. In addition, Smith and Gregorio (2002, p.130) introduced the entrepreneurial action theory, which refers to "any newly fashioned behaviour by which firms exploit opportunities others have not noticed or exploited." The theory provided substantial support to the link between CE and firms' strategies and explored the varied impact of entrepreneurial action on the market. For their part, Schildt et al. (2005) explored the differences between explorative and exploitative

learning in corporate venturing activities and concluded that the venture's governance structure determines the type of learning that take place.

Later on, Garvin and Levesque (2006) used the phrase 'two-cultures problem' to explain that firms face failure because of differences between the management and operation of traditional businesses and the management and operation of new ventures and suggested that a balance between the two cultures is essential for the success of the new venture. Thus, the need for more research for the managerial requirements for implementing CE arose, which has since then attracted the majority of CE researchers (Kuratko 2017; Arshad 2018). Finally, through a comprehensive review of the CE research field, Kuratko et al. (2005b) and Kuratko (2007) developed a broad model of the CE process that includes external triggers, CE strategy execution, firm antecedents, the entrepreneurial behaviours of top and middle managers, and outcomes and perceptions.

2.2.5 Corporate Entrepreneurship Research in the 2010s onwards

Throughout the 2010s and on, scholars have started to explore CE across other fields. For instance, Goodale et al. (2011) assessed the interaction between CE and operations management by analysing the effects of control and formality on CE's building blocks, which are defined in the CEAI tool (see Chapter 3 for more details), and innovation performance. The authors found that, when the building blocks interacted with the identified operational factors, they influenced the firm's innovation performance. Meanwhile, the development of CE measurements still attracted the scholars' attention during the twenty-first century. Although the CEAI tool that Kuratko et al. (1990) originally presented has been commonly used by other researchers, Kuratko et al. (2014b) developed and improved it since then.

As the CE research field evolved, more refined research has been conducted. Nason et al. (2015) examined the impact of firm size on CE activities and found that small and larger firms have synchronous strengths and weaknesses. Covin et al. (2016) explored the interaction between internal corporate ventures' learning competency and performance and concluded that the relationship is positive when the initial value proposition is unclear. During the 2010s, the research effort on renewed CE integration models is noticeable. For example, Covin et al. (2010) presented a model of the CE process that integrated all managerial levels. They also performed a historical review of the research field and found that CE's domains had been developed in which corporate venturing had been categorised as internal, external, and

cooperative venturing and strategic entrepreneurship had been categorised in modes like strategic renewal, sustained regeneration, and business model reconstruction. As a consequence, CE's domains are deeply rooted by researchers' efforts over the last three decades.

Based on this review of the evolution of the CE research field, it is clear that the focus of most research falls into two main categories: conceptualisations of CE and its implementations using theories that focus on antecedents at various levels. The conceptualisations of CE are discussed in the following sections, while the implementations of CE is discussed in Chapter 3. Table 2.1 outlines some of the critical CE research over the last five decades and identifies the seminal texts for CE research (i.e., studies 1,3,4 and 5) in which the primary focus was corporate venturing's similarities with entrepreneurial venturing. (Holmes et al. 2016; Kuratko 2017). These studies can be classified as the foundations that inspired scholars to consider CE a separate research field by the early 1980s. The rest of the studies in Table 2.1 inspired this thesis and helped to identify the gaps in the literature.

Table 2.1 Key research papers on corporate entrepreneurship over the last five decades

	Authors (Year)	Conceptualization of CE	Focus	Main findings
1	Westfall (1969)	Corporate venturing	Organisational factors	To stimulating corporate entrepreneurship a firm must decentralized venture planning and adopt the strategy of subsidies for entrepreneurial undertakings.
2	Peterson and Berger (1971)	Entrepreneurship strategy	Strategy and structure	CE allows firm to cope with turbulent market environment.
3	Hill and Hlavacek (1972)	Innovation	Corporate venture team	Venture teams can foster an entrepreneurial culture once they are separated from the rest of the firms' units.
4	Hanan (1976)	Entrepreneurship strategy	Corporate venture	Entrepreneurial venturing activities are more attractive and profitable than traditional acquisition activities.
5	von Hippel (1977)	Corporate venturing	Internal Corporate venturing	Experience of managers and venturing team are important.
6	Miller and Friesen (1982)	Innovation	Innovation process	Firms should implement the entrepreneurial model and view innovation as a tool to success.
7	Burgelman (1983b)	Internal corporate venturing	Individual and organisational level	Successful ICV depends on the ability of operational-level actors to engage in independent entrepreneurial activities, the capacity of middle-level managers to think about the strategic ramifications of these efforts in more broad-based

				system terms, and top management's ability to let successful entrepreneurial projects alter company direction.
8	Burgelman (1983a)	Innovation	Diversification strategies	CE is a source of the firm's diversification.
9	Quinn (1985)	Innovation	Organisational design	Larger firms stay innovated if they act like small ventures.
10	Pinchot (1985)	Intrapreneurship	Individuals' role	Individual initiatives, even when sanctioned by management, sustain CE.
11	Fry (1987)	Intrapreneurship	Internal environment	Establishing the proper internal environment is needed to foster CE activities.
12	Jennings and Lumpkin (1989)	Innovation	Organisational structure	To increase CE activities the decision making should be more participative, relies on specialised participation and managers must not be penalised if a risky project fails.
13	Zahra (1993)	Corporate venturing, Innovation, Strategic renewal	External environment	External environmental influence CE activities and CE is important for firm's performance.
14	Stopford and Baden-Fuller (1994)	Corporate venturing, business renewal and strategic renewal	Firm's capability, structure and leadership	All of CE activities have common attributions: proactiveness, aspirations that go beyond existing abilities, teamwork, the capacity to overcome problems, and learning potential.

15	Krackhardt (1995)	Pursuing opportunities	Organisational structure	Informal networks are important for firm's entrepreneurial activities.
16	Birkinshaw (1997)	Entrepreneurial initiative	Corporate venturing	CE at the subsidiary level has the ability to increase local responsiveness, worldwide learning and global integration.
17	Zahra et al. (1999b)	Formal and Informal entrepreneurial activities	Knowledge-creation processes	New abilities may be created through knowledge, which a firm can employ to reorganise the sources of its competitive advantage.
18	Dess et al. (1999)	Corporate venture and strategic renewal	Structure, strategy and process	A holistic approach is needed for CE.
19	Floyd and Wooldridge (1999)	Corporate venture and strategic renewal	Knowledge dynamics and social structure	CE mediates between inertia and learning in the capability-development process.
20	Sharma and Chrisman 1999)	Corporate venturing, Innovation, Strategic renewal	Internal corporate venture	Redefine CE.
21	Covin and Miles (1999)	Sustained regeneration, organisational rejuvenation, strategic renewal and domain redefinition	Structure and strategy	Reclassify CE.

22	Ahuja and Lampert (2001)	Innovation	The creation of the actual inventions	Presented a model for breakthrough innovation process.
23	Smith and Gregorio (2002)	Entrepreneurial actions	Market effectiveness	Entrepreneurial actions are fundamental firm behaviours which create a competitive advantage.
24	Schildt et al. (2005)	Corporate venturing	Explorative and exploitative learning	Exploratory learning is significantly impacted by corporate venturing and technology relatedness.
25	Garvin and Levesque (2006)	Corporate venturing	Internal environment and structure	Balance between the main firm and the new venture.
26	Kuratko et al. (2005b)	Corporate venturing, Innovation, Strategic renewal.	Middle-level managers' entrepreneurial behaviour	Integrate knowledge about CE and middle-level managers' behaviours.
27	Kuratko (2007)	Managers' entrepreneurial behaviour	CE process	Developed the integration model presented in 26.
28	Covin et al. (2010)	Corporate venturing and Strategic renewal	CE conceptualization	Reclassify CE.
29	Goodale et al. (2011)	Strategic reorientation	Structure and operations	Organisation antecedents of CE has significant impact on innovation performance.
30	Zahra et al. (2013)	Entrepreneurship within a firm	Systematic literature review	Suggested some future research directions, such as linking CE to strategy variety, linking the knowledge created by

				engaging in CE and the variety of new firm's capabilities, exploring CE at the international level, linking CE and the social entrepreneurship, and exploring the micro foundation of CE (i.e., employees' cognitions, attitudes, beliefs, motivations and behaviours).
31	Kuratko et al. (2014b)	Innovation	Internal environment	Corporate Entrepreneurship Assessment Instrument (CEAI) was used as a diagnostic tool to evaluate managers' impressions of the five key factors essential to fostering a creative and entrepreneurial environment.
32	Nason et al. (2015)	Corporate venturing, Innovation, Strategic renewal	Organizational size	CE is related to both large and small size firms.
33	Covin et al. (2016)	Internal corporate venturing	Planning and learning ability	When the initial evolution value proposition is ambiguous, a positive association exists between learning proficiency and the success of internal corporate ventures.
34	Holmes et al. (2016)	Corporate venturing, Innovation, Strategic renewal	Government Technology Policies	Technology policies such as research funding and IP protections determine the chances and limitations for innovation, changing the firm's motivations and capacity for certain CE and political tactics.

35	Byrne et al. (2016)	Corporate venturing, Innovation, Strategic renewal	Corporate Entrepreneurship Training	The action learning approach enabled entrepreneurial learning outcomes.
36	Sakhdari (2016)	Corporate venturing, Innovation, Strategic renewal	Systematic literature review	Suggested some future research directions, such as focusing on the linkages between a firm's capabilities and CE, the use of outsourcing knowledge to shape the firm's CE activities, investigating the impact of context-related factors (i.e., institutions) on CE activities, and the need for more individual-level research.
37	Kuratko (2017)	Corporate venturing, Strategic entrepreneurship	Systematic literature review	Research areas that need further explanations include employees' cognitions, measurement development for the initiation and the impact of CE on organisations, the impact of CE implementation in SMEs, not-for-profit and family firms, employees' entrepreneurial behaviour, entrepreneurial projects validation or validation or validation or termination.
38	Mustafa et al. (2018)	Employee entrepreneurial behaviours	Systematic literature review	Suggested some future research directions, such as using qualitative methods to provide a deeper explanation of employees' entrepreneurial behaviours and related factors (i.e., employees' cognitions, attitudes, beliefs, motivations

				and behaviours), investigating the impact of context-related factors (i.e., institutions), use of multilevel-modelling to address the multidimensional aspect of entrepreneurship within firms.
39	Lesner et al. (2018)	Corporate venturing, Innovation, Strategic renewal	Systematic literature review	CE literature converges around four archetypes: the portfolio, the transfer, the cultural, and the individual archetype.
40	Schindehutte et al. (2018)	Entrepreneurship within a firm	Systematic literature review	CE is a multidimensional phenomenon which motivated by meso, micro and macro factors. Effective CE is influenced by multi-layered individual and organizational variables which need to be addressed by future research.
41	Demirkan et al. (2019)	Corporate venturing, Innovation, Strategic renewal	Systematic literature review	Studies that explore CE from a holistic perspective in emerging markets are still rare.
42	Vanacker et al. (2021)	Internal CE (i.e., risk taking, proactiveness, and innovation) and external CE (i.e., corporate venturing)	The impact of country formal institutions on CE-firm performance relation	Flexible formal institutions have positive impact on CE-firm performance relation. Future research should examine the impact of other formal institutions using different set of countries and timeframe.

43	Pirhadi and Feyzbakhsh (2021)	Corporate venturing, Innovation	Systematic literature review	Future studies may examine the individual factors that drive CE; specific firms' capabilities to understand why some firms are more successful than others in CE implementation; and investigate the impact of contextual factors such as national culture or institutional contexts.
44	Chang et al. (2022)	Corporate venturing, Innovation, Strategic renewal	The interaction between the unit and firm resources on one side and the unit's CE performance on the other side	The interaction between firm's performance and unit's CE is mediated and also moderated by dyad-level human capital.
45	Urbano et al. (2022)	Corporate venturing, Innovation, Strategic renewal	Systematic literature review	Future studies may examine the influence of country institutions on CE; the role of first-level managers and non-managerial employees. Also, it will be better to use the multilevel regression technique to address the multidimensional nature of CE.

2.3 Conceptualisations issues

CE was introduced in the 1970s to be large firms' strategic choice to increase growth, but it has evolved to be conceptualised by scholars in various ways. Using broad or narrow lenses to study entrepreneurship in established firms, scholars have described the phenomenon as the activities that allow firms to gain competitive advantage, create value, and benefit stakeholders (Yang et al. 2009; Vanacker et al. 2021). However, Guth and Ginsberg (1990, p.9) stated, "despite the growing interest in corporate entrepreneurship, there appears to be nothing near a consensus on what it is." Thirty-two years later, Guth and Ginsberg's statement is still valid, and the debate among scholars concerning the nature of the phenomenon and its related events is ongoing (Schindehutte et al. 2018; Urbano et al. 2022). For example, some scholars have conceptualised CE as the firm's strategic posture or 'bundles' of internal and external attributes that lead to industry leadership (e.g., Covin et al. 1994; Stopford and Baden-Fuller 1994; Ireland et al. 2009; Hosseini et al. 2018). Others have attributed it to specific firm activities, such as innovation (e.g., Covin and Miles 1999; Ahuja and Morris Lampert 2001; Kuratko et al. 2014b), strategic renewal, or corporate venturing (e.g., Guth and Ginsberg 1990; Schildt et al. 2005; Covin et al. 2010; Covin et al. 2016).

Covin and Miles (1999) argued that CE must not refer to the entrepreneurial activities of individuals or departments in a firm and must be limited to activities in which the entire firm is engaged. This kind of conceptualisation is driven by the view that CE is an organisation-level perspective, so entrepreneurial activities could not be categorised as CE activities unless they result from organisation-level factors. Although this perspective was initially accepted, it has been criticised because it limits the CE phenomena (Kuratko 2017). Some scholars have also argued that there would be no CE without individual initiative because individuals create the initial spark for CE, as CE starts when individuals engage in entrepreneurial behaviours like environmental scanning and opportunity recognition (Dalton et al. 1998; Åmo 2010; Urban and Wood 2015). Despite 'the debate on the conceptualisation of CE, there is solid evidence that factors from various levels—individuals, firms, and external environments—play central roles in the creation, development, and execution of CE activities (Schindehutte et al. 2018; Urbano et al. 2022).

Some scholars have conceptualised CE as a tool that allows firms to innovate boldly and regularly as a result of individuals' entrepreneurial behaviour in a firm (Mustafa et al. 2016)

and as a process that leads to the creation of new ventures (Zahra 1991). In addition, some scholars have indicated that CE must occur in every aspect of the firm's daily activity (e.g. Burgelman 1983b; Calisto and Sarkar 2017a; Rigtering et al. 2019), while others have limited CE to the release of new products or operating in new markets (e.g. Zahra 1996a; Schmidt and Heidenreich 2019). This conceptual disagreement led to overlaps between new and existing terms, definitions, and measurements (Castriotta et al. 2021).

2.3.1 Corporate Entrepreneurship's Terminology

Since the 1970s, scholars have introduced new terms and labels to describe the phenomenon of entrepreneurship in established firms' based on their viewpoints and the research context. Although 'CE' is the most common term (Burgelman 1983a; Simsek et al. 2007a; Kuratko et al. 2014; An et al. 2018), other terms as shown in table 2.2 below have also been used similarly or have provided varying and sometimes opposing definitions. The multiplicity of terms increases ambiguity in the relationship among the terms, how they exist in firms, and their association with firms' outcomes (Brown et al. 2001; Daryani and Karimi 2017; Jancenelle et al. 2017; Ortkarpuz and Alagoz 2017; Monsen and Boss 2018; Sambo 2018; Sugandini et al. 2018; Kasturi et al. 2019; Kreiser et al. 2021).

Table 2.2 Terms used to refer to entrepreneurship in established firms (source: Author and Schindehutte et al. (2018)

Terms	Representative studies
Collective entrepreneurship	(Comeche and Loras 2010; Ribeiro-Soriano and Urbano 2010; Franco and Haase 2017)
Corporate entrepreneurship	(Burgelman 1983a; Zahra 1991; Duane Ireland et al. 2006; Tseng and Tseng 2019; Nguyen et al. 2020)
Corporate entrepreneurship strategy	(Dess et al. 1999; Ireland et al. 2009; Kearney and Meynhardt 2016; Jahanshahi et al. 2018; de Waal and Maritz 2019)
Corporate innovation	(Jennings and Lumpkin 1989; Huse et al. 2005; Garrett 2010; Lau et al. 2010; Chen et al. 2014)
Corporate venture capital	(Dushnitsky and Lenox 2005; Dushnitsky and Lenox 2006; Keil et al. 2010; Wadhwa et al. 2016)

Corporate venturing	(Hanan 1976; Dushnitsky and Lenox 2005; Kuratko et al. 2009; Wadhwa et al. 2016; Titus and Anderson 2018)
Entrepreneurial culture	(Chandler et al. 2000)
Entrepreneurial employee activity	(Bosma et al. 2012; Stam 2013; Ali et al. 2016; Widyarinia et al. 2016; Liebregts and Stam 2019)
Entrepreneurial firms	(Miller and Friesen 1982; Miller 1983; Begley and Boyd 1987; Salimath et al. 2008; Kang et al. 2016)
Entrepreneurial leadership	(Kuratko and Hornsby 1999)
Entrepreneurial management	(Stevenson and Jarillo 1990; Bradley et al. 2011; Sakhdari and Burgers 2017)
Entrepreneurial orientation	(Morris 1993; Lumpkin and Dess 1996; Kemelgor 2002; Yusuf 2002; de Villiers-Scheepers 2012)
Entrepreneurial posture	(Gabrielsson 2007)
Entrepreneurial strategy	(Peterson and Berger 1971; Russell and Robert D. Russell 1992; Yang and Wang 2014; Dyduch 2019)
External corporate venturing	(Schildt et al. 2005; Wadhwa and Kotha 2006; Keil et al. 2010; Titus and Anderson 2018)
Firm's entrepreneurial behaviours	(Jones et al. 2019; Kraus et al. 2019)
Internal corporate entrepreneurship	(Jones and Butler 1992; Sharma and Chrisman 1999)
Internal corporate venturing	(Burgelman 1983b; Ma et al. 2016; Makarevich 2017)
International corporate entrepreneurship	(Zahra and Garvis 2000; Naldi et al. 2015; Ahsan and Fernhaber 2019)
International venturing	(Bloodgood et al. 1996; Yiu et al. 2007; Zahra and Hayton 2008; Lau et al. 2010)
Intrapreneurial behavior	(Ijaz et al. 2012; Taştan and Güçel 2014; Edú Valsania et al. 2016; Anderson et al. 2019; Monfared et al. 2019)
Intrapreneurship	(Morse 1986; Duncan et al. 1988; Ibrahim 2016; Rivera 2017; Kasturi et al. 2019)
Strategic entrepreneurship	(Messeghem 2003; Lassen 2007; Anderson et al. 2019)
Strategic posture	(Covin et al. 1994; VIJ and Bedi 2016)

Strategic renewal	(Verbeke et al. 2007; Glaser et al. 2015; Kearney and Morris 2015; Colabi and Khajeheian 2018)
Strategic reorientation	(Tushman and Rosenkopf 1996; Gordon et al. 2000)

2.3.2 Definitions of Corporate Entrepreneurship

Scholars have defined entrepreneurship in an established firm differently, contributing to ambiguity. Some scholars have attributed the use of different definitions to the nature of the phenomena as a multi-layered concept (Sharma and Chrisman 1999; Monsen and Boss 2018; Schindehutte et al. 2018) cause scholars have focused on different levels of analysis, different dimensions, and different consequences or outcomes. The resulting definitions often contain overlaps between the attributes that are linked to these definitions and terms. Table 2.3 presents some of these definitions and key terms used to describe entrepreneurship in established firms.

Table 2.3 Some definitions of the key terms used to refer to entrepreneurship in established firms (source: Author and Schindehutte et al. (2018)

Terms	Source	definition
Entrepreneurial firms	Miller and Friesen (1982, p.5)	"that innovate boldly and regularly while taking considerable risks in their product-market strategies"
	Miller (1983, p.771)	"engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch"
	Morris and Paul (1987, p.249)	"an entrepreneurial firm is one with decision-making norms that emphasize proactive, innovative strategies that contain an element of risk"
	Covin and Slevin (1998, p.218)	"… in which the top managers have entrepreneurial management styles, as evidenced by the firms' strategic decisions and operating management philosophies. non-entrepreneurial or conservative firms are those in which the top management style is decidedly risk-averse, non-innovative, and passive or reactive"
Corporate entrepreneurship	Burgelman (1983, p.1349)	"to the process whereby firms engage in diversification through internal development"
	Jennings and Lumpkin (1989, p.489)	"… develops a higher than average number of new products and/or new markets."
	Guth and Ginsberg (1990, p.5)	"…encompasses two types of phenomena and the processes surrounding them: (1) the birth of new businesses within existing organizations, i.e., internal innovation or venturing; and (2) the transformation of organizations through renewal of the key ideas on which they are built, i.e., strategic renewal"
	Zahra (1991, p.260-261)	"…the process of creating new business within established firms to improve organizational profitability and enhance a company' competitive position or the strategic renewal of existing business"

	Zahra (1991, p.262)	"…a formal or informal activity aimed at creating new business in established firms through product and process innovations and market developments"
	Zahra (1993, p.321)	"…a process of organizational renewal that has two distinct but related dimensions: (1) innovation and venturing and (2) strategic renewal"
	Zahra and Covin (1995, p.226)	"…the sum of a company's venturing and innovation activities"
	Dess et al. (1999, p.85)	CE may be viewed "as consisting of two types of phenomena and processes: (1) birth of new businesses within existing organizations, whether through internal innovation or joint ventures/alliances and (2) transformation of organizations through strategic renewal, i.e., the creation of new wealth through the combination of resources"
	Sharma and Chrisman (1999, p.18)	"…the process whereby an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization"
	Zahra et al. (2000, p.947)	"the sum of a company's venturing and innovation activities"
	Zahra and Garvis (2000, p.471)	"the sum of a company's innovation, risk taking, and proactiveness"
	Schmelter et al. (2010, p.717)	"is a set of company-wide activities that centres on the discovering and pursuing new opportunities through innovation, creating new business, or introducing new business models"
Internal corporate entrepreneurship	Jones and Butler (1992, p.734)	"entrepreneurial behaviour within one firm"
	Schollhammer (1982, p.211)	"all formalized entrepreneurial activities within existing business organizations. Formalized internal entrepreneurial activities are those which receive explicit organizational sanction and resource commitment for the purpose of innovative corporate [endeavours] new product developments, product improvements, new methods or procedures"
Intrapreneurship	Pinchot (1985, p.xv)	"…entrepreneurship inside large corporations"

	Nielsen et al. (1985, p.181)	"the development within a large organization of internal markets and relatively small and independent units designed to create, internally test-market, and expand improved and/or innovative staff services, technologies or methods within the organization. This is different from the large organization entrepreneurship/venture units whose purpose is to develop profitable positions in external markets"
	Antoncic and Hisrich (2001, p.498)	"…a process that goes on inside an existing firm, regardless of its size, and leads not only to new business ventures but also to other innovative activities and orientations such as development of new products, services, technologies, administrative techniques, strategies and competitive postures"
Entrepreneurial orientation	Covin and Slevin (1991, p.7)	"...a dimension of strategic posture represented by a firm's risk-taking propensity, tendency to act in competitively aggressive, proactive manners, and reliance on frequent and extensive product innovation"
	Lumpkin and Dess (1996, p.136)	"the processes, practices and decision-making activities that lead to new entry and treat eo as firm-level entrepreneurship" and is characterized by one, or more of five dimensions: "a propensity to act autonomously, a willingness to innovate and take-risks, and a tendency to be aggressive toward competitors and proactive relative to marketplace opportunities"
	Zahra and Neubaum (1998, p.124)	"the sum total of a firm's radical innovation, proactive strategic action, and risk taking activities that are manifested in support of projects with uncertain outcomes"
	Anderson et al. (2009, p.220)	"characterized as a strategic construct that captures a firm's strategy-making practices, management philosophies, and firm-level behaviors that are entrepreneurial in nature"
	Covin and Lumpkin (2011, p.863)	"EO can be understood as a sustained firm-level attribute represented by the singular quality that risk taking, innovative, and proactive behaviors have in common"

	Anderson et al. (2015, p.1582-1583)	"EO (is) a second-order, firm-level construct comprised of two lower-order dimensions: entrepreneurial behaviors (encompassing innovativeness and proactiveness), and managerial attitude towards risk (risk taking). We define entrepreneurial behaviors as the firm-level pursuit of new products, processes, or business models (e.g., innovativeness) with the intended commercialization of those innovations in new product/market domains (e.g., proactiveness). We define managerial attitude toward risk as an inherent managerial inclination – existing at the level of the senior manager(s) tasked with developing and implementing firm-level strategy – favoring strategic actions that have uncertain outcomes (Miller, 1983). (The three existing components of eo) are reordered into two lower-order dimensions – risk taking as an attitudinal dimension, while innovativeness and proactiveness collapse to one behavioral dimension"
Corporate venturing	Biggadike (1979, p.104)	"as a business marketing a product or service that the parent company has not previously marketed and that requires the parent company to obtain new equipment or new people or new knowledge"
External corporate venturing	Covin et al. (2010, p.88)	"entrepreneurial activity in which new businesses are created by parties outside the corporation and subsequently invested in (via the assumption of equity positions) or acquired by the corporation"
internal corporate venturing	Zajac et al. (1991, p.171)	"the creation of an internally-staffed venture unit that is semi- autonomous, with the sponsoring organization maintaining ultimate authority"
Cooperative corporate venturing	Kuratko (2007, p.7)	"entrepreneurial activity in which new businesses are created and owned by the corporation together with one or more external development partners"

Strategic renewal	Guth and Ginsberg (1990, p.6)	"Strategic renewal involves the creation of new wealth through new combinations of resources"
Strategic entrepreneurship	de Villiers-Scheepers (2012, p.401)	"capitalizing on both opportunity-seeking activities, which inherently characterize entrepreneurship, as well as advantage-seeking activities demanded by strategy"
Entrepreneurial culture	Ireland et al. 2003, p.970)	an effective entrepreneurial culture is one in which new ideas and creativity are expected, risk taking is encouraged, failure is tolerated, learning is promoted, product, process and administrative innovations are championed, and continuous change is viewed as a conveyor of opportunities
Entrepreneurial actions	(Smith and Gregorio 2002)	"as any newly fashioned behavior by which firm exploit opportunities others have not noticed or exploited"

2.3.2.1 *The overlap between definitions.* Among the issues related to the various definitions and terms is the clear overlap between some definitions. For example, Zahra and Garvis (2000) defined CE as the sum of the firm's innovation, risk-taking, and proactiveness, which is similar to how others define entrepreneurial orientation (EO) (e.g., Covin and Slevin 1991; Lumpkin and Dess 1996; Zahra and Neubaum 1998). The overlap between CE and EO, considered one of the major issues in the CE' field, can be traced to the 1990s and is still a subject of debate (Hosseini et al. 2018). For example, scholars have criticised the use of EO as a synonym for CE or as a term that reflects firms' entrepreneurial activities because doing so suffers from a lack of underlying theory. Most studies that have examined the relationship between a firm's EO score and its performance have neglected CE (Schindehutte et al. 2018), which makes little sense since EO and its dimensions do not exist without CE activity.

Other scholars have differentiated between EO and CE, stating that EO is a strategic process that firms undertake to establish the proper internal environment for entrepreneurship and to strengthen CE (Cruz and Nordqvist 2012; Hosseini et al. 2018), while CE is the entrepreneurial activity (Thi and Trang 2018). Hence, capturing the firm's ability to deal with market turbulence or the ability to recognise opportunities does not necessarily reflect or translate to actual CE activities. For instance, Nokia's fall is an example that supports the argument that the ability to recognise opportunities is not enough to survive. (See section 1.1)

The EO-CE overlap, along with other overlaps in the CE field, has caused ambiguity in the conceptualisation of CE that extends to measurement issues and levels of analysis. This ambiguity in conceptualisation has been addressed by the vital work of several key scholars in the field (Sharma and Chrisman 1999; Ireland et al. 2009; Phan et al. 2009; Kuratko and Audretsch 2013; Zahra et al. 2013). They have argued that the definition's ambiguity is caused by the need for a definition that reflects both CE's activities at multiple levels and the various kinds of infrastructure needed (Guth and Ginsberg 1990; Sharma and Chrisman 1999; Schindehutte et al. 2018).

2.3.2.2 *Scholars' views as source of definition's ambiguity.* Since the early 1990s, several calls have been made to clarify the concept and definition of CE (e.g., Schendel 1990). In response, scholars made several attempts to address the causes of ambiguity. For example, some scholars attributed ambiguity in CE's definition to differences in scholars' views about the CE phenomenon. Burgers and de Vrande (2016) summarised these views into outcome-driven, context-driven, and individual-driven views. The outcome-driven view focuses on the

relationship between CE-related activities (i.e. innovation, venturing, and strategic renewal) and the firm's performance (Yang et al. 2007; Fis and Cetindamar 2009; Ağca et al. 2012; Simsek and Heavey 2016). In this view, scholars rely on Sharma and Chrisman's (1999, p. 14) definition of CE as "the process by which an individual or a group of individuals, within an existing organisation, create a new organisation or instigate renewal or innovation within that organisation." The context-driven view focuses on the internal firm characteristics that encourage CE activities, such as those identified in the CEAI model (Kuratko et al. 1990). In this view, scholars mostly rely on Stevenson and Jarillo (1990), who defined CE as a pursuit of opportunities. Finally, the individual-driven view focuses on the idea that opportunities are recognised and developed by individuals. Scholars who take this view endeavour to harmonise CE with independent entrepreneurship (Kacperczyk 2012; Dahlander et al. 2016).

2.4 Methodological issues

2.4.1 The multidimensional issue.

Over the last five decades, scholars have argued that the spark of CE may take place at any of three levels: the individual or group level, the organisation level, and the industrial level, where Schumpeterian innovation changes the rules of the game (Stopford and Baden-Fuller 1994; Soleimanof et al. 2019). Despite the differences between the levels in the amount of research, the scholarly work done at each level enriched the CE literature but also highlighted methodological problems and introduced research gaps that require further research (Schindehutte et al. 2018). For instance, as the CE research field evolved, more organisational phenomena and constructs, several of which were multi-dimensional and often multi-level themselves, emerged in the CE field (Kuratko and Hoskinson 2018). Despite the efforts some scholars made in using a multi-level of analysis when studying CE e.g., Behrens and Patzelt (2016), the multi-level problem has not received adequate attention in CE research (Hughes and Mustafa 2017; Schindehutte et al. 2018; Demirkan et al. 2019). For instance, Pirhadi and Feyzbakhsh's (2021) literature review on CE found only three studies that addressed multi-level factors.

2.4.2 The Domination of Top-Down Approach

Scholars that use the *top-down* approach have argued that CE is structured and formal, so organisations influence the processes of exploring and exploiting opportunities through their

cultures, structures, resource allocation, processes, and administrative instructions (Covin and Slevin 1991; Zahra et al. 1999; Baruah and Ward 2015). For instance, since the beginning of CE research, scholars have seen CE as the firm's strategic commitment to innovation and venturing (Burgelman 1983a; Miller 1983) or as a firm's strategic orientation, which leads to the firm's learning ability (Hayton 2005). CE has also been seen as the firm's readiness to be involved in new corporate ventures or strategic renewal and to dedicate the needed resources to execution to reflect the top management's entrepreneurial skills (Zahra and Covin 1995).

The top-down approach dominates the CE literature. As will be discussed in Chapter 3, most CE research has focused on exploring the role of top management team members in CE implementation, finding, for example, that top-level managers are responsible for formulating, setting, and establishing the initial entrepreneurial environment for CE by sharing the firm's strategy, mission, and vision (Ling et al. 2008a). However, while top-level managers may launch entrepreneurial projects, they have to follow the existing firm's policies and operations (Hornsby et al. 2009). The focus on investigating the role of top managers in CE implementation continued until the role of the other managerial levels started to attract attention in the 1990s (Kuratko 2017). Fulop (1991) found that middle and lower-level managers are not less critical than top managers in implementing CE. For instance, because of their organisational position, middle-level managers play central roles as creators and boosters of CE activities and processes (Ireland et al. 2009). Without steady commitment from all managerial levels, including the middle and lower levels, CE implementation would not be possible (Pearce et al. 1997; Kuratko et al. 2005a)

Along the same line, various studies have focused on the managerial functions within the firm's structure, finding that some organisational structures, which embrace formalisation and hierarchical orders impede CE implementation. For example, while employees are executing CE activities, managers should be efficient in minimising the process time and learn to cope with changes (Slevin and Covin 1998). Therefore, investigations of managerial functions in the firm's structure have identified the stimuli and contraindications of CE (e.g., Hitt and Duane Ireland 2017) in the role of managers.

Similarly, the impact of various firm-level elements and how they affect the adoption and growth of CE activities have been extensively studied in the literature. (Lindsay and Rue 1980; Scott 2008). For example, scholars have investigated the direct and indirect impact of firms' structure (Heavey et al. 2009), resource availability (Yuan et al. 2017), capabilities

(Burgelman 1983a), and internal culture (Ireland et al. 2009) on CE activities and firm performance. Studies have also examined the interaction between factors related to the top management team factors and those related to the firm in enhancing CE activities. For example, researchers have explored the emotional aspects of CE implementation, finding that implementing activities in support of CE and experiencing the failure of CE projects might be emotional for managers (Shepherd et al. 2009). Although the top-down approach dominates CE research, variations in similar research findings may be due to differences in the research context and researchers' approaches. Hence, a comprehensive overview all relevant information in CE research may be difficult (Gogtay and Thatte 2017). Therefore, Chapter 3 will provide a statistical review of the most frequently examined antecedents of CE across the various levels to clarify the relative importance of CE's drivers.

2.4.3 The Bottom-Up Approach

On the other hand, the bottom-up approach argues that CE is more informal and that entrepreneurial initiatives originate from an employee's perspective, regardless of the administration's desires. Although the firm-level and top-management-level factors are vital to CE's success, that success depends heavily on employees' engagement (Pellman and Pinchot 1999). An employees' decision to behave entrepreneurially is voluntary, as entrepreneurial behaviour is seldom specified in the standard job description (Rigtering and Weitzel 2013). Therefore, some scholars have argued that the firm's entrepreneurial activities are based on employees' initiative. The process of originating a process at the lower level of the organisation's structure based on employees' entrepreneurial behaviour and progressively moving up across the top management for an execution decision can be classified as a bottom-up process (Dalton et al. 1998; Åmo 2010; Blanka 2018; Mustafa et al. 2018).

Research that uses the bottom-up approach to explore CE and examine employees' role in firms' entrepreneurial activities remains limited compared to research that uses the top-down approach to explore CE. Although a few studies examine entrepreneurial activities on the employee level, they focus on how organisation-level factors (e.g. organisational culture, processes, and administrative instructions) influence the processes of exploring and exploiting opportunities (Covin and Slevin 1991; Zahra et al. 1999a; Baruah and Ward 2015). Similarly, other organisation-level factors, such as reward/reinforcement (Kühn et al. 2016; Agapie et al. 2018), time availability (Hornsby et al. 2002; Turner and Pennington 2015), collective firm culture (Zu et al. 2010), corporate support (Engelen et al. 2018) and flexible organisational

structure (Kreiser et al. 2021), are critical for engagement in EEB. Another stream of research focuses on group-level factors (e.g. the top management team's experience, education, and tenure) and how they influence employees' engagement in entrepreneurial activities (Kuratko 2017). Elements of job design, such as hierarchical position (Hornsby et al. 2002), autonomy (Thi and Trang 2018), and the levels of rational thinking and boldness required (Salanova and Schaufeli 2008), are also found to be positively associated with EEB.

Entrepreneurial actions that are pursued through employees' engagement using a bottom-up approach, also known as intrapreneurship (Åmo and Kolvereid 2005; Rigtering and Weitzel 2013), are influenced by individual-level factors like personality traits (Farrukh et al. 2016; Woo 2018) and innovativeness (Barrick and Mount 1991; Duradoni and di Fabio 2019). Along that line, Afriyie et al. (2019) find that employees' self-efficacy has a positive effect on their intrapreneurial behaviour, especially when they have access to their firms' resources. Nevertheless, research on how individual-level factors like employees' socio-cognitive traits impact EEB remains limited (Zahra et al. 2013). Therefore, understanding the individual-level factors that explain EEB without limiting them to managerial employees emerges as a fundamental knowledge gap in the CE research field (Zhao et al. 2010; Gaglio 2018).

2.4.4 The measurements issue

How CE is measured is another methodological issue for this research field. The ambiguity in CE's conceptualisation, definition, and terminologies could be a reason behind the measurement issues. For example, Zahra's (1996) scale is among the most commonly used CE scales in the literature (e.g. Simsek 2007; Ling et al. 2008b; Heavey et al. 2009). However, the scale is based on Miller's (1983) index, which is supposed to capture CE but actually captures EO because it focuses on a firm's risk-taking, proactiveness, and innovativeness. Although EO could be associated with CE, CE is much more than these three factors. Miller's index is also theoretically built to capture the firm's ability to respond to competitors, deal with uncertainty, and introduce new products over specific timeframe, factors that do not necessarily reflect CE.

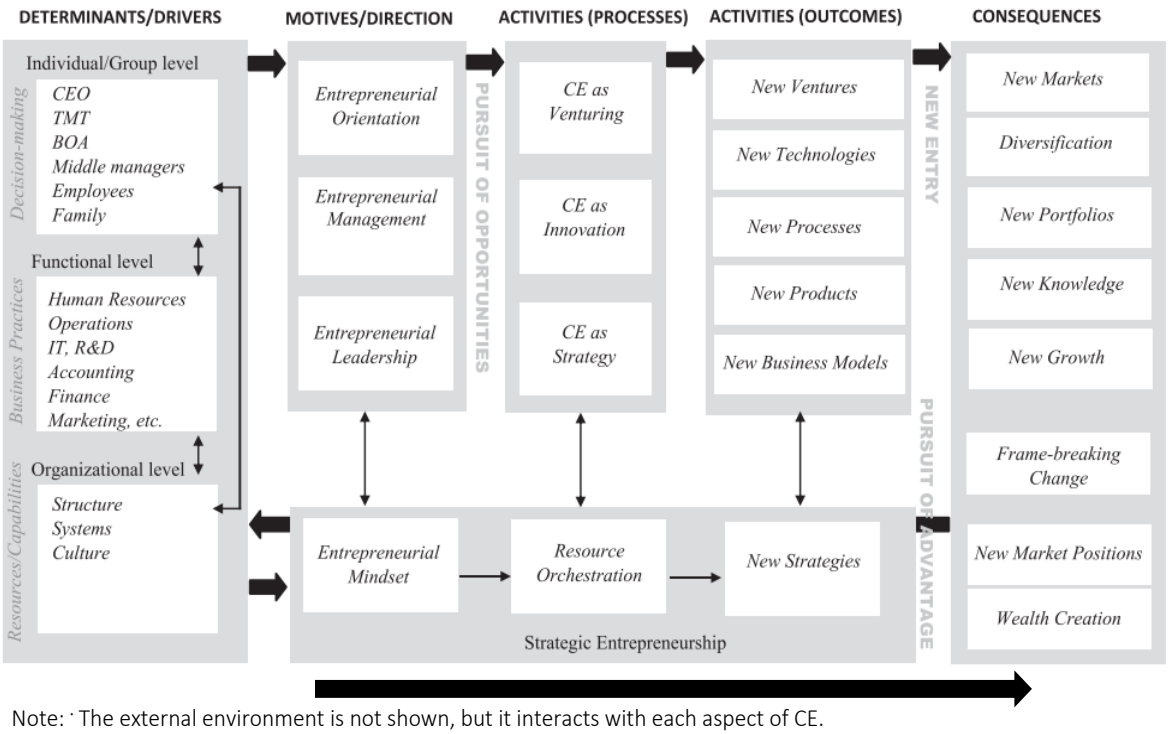
Using improper measurements and referring to something that is not what the measurement is supposed to measure is another example of measurement issues in the CE field (such as in Guerrero et al. (2021)), as is how studies operationalize corporate venturing based on individual-level measurements that capture the employees' involvement in venturing

activity. Employee-based venturing behaviour is one step in the venturing process that the firm must take once the TMT approves it. Acquisition and alliances (Zahra 2010), internal and external venturing (Basu and Wadhwa 2013; Ma et al. 2016), and corporate venture capital investments (Lin and Lee 2011) are examples of how corporate venture is usually measured in the CE literature.

2.5 Corporate Entrepreneurship as a multidimensional phenomenon

To date, the CE research has embraced the strategic management paradigm, which links to CE's having been considered a strategic leadership style since the early 1980s (Miller and Friesen 1982; Burgelman 1983b; Begley and Boyd 1987). According to Guth and Ginsberg (1990), CE relies mainly on the characteristics, values, beliefs, and behaviour of the organisation's leader. This conceptualisation still dominates CE research, which explains the high number of CE-related publications that have adopted the top-down approach (See chapter 3; Kuratko and Hoskinson 2018; Monsen and Boss 2018). On the other hand, while entrepreneurial management theory emphasis the role of employees in adopting CE (Stevenson and Jarillo 1990), those surveyed in most CE studies were CEOs and top management team members. Studies that are not limited to managerial employees are rare in the CE field (Jones et al. 2019).

To address these issues, researchers must look at CE as the umbrella under which lie various levels of determinants, behaviours, activities, processes, and practices. CE is a collection of multi-dimensional entrepreneurial phenomena in an established firm, where these phenomena "are not inherently alternative (i.e. mutually exclusive) constructs, but may co-exist as separate dimensions of entrepreneurial activity within a single organisation" (Covin and Miles 1999, p. 48). Although CE originated and some of its dimensions have their roots in the strategic management field, CE does not occur only because of firm-level factors nor is it facilitated only by the top management team (Urbano et al. 2022). Hence, CE is a comprehensive, multi-dimensional phenomenon that is influenced by organisational, external environmental elements as well as individuals from all levels in the organisation, all of which play a role in implementation of CE (See Figure 2.3).



Note: · The external environment is not shown, but it interacts with each aspect of CE.

Figure 2.3 A multidimensional framework for corporate entrepreneurship (source: Schindehutte et al. 2018)

2.6 Conclusion

The aim of this chapter was to answer the thesis' research question 1: What is entrepreneurship in an established firm?; research question 2: How has it been defined, conceptualised, and measured?; and research question 4: What are the knowledge gaps in the CE literature? To answer these research questions, the chapter first discussed the development of the CE research field by reviewing the literature from the last five decades. During the 1970s, the research was phenomenon-driven, and efforts were made to distinguish between independent entrepreneurs and entrepreneurship in an established firm. Research in the 1980s highlighted CE as a tool for success and in the 1990s highlighted CE's re-conceptualisation. Research in the 2000s established the proper infrastructure for exploring CE across other disciplines from the 2010s and on.

The chapter also discussed how CE has proven to be a legitimate and valid research field whose scholars can considerably impact this important strategy. As CE's importance grows, the research field has developed and proliferated in terms of theoretical and empirical knowledge. Despite this promising evolution, the chapter highlighted several issues from which the CE research field has suffered. For instance, how the research field is still

disadvantaged by conceptual ambiguity and overlapping terms, definitions, and measurements, in part because of the ongoing introduction of new definitions, terminologies, and measurements. The literature review identified several reasons for these issues, including the various views (i.e. outcome-driven, context-driven, and individual-driven) and overlapping between CE's definitions.

The chapter also discussed the methodological issues from which the CE research field still suffers, such as neglecting the multi-dimensional aspect of CE and the scarcity of studies that investigate the role of non-managerial employees and their related factors because the uses of bottom-up approach (versus the top-down approach) remains limited in the CE literature. The rarity of investigations of institutional contexts on the country level also impacts CE's implementation. The chapter also highlighted the use of inadequate measurements in the CE research field as one of the main methodological issues in the field.

The chapter concluded, based on the literature review, that CE is a comprehensive, multi-dimensional phenomenon that is influenced by factors on various levels. Influential factors could be related to individuals from any level to factors at the firm level, and to factors in the external environment, all of which play a role in implementing CE. The extant CE literature has mainly focused on organisational-level or the top management team (TMT) related antecedents of CE. This continues regardless of the many research calls to clarify who is explicitly developing and engaging in firms' entrepreneurial activities and why, thus neglecting a critical part of the management puzzle on understanding what leads to EEB as a 'micro foundations' of CE.

The discussion provided in Chapter 2 aimed to provide a roadmap for the chapters to follow, with the objective of filling in the identified gaps in the literature. Moving forward, Chapter 3 will provide a statistical review of the most frequently examined antecedents of CE, presenting a quantitative integration of the various levels and helping to clarify the relative importance of CE's drivers. Chapter 3 will also address the impact of the country-level institutional context, which may explain the differences in the relationships between the antecedents and CE. Hence, Chapter 3 will aim to present a multi-level framework for the meta-analytic examination of CE's antecedents, CE, and the country-level institutional context.

Then, Chapter 4 will focus on employees, an antecedent of CE that has been widely neglected in the CE literature, and how employees' socio-cognitive traits influence their EEB.

Chapter 4 will further address the multi-dimensional aspect of CE and examines the direct impact of the country-level institutional context on EEB and its moderating impact on the relationship between employees' socio-cognitive traits and EEB.

Chapter 3 Corporate entrepreneurship's antecedents: A multilevel meta-analysis (CE implementation)

3.1 Introduction

This chapter seeks to address the research question 3 *(What are the most commonly investigated antecedents of CE?)* and research question 4 (*What are the potential knowledge gaps in CE literature?).* In doing so, this chapter presents a multi-level framework for the meta-analytic examination of CE's antecedents. As it shown in Figure 3.1 below, the chapter starts with a preface to the meta-analysis, followed by a brief overview of CE and its dimensions, then by the multi-level framework of CE's antecedents which includes (i) antecedents at the individual/group level and (ii) antecedents at the firm level. Next the chapter discuss the moderation impact of the institutional environment. The chapter concludes by presenting the way forward.

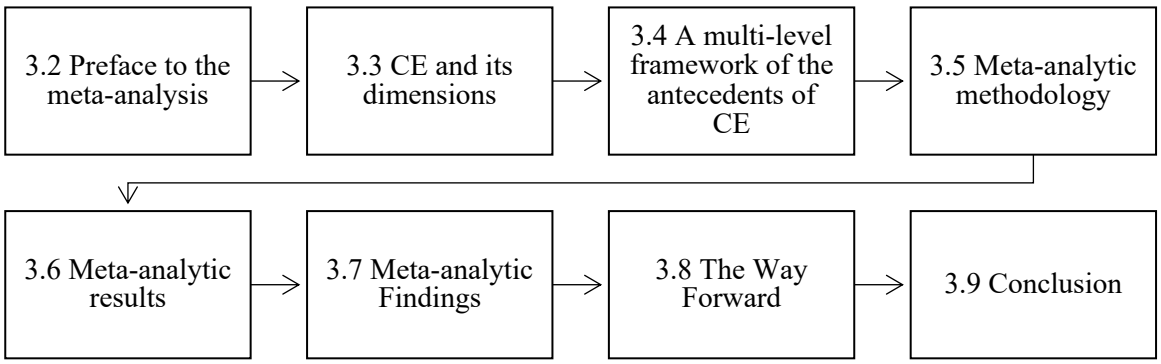


Figure 3.1 Outline of Chapter 3

3.2 Preface to the meta-analysis

Over the last five decades, strategic management, innovation management, and entrepreneurship research have worked to identify the antecedents of CE in multiple frameworks and from a variety of perspectives (Guth and Ginsberg 1990; Hornsby et al. 1993; Ireland et al. 2009; Sakhdari 2016; Urbano et al. 2022). While existing frameworks (e.g. the CEAI from Hornsby et al. (2002) have provided a holistic view that consolidates CE's

antecedents at several levels, such as the individual/group level (e.g. beliefs, attitude, values) and the firm level, there is a lack of empirical evidence-based conclusions about the drivers on which CE is based (Hornsby et al. 2009; Phan et al. 2009; Kuratko et al. 2015).

It is motivated by two gaps in the extant research. First, as mentioned in section 2.3.2 in Chapter two, the top-down approach, in which CE activities are driven by the top management team or organisational factors, dominates the CE research field. CE research has demonstrated that top managers have significant influence on CE because of their unique ability to shape organizational strategy, processes, and outcomes (Kuratko 2017; Chen et al. 2022). CE research has also emphasized the role of firm-level factors—that is, the internal environment—that stimulate entrepreneurial action inside an organisation(e.g. management support, rewards system, time allocation) by providing the resources and capabilities (e.g. slack resources, absorptive capacity) that are required to perform those actions. However, the empirical evidence illuminates only one part of a larger explanatory puzzle and lacks quantitative integration across the various levels. Schindehutte et al. (2018) noted that "one must seek to capture multi-level inputs, multi-level processes, and multi-level outcomes that research designs must reflect the interdependence among multi-layered individual and organizational factors that lead to effective CE" (p.29). The resulting emergence of fragmented research limits the understanding of the relative importance of CE's drivers (Phan et al. 2009).

Based on the discussion in sections 2.3 and 2.4, the second research gap that motivates this chapter is that, while the fragmented, eclectic, multidisciplinary, and interconnected nature of CE research offers the kind of rich intellectual framework in which a systematic integration of research may be valuable, the range of contexts in which it is conducted also contributes to this, there is an urgent necessity to reflect more systematically on the border circumstances surrounding the antecedents of CE, as these boundary conditions may be the source of the inconclusive findings (Urbano et al. 2022). Research has presented empirical evidence that the strength of the CE–performance relationship stems from the type of firm (e.g. SME, MNEs) and the country context (Bierwerth et al. 2015a; Vanacker et al. 2021). No research at the country level explains the differences in these antecedent-CE relationships (Urbano et al. 2022). Given the multi-faceted nature and broad-based prevalence of CE in multiple contexts (Phan et al. 2009), such an explanation can be of significant value to the development of future research on CE.

3.3 CE and its dimensions

CE was called by a number of names, including organizational entrepreneurship, intrapreneurship, corporate venturing, and strategic entrepreneurship (Schindehutte et al. 2018), and was defined differently (See Table 2.3). However, based on the discussion in sections 2.2 and 2.4 in Chapter 2, this thesis defined CE as a collection of multi-dimensional entrepreneurial phenomena in an established firm, influenced by factors from different levels (i.e. individuals from different levels, the firm-level factors and external environment factors). Its outcomes emerge solo or combined in the form of innovation, strategic renewal, and venturing.

3.3.1 Innovation.

Innovation is considered a core activity of entrepreneurship; whether it is at the individual or corporate level, it influences the level of a firm's competitiveness (Schindehutte et al. 2018). Studies on the relationship between innovation and entrepreneurship date to Schumpeter (1934), which saw the entrepreneur as an innovator who combines available resources to create a disruptive and radical new product, market, or organisation. CE's scholars have acknowledged the importance of innovation as one of CE's dimensions, stating that it might be the critical aspect of CE that leads to the other two of CE's dimensions: strategic renewal and corporate venturing (e.g., Herbert and Brazeal 1998; Covin and Miles 1999; Dess et al. 1999). However, Sharma and Chrisman's (1999) review revealed that, although innovation is an essential activity of entrepreneurship, it is not necessary for strategic renewal and corporate venturing because innovation depends on the ability to commercialise and whether the innovation is actually consumed. Hence, innovation should be considered one of the firm's entrepreneurial acts but not the only act.

To avoid overlapping too closely with the innovation management literature, this chapter considers innovation based on the discovery and pursuit of market opportunities only (Phan et al. 2009). Thus, innovation refers to the creation and presentation of new products or services to the market that increase market share, enhancing the firm's growth and competitiveness (Zahra 1996a; Sharma and Chrisman 1999). It reflects the creativity of transforming the firm's knowledge and resources into new products or services that enhance its economic value (Hosseini et al. 2018). It is a tool that allows firms to gain first-mover advantages, define the standards and prices for their pioneering products or services, lower their costs, and increase

their profit margins as their experience increases over time (Carow et al. 2004). Innovation also helps firms to fulfil employees' need to experience passion and enthusiasm (Ağca et al. 2012).

Scholars have explained the innovation concept and its process by stating that the term 'invention' refers to the developing stage of the innovative product or service, while the term 'innovation' refers to the commercialisation stage (Ahuja and Morris Lampert 2001). They have also defined two types of innovation: exploratory and exploitative. Exploratory innovation refers to a revolutionary procedure that allows firms to meet the demands of new markets and consumers (Jansen et al. 2006), while exploitative innovation refers to an innovative process that meets the current markets and consumers' needs (Lisboa et al. 2011). Both exploratory and exploitative innovation enhance the firm's competitiveness and improve its performance (Bloodgood et al. 1996; Jansen et al. 2006; Bierwerth et al. 2015a). For example, through exploratory innovation, a firm will invest in cutting-edge processes or use new production technology, which reduces production costs, increases productivity, and increases profitability (Zahra et al. 2000; Baer and Frese 2003). Likewise, investing in innovation related to administration systems or human research management enhances employees' engagement in entrepreneurial activities, which positively influence the firm's subjective and objective performance (Huse et al. 2005).

To reach a successful outcome for their innovation activities, adequate marketing strategies are necessary. Firms must know their target markets, the right time to release their innovations, and the right prices for them because the wrong marketing strategies will lead to innovation failure (Zahra and Covin 1995; Srivastava and Lee 2005). Resources must also be allocated at the right time and in the right amount to avoid innovation failure and negatively effects on the firm's performance (Camelo-Ordaz et al. 2012).

3.3.2 Strategic Renewal

Strategic renewal attracted scholars across all fields of business research, including CE, as an essential firm practise that stimulates their ability to cope with the immense changes in today's business environment (Schmitt et al. 2018). These changes, increased competition, and globalisation make it difficult for firms to predict the next technological, political and economic change. Scholars have examined strategic renewal as an effective practice for transforming from the traditional bureaucratic way of running a business, which may impede innovating new products, entering new markets, creating a new product line, or establishing methods that are

more flexible and adaptable (Flier et al. 2003; Ocak and Ozturk 2018). Such a transformation, which enhances the firm's likelihood of survival in the long term, can be implemented at lower levels (i.e. departments and sections) or higher levels (i.e. firm structure and strategy).

In the early 1990s, scholars noticed a lack of clarity in what CE and its related activities are. As a consequence, Guth and Ginsberg (1990) conducted an extensive review of the literature, which concluded that CE encompasses two types of activities: the creation of new business and strategic renewal. Strategic renewal is defined as "corporate entrepreneurial efforts that result in significant changes to an organisation's business or corporate-level strategy or structure" (Sharma and Chrisman 1999, p.18). Strategic renewal revives the firm's competitiveness by enhancing the firm's resource allocations and consumption, and positively influences overall performance by enhancing opportunity-recognition activities (Zahra 1996a; Yiu et al. 2007; Glaser et al. 2015). By reformulating their mission, restructuring, and making system-wide changes, firms can modify their core businesses and operations and target new markets, positively influencing their performance (Guth and Ginsberg 1990). Still, strategic renewal comes with risks, such as increasing employees' feelings of uncertainty and resistance (Tushman and Rosenkopf 1996; Piderit 2000). Therefore, these issues must be addressed and the flow of information must emphasise the need for renewal and its positive outcomes.

More recent studies that conceptualise CE provide more clarification regarding the strategic renewal dimension, for which they have used the collective term 'strategic entrepreneurship'. Strategic entrepreneurship has been conceptualised as behaviour that combines searching for opportunity and competitive advantages (Kuratko 2017). Schmitt et al. (2018) argued that the difference between firms that are successful in fulfilling stakeholders' expectations and those that are not is the ability to recognise and exploit available opportunities that lead to competitive advantage. As such, a firm must use its resources to existing market opportunities while also scanning for future opportunities, which enhances the firm's ability to cope with future changes. Hence, scholars have introduced CE and strategic entrepreneurship as simultaneously exploiting current opportunities and exploring future opportunities (Ireland et al. 2003). Strategic entrepreneurship is characterised in the literature as strategic renewal, ongoing renewal, domain reconsideration, organizational regeneration, and business model rebuilding (Covin and Miles 1999; Hitt et al. 2001; Ireland et al. 2003; Ireland et al. 2007; Kuratko and Audretsch 2013).

3.3.3 Corporate Venturing

Along with strategic renewal, the corporate venture was one of the first dimension of CE explored by scholars. As discussed in section 2.1.1, CE was conceptualised as corporate venturing activity in the 1970s, where the focus was on the role of the internal teams in the creation of a new business (Peterson and Berger 1971). Since then, the corporate venturing dimension has continued to attract researchers' interests. It refers to the establishment of new ventures that might be part of the firm or detached in their advanced stages with the goal of enhancing the firm's overall performance (Antoncic and Prodan 2008; Burgers et al. 2009; Keil et al. 2010). Scholars have defined three main categories of corporate venturing: internal, cooperative, and external (Kuratko and Audretsch 2013). Internal venturing refers to creating a new venture that is owned and operated by the mother firm, although it may have a level of autonomy. Cooperative venturing refers to the creation of a new venture that results from a joint venture or alliances with external partners. External venturing occurs when a firm invests in a new venture that is owned and operated by other parties.

Corporate venturing might be motivated by, for example, a firm's desire to invest in a small enterprise to gain access to new technology (Sahaym et al. 2016). A firm may also seek to diversify its business structure by creating new ventures in a market that may or may not be related to its core business. Venturing in the same market will enhance the performance of the venture and the firm itself through the exchange of resources and expertise and distribution of costs (Lin and Lee 2011). Venturing into a new market might lead to new customers, which could enhance the firm's overall performance (Simsek and Heavey 2011). In addition, new ventures are usually small and flexible, so they can recognise and exploit opportunities much faster than a larger, more established firm can (Garrett and Holland 2015). The costs of engaging in venturing activities, such as the massive amount of resources, which may reduce the resources available for other CE activities, must be considered (Prabhu et al. 2005).

3.4 A multi-level framework of the antecedents of CE

Drawing on a variety of theoretical frameworks, previous studies have explored—mainly at the individual/group level, the firm level, and the environmental level—a multitude of determinants, behaviours, activities, processes, and practices that affect CE (Zahra et al. 2009; Schindehutte et al. 2018; Urbano et al. 2022). Although a large body of research has been devoted to understanding antecedents' effect on CE, the relative importance of these

antecedents in terms of their influence on CE is not well understood; however, most scholars agree that CE is context-dependent (Zahra et al. 1998; Pindado and Sánchez 2017) and that a multi-level approach is needed (Stevenson and Jarillo 1990; Schindehutte et al. 2018; Urbano et al. 2022). Two issues in particular have not been adequately addressed in previous empirical studies and qualitative reviews: whether CE occurs only because of firm-level factors or is facilitated only by the top management team (TMT), and whether these multi-level antecedents of CE are universal or are contingent on the type of firm and its institutional context. To do so, different theories that focus on antecedents at various levels to explain CE and its implementations were integrated. For instance, the upper echelons theory, which views top management as a crucial factor in determining strategic choices and organizational outcomes, was used to examine the influence of the top management team level factors on CE (Hambrick and Mason 1984; Finkelstein and Hambrick 1996). At the firm level, two sub-dimensions were considered: the firm's building blocks (Hornsby et al. 2002) and its resources and capabilities (Barney 1991). Firms' building blocks assess the entrepreneurial environment (Hornsby et al. 2002) and the organization's preparedness for successful implementation of CE (Kuratko et al. 2014b). The firm's resources and capabilities build on the resource-based view of the firm (Barney 1991), which defines firms as a collection of strategic resources that a firm owns and controls and to which it has access (Helfat and Peteraf 2003) and defines capabilities as the firm's capacity to utilise its resources to carry out a planned series of actions in order to meet its goals (Barney 2001; Helfat and Peteraf 2003) that collectively determine CE. Finally, building on organizational theory, this chapter argues that firms' characterises, such as firm size, have implications for CE (Liu et al. 2015; Nason et al. 2015).

In terms of the external environment, the focus is not on micro-environment-level factors because only a handful of studies have explored micro-environment-level factors with regard to CE (Mitchell et al. 2000; Tajeddini and Mueller 2012). The neo-institutional theory (Meyer and Rowan 1977; Scott 2008) were used for an informal institutional environment-level moderator analyses. Hence, the multi-level framework (Figure 3.2) builds on theories at each level that are linked by their common focus on providing the internal and external resources that are needed to engage in CE activities (Zahra et al. 2009; Chang et al. 2022).

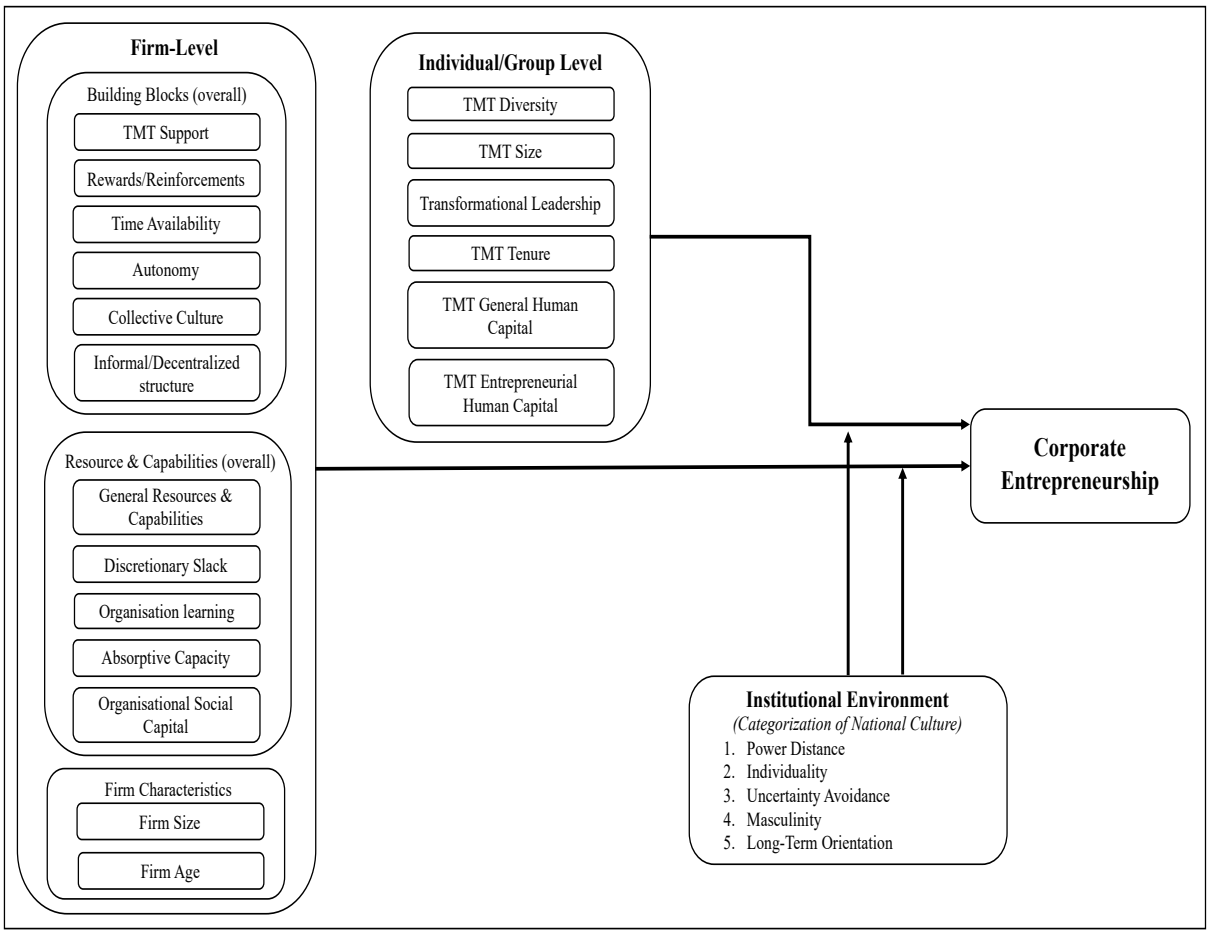


Figure 3.2 A multi-level framework of the antecedents of CE

Building on a variety of level-specific theories and areas of the literature, the following sections offer the theoretical justifications for the linkages between CE and its antecedents at the individual-/group level and the firm level. Two broad categories of antecedents of CE were used because, although this schema is not definitive, it has pedagogical value and intuitive appeal, as it captures the most commonly investigated antecedents of CE (Kuratko 2017). In addition, using these categories facilitates comparisons with meta-analytic findings on the antecedents of CE, and it reflects the frameworks that have been proposed in the prevalent CE literature (Ireland et al. 2009; Schindehutte et al. 2018).

3.4.1 Antecedents of CE at the individual/group level.

Under the premise of upper echelons theory, organizations are reflections of their TMTs (Hambrick and Mason 1984), which play a critical role not only in facilitating an environment that encourages innovation and entrepreneurship but also in developing the procedures and mechanisms that are needed for strategic choices like CE (Green et al. 2008). TMTs also oversee the processes for corporate venturing, strategic renewal (Kuratko and Audretsch 2013),

and continuous innovation (Chen and Nadkarni 2017). The TMT is also responsible for facilitating the decision-making related to providing a strategic direction (Burgelman 1983a; Benitez-Amado et al. 2010) and for converting corporate policy into particular plans, objectives, and goals (Heavey and Simsek 2013). In addition, the entrepreneurial management theory underpins the critical role of TMT in the initiation, promotion, and implementation of entrepreneurial activities (Srivastava and Lee 2005). The following paragraphs discuss the five most widely researched TMT characteristics—diversity, size, transformational leadership, tenure, and human capital—and how they are linked to the successful implementation of CE.

The TMT's *diversity* refers to the heterogeneity level of personal characteristics among members of the TMT (Díaz-Fernández et al. 2020). A diverse TMT positively influences CE because of the TMT's ability to gain information via their members' external networks (Heavey and Simsek 2013; Chen et al. 2022), ability to recognise a wide range of opportunities (Hayton 2005; Nuscheler et al. 2019), rigorous examination of varied perspectives and business challenges, and efficiency in making the unusual or unexpected decisions that are linked with environmental uncertainty and frequent technological changes (Blanco-Oliver et al. 2018). Diversity in terms of nationality enhances a TMT's human and social capital, which has an impact on the TMT's dynamics and CE implementation (Boone et al. 2019a), as such diversity can lead to productive conflict that can surface a variety of ideas that TMT members then merged to construct a creative solutions to complex problems (Talke et al. 2010; Olson et al. 2020).

The TMT's *size* is positively related to CE because a larger TMT will have a wider variety of human capital, which increases the environmental scanning and evaluation activities for potential opportunities (Haleblian and Finikelstein 1993; Yang and Wang 2014). Also, it increases the amount of CE-related information (Jin et al. 2017; Bui et al. 2020) and improves the ability to process this information (Zahra et al. 2000; Li et al. 2021). Larger teams are likely to have more of the resources, abilities, and skills that are central to resolving the complex situations that are often faced during CE implementation (Heavey and Simsek 2013). While the TMT's size alone may be a poor assessment of its members' capabilities (Díaz-Fernández et al. 2020), it may demonstrate the diversity of backgrounds and knowledge sources of its members and their combined ability to understand and process complicated information. (Rovelli 2020). A large TMT, which benefits substantially from the division of labour, can enhance a firm's capability to administer its operations efficiently and can facilitate efficient

environmental scanning and information evaluation, thus enriching the volume of useful information (Tribbitt and Yang 2017; Chen et al. 2022) and improving the firm's ability to process CE-related information (Zahra et al. 2000). In addition, a large TMT offers depth and breadth in terms of material financial assets, immaterial cognitive resources, network relationships, and worldviews that are uncommon in small TMTs (Jahanshahi et al. 2018).

Leaders can create visionary scenarios that can be used to assemble and mobilize a supportive group in a firm that is committed to the discovery and exploitation of opportunities and to developing the market for new products that result (Gupta et al. 2004; Li et al. 2021). In line with the notion that CE is a series of activities of individuals and groups in a firm, research has pointed to the transformational leadership style's positive effect on employee satisfaction, intellectual stimulation, and creativity, all of which may enhance firms' innovativeness (Shafique and Kalyar 2018; Pan et al. 2021), leading to effective implementation of CE initiatives and improving firm performance (Ocak and Ozturk 2018; Boukamcha 2019).

TMT members with long *tenures*, having dealt with many challenges over time, have historical managerial and industrial knowledge and experience, which improves their decision-making ability (Sahaym et al. 2016; Jones et al. 2019). Their perception and interpretation of internal and external changes help them to identify the opportunities (Hayton 2005) that could have a positive influence on successful risk-taking and CE activities (Simsek 2007). Successful adoption of CE strategies also requires significant interdependence and integration in firm, which a longer-tenured TMT can pursue by facilitating social cohesion and shared cognitive structures (Amason and Sapienza 1997). On the other hand, research has suggested that short-tenured TMTs are more likely to be up to date on emerging competitive areas (Floyd and Lane 2000) and to be more enthusiastic, challenging risk-takers than long-tenured TMTs, who may prefer maintaining the status quo (Certo et al. 2006). Hence, short-tenured TMTs' attitudes might be a source of conflict, yet they may have significant effects on CE (Heavey and Simsek 2013).

Research that has explored TMT's *human capital* and CE relationship has found that TMTs' education level and majors correlate with firms' innovation activities (Jahanshahi et al. 2018) and that TMTs' experience positively impacts the quality of CE-related decisions (Nkongolo-Bakenda et al. 2010; Yuan et al. 2017). TMT members' experience also equips them with tools for exploring and exploiting opportunities and allocating the needed resources effectively (Nuscheler et al. 2019). Similarly, a high level of experience means that TMT

members have the field-related knowledge that they can use to widen their networks inside and outside their firms' fields (Li et al. 2020) that are considered vital to successful implementation of CE (Yuan et al. 2017). Building on the human and relational capital theory, researchers have found that CE and its activities are heavily dependent on the TMT's entrepreneurial alertness (Tang et al. 2012; Tzabbar and Margolis 2017). Furthermore, TMT members' proactiveness and risk-taking abilities, as manifestations of their entrepreneurial human capital, has been shown to help their firms exploit opportunities faster than their rivals can (Heavey et al. 2009).

3.4.2 Antecedents of CE at the firm level.

Following (Schindehutte et al. 2018), the focus is on three key drivers: the firm's building blocks, its resources and capabilities, and its characteristics. The f*irm's building blocks* measure the functional aspects of business processes and practices that promote entrepreneurial activities inside an organisation(Kuratko et al. 1990; Ireland et al. 2009; Hayton et al. 2013). Six building blocks: TMT support, rewards/reinforcements, time availability, autonomy, collective culture, and informal/decentralised structure, which have a positive influence on CE were proposed. Several scholars found that *TMT's support* positively influences CE, regardless of the industry or the type of organisation(e.g. Hornsby et al. 2009; Urban and Wood 2017). TMT support aligns with firm-level factors (Hughes and Mustafa 2017) because it reflects how the TMT members support entrepreneurial behaviour in the firm (Kuratko et al. 2005a; Kearney and Meynhardt 2016) , thus positively influencing and facilitating the firm's CE (Kuratko et al. 1990).

Similarly, an effective *reward/reinforcement system* that encourages risk-taking and innovation and is performance-based can encourage entrepreneurial behaviour amongst employees and is positively associated with successful implementation of CE (Kühn et al. 2016; Agapie et al. 2018). *Time availability* relates to evaluating employees' workloads in terms of their work structure and time availability (Hornsby et al. 2002; Turner and Pennington 2015). When work systems allow employees to devote some of their working hours to innovation and fulfilling organizational goals, they not only encourage employees' engagement in CE activities but can also enhance the employees' entrepreneurial behaviour (Goodale et al. 2011; Reyes 2019). *Autonomy* refers to the extent of the empowerment level that employees receive to decide how to carry out their tasks in a way that they think is most productive and effective (Kreiser et al. 2021), has also been shown to improve productivity and successful implementation of CE (Thi and Trang 2018; Chebbi et al. 2020; Setiawan and Erdogan 2020).

CE researchers have also highlighted that a *collective firm culture*, where the group's interests come before personal interests, and where the importance of teamwork, collaboration, and harmony at work are valuable (Morris 1993), is positively influence CE implementation (Ireland et al. 2009). Such a culture is considered the proper environment for CE because of a high level of information exchange among employees and enhancing their ability to achieve common goals (Zu et al. 2010), improves the practice of decentralisation and empowerment (Paunovic and Dima 2014), and establish a solid internal infrastructure for other building blocks elements to influence CE positively (Ireland et al. 2009). Additionally, several CE research has emphasised how crucial *organisational structure* is in affecting CE implementation (Rigtering and Behrens 2021). The firm's operations must be processed based on a specific chain of command in the formal and centralised structures, which might negatively impact the firm's innovation and CE adoption (Chigamba et al. 2014). On the other hand, the flexible, informal, and decentralised structures might be advantageous to CE since CE demands quick answers to possibilities, especially in highly dynamic contexts (Russell and Russell 1992; Burgers et al. 2009; Kreiser et al. 2021). According to Chang et al. (2017), such a structure also fosters empowerment, information sharing, and unit integration, all of which positively impact CE.

In line with the resourced-based view of the firm (Barney 1991), the relationship between a *firm's resources and capabilities* and its successful implementation of CE were examined with reference to five elements of resource availability and the firm's ability to use them: general resources and capabilities, discretionary slack, organizational learning, absorptive capacity, and organisationsocial capital. A firm's *general resources and capabilities*, as reflected in its structures, systems, and cultures, are the constellation of skills it can use to explore and exploit new knowledge and opportunities so as to choose CE as a path by which to grow and succeed (Autio et al. 2000; Ireland et al. 2009; Wahab and Nagaty 2017) *Discretionary slack* in these resources (e.g. tangible, intangible, human, and financial), along with their amount, accessibility, recoverability, and availability, positively influence the firm's entrepreneurial activities (Yuan et al. 2017; Olson et al. 2020). For instance, a firm is likely to engage in CE more frequently when it has access to spare resources than a firm with restricted resources (Garrett et al. 2021; Chen et al. 2022).

Organizational learning is essential to the firm's CE-related operations since it helps the company stay informed about market developments and broadens its expertise. For instance, a

firm that is committed to learning and has a learning-oriented strategy can recognise market opportunities and participate more likely in CE (Lee et al. 2016; An et al. 2018). *Absorptive capacity* is more about the actions, and skills firms employ to assess and transmit information to satisfy commercial goals (Song 2015). According to knowledge-based theory, absorptive capacity enhances the firm's capacity for opportunities recognition by encouraging the development of new skills among TMT members (Zahra et al. 2009; Nabeel-Rehman and Nazri 2019) and employees (Rangus and Slavec 2017), thus supporting the firm's innovation performance (Shafique and Kalyar 2018; Rehman et al. 2020). Investment in absorptive capacity is considered essential to successful implementation of CE (García-Sánchez et al. 2018; Jiménez-Barrionuevo et al. 2019). From a *social capital* perspective (Nahapiet and Ghoshal 1998), firms can be viewed as a collection of interdependent roles linked by social networks that relocate knowledge, resources, and influence. When alternative sources of information are unavailable, business networks in the form of interlocking directorates give firms access to affordable, reliable, and verifiable business information that may impact their CE activities (Yiu and Lau 2008). Similarly, social networks can improve trust among allies, resulting in successful implementation of CE (Hosseini et al. 2018).

In line with organisation theory (Robbins and Judge 2013; Haveman and Wetts 2019), CE is seen as function of a *firm's characteristics* (i.e., its size and age). The relationship between a *firm's size*, as a proxy for firm-specific advantages, and CE has been widely investigated (Plambeck 2012; Josefy et al. 2015). While some studies have concluded that larger firms, having more discretionary slack, tend to be more risk-seeking in over-border venturing (Sahaym et al. 2016), others have claimed that large firm size, with its complicated hierarchical structures, has a negative impact on activities related to strategic renewal (Zahra 1996b; Jahanshahi et al. 2018) and that smaller firms' simple structure increases the information exchange process between firm's employees (Heavey and Simsek 2013) so a quicker response to market changes through strategic renewal activities can take place adequately (Nason et al. 2015). The research on the impact of the *firm's age* on its CE activities has revealed that a mature firm, which is likely to have the benefit of extensive social capital, generally has more experienced employees than younger firms do, which positively impacts their ability to engage in CE successfully (Nkongolo-Bakenda et al. 2010; Unger et al. 2011). However, others have argued that younger firms are more likely to engage in CE activities because of a higher level of flexibility and passion (Liu et al. 2015). In contrast, mature firms

are less likely to implement CE because of a lack of motivation or difficulty changing routines (Kearney and Morris 2015).

3.4.3 The institutional environment as a moderator

In the 1930s, the country-level institutional context emerged as a central component of sociological theory to understand human society (Hughes 1936). Later in the 1970s, Meyer and Rowan introduced the institution theory to the business research field to explain how an organisation fit and is influenced by the society where it operates (Meyer and Rowan 1977). Through the cultural elements, such as values, norms, rules, beliefs and assumptions, the theory emphasises that institutions govern how members of society, including individuals and organisations, behave and attitudes (Barley and Tolbert 1997).

Institutions provide stable expectations by reducing the risk and uncertainty that are associated with political, economic, and social interactions (North 1990; Kostova et al. 2020). The role of institutions has been widely discussed in the entrepreneurship literature, with a particular focus on their role in facilitating innovation, growth, and productivity (Dheer 2017). The foundations of neo-institutional theory (Meyer and Rowan 1977; Scott 2008) argued that formal and informal institutions provide firms with resources inside and outside the firms, thus influencing activities such as those related to CE. Hence, the effects of multi-level factors (i.e., individual/group- and firm-level factors) on CE vary depending on the institutional context in which firms operate. More precisely the effect of culture, an informal institution, will enhance the understanding of the mechanism behind the interaction between the multi-level factors-CE. Thus, (Hofstede and Bond 1984) categorization of five dimensions of national culture: power distance, individuality, uncertainty avoidance, masculinity, and long-term orientation, were used. However, the CE literature contains limited theoretical rationale for the moderating effects of these cultural dimensions. As identified in Urbano et al.'s (2022) literature review, no extant study explores the impact of the institutional environment on CE; thus, an exploratory approach were used, which is consistent with previous meta-analytic analyses (Tihanyi et al. 2005; Geyskens et al. 2006; Kirca et al. 2012).

3.5 Meta-analytic methodology

During the social since research method (SSRM) year, the researcher started exploring and collecting the literature. At that time, the aim was to understand CE's phenomena and what

has been done in the CE research field. Overwhelmed by literature described as "fraught with ambiguities, confusion, inconsistencies, comprised methodologies, and conflicting findings" (Schindehutte et al. 2018, p.13), the necessity of adopting a systematic review rose to overcome the identified literature issues. Bearing in mind that quantitative methods dominate the CE research field, meta-analysis is the proper carry-on systematic review. Therefore, guided by previous scholars' research (e.g., Field and Gillett 2010; Pigott 2012; Koricheva et al. 2013; Eisend 2017), the current meta-analysis process started by systematically collecting, analyse, and extract conclusions from the literature.

This stage's primary objective was to review and explore the current stage of knowledge in the CE research field. Conducting a meta-analysis was the right choice because it explores the current state of knowledge and quantitatively identifies correlations among studied variables (Glass 1976). This systematic review is needed because of the number of publications in the CE research field every year. Besides, there is a possibility of variations between similar research findings because of differences in the research context and researchers' approaches. Hence, it is difficult for those interested in CE research to overview all relevant information comprehensively (Gogtay and Thatte 2017). Thus, the meta-analysis stage helped address the huge publications volume and the variation of the results by analysing CE antecedents' relationship with CE from several studies (Todorovic et al. 2015).

3.5.1 Literature research

To develop the database for the meta-analysis, first, a comprehensive search for studies published by April 2022 in several research sources such as ABI/INFORM, PsycINFO, EBSCO (Business Source Elite), and Wilson Business Abstracts using the keywords, such as corporate entrepreneurship, firm entrepreneurship, and strategic entrepreneurship, were conducted. Then leading management, entrepreneurship journals and the bibliographies from the existent reviews in CE research filed (Dess et al. 2003; Kuratko 2007; Bierwerth et al. 2015b; Urbano et al. 2022) were manually searched. To avoid publication bias, working papers and unpublished dissertations were also added. Specific inclusion/exclusion criteria are followed. First, the study must focus on CE and in line with CE definition stated earlier in section 3.1. Second, only studies that presented the Pearson correlation coefficient (r) for the targeted associations or reported adequate statistical information to calculate r with the formulas by (Hunter and Schmidt 2011) were included. Third, only studies that are relevant to the CE literature were included. Regarding this third criteria, some scholars have considered

entrepreneurial orientation (EO) a dimension of CE (Rensburg 2015). However, based on the discussion in section 2.2.2, the two concepts were distinguished. While EO captures a firm's inclination towards entrepreneurship (Cruz and Nordqvist 2012) and a predisposition to engaging in entrepreneurial activity (Hosseini et al. 2018), in this analysis, CE focuses on practical entrepreneurial activity (Schindehutte et al. 2018; Thi and Trang 2018). Also, to control the nonindependence of data, studies based on the same sample are excluded (Koricheva et al. 2013). On completion of the search process in April 2022, 585 effects from 97 studies published by April 2022 were obtained, representing a sample of 2,77,337 firms. For the individual/group-level antecedents of CE, findings from 44 studies (45,202 firms) were identified and coded, while 95 studies (232,038 firms) were consulted for effects of firm-level antecedents of CE. A complete list of these studies and their characteristics is presented in Table 3.1.

Table 3.1 Studies Used in the Meta-Analysis

	Study	Journal	Year	Sample size	Country	Individual level/Group level *construct label*	Firm level *construct label*	CE *construct labels*
1	Covin et al.	JMS	1994	91	USA	n/c	BB	SR
2	Zahra	JBV	1995	47	USA	n/c	Firm size, Firm age, FRC	IN, CV
3	Bloodgood et al.	ETP	1996	61	USA	GHC	FRC, Firm size	IN
4	Tushman and Rosenkopf	MS	1996	921	USA	n/c	Firm age	SR
5	Zahra	AMJ	1996	127	USA	n/c	FRC, Firm size	CV, IN, SR
6	Boeker	AMJ	1997	67	USA	Diversity, Tenure	Firm age	SR
7	Covin et al.	JBV	2000	103	USA	n/c	Firm age	IN
8*	Gordon et al.	JM	2000	74/43/113	USA	EHC, Diversity	Firm size	SR
9	Zahra et al.	JM	2000	231	USA	TMT size	Firm size, Firm age	IN, CV
10	Ahuja and Lampert	SMJ	2001	721	Global	n/c	Firm size	IN
11	Morrow	NEJE	2002	100	USA	n/c	BB, FRC	CE
12	Hoskisson et al.	AMJ	2002	234	USA	n/c	Firm size	CV
13	Li and Atuahene-Gima	SEJ	2002	184	China	n/c	Firm size, Firm age	IN, CV
14	Alpkan and Kaya	AEJ	2004	70	Turkey	n/c	BB	SR
15	Hayton	RDM	2005	237	USA	GHC, Diversity	Firm age	IN, CV
16	Srivastava and Lee	JBV	2005	223	USA	TMT size, GHC, Diversity, Tenure	n/c	IN
17	Jansen et al.	MS	2006	283	EU	n/c	BB, Firm size	IN
18	Rothaermel et al.	SMJ	2006	492	USA	n/c	Firm size, Firm age	IN, CV, SR
19	Zhou et al.	JIBS	2006	180	China	TR-Leadership	BB, Firm size, Firm age	IN, SR

20	Wadhwa and Kotha	AMJ	2006	383	USA	n/c	Firm age	CV
21	Brizek and Khan	IJHM	2007	522	USA	n/c	BB, Firm size	CE
22	Simsek et al.	JMS	2007	495	USA	EHC	BB, FRC, Firm size, Firm age	CE
23	Yiu et al.	JIBS	2007	278	China	GHC	FRC, Firm age, Firm size	CV, SR, IN
24	Ling et al.	AMJ	2008	152	USA	TMT size, Diversity, Tenure, TR-Leadership	BB, FRC, Firm size, Firm age	CE
25	Salimath et al.	DS	2008	278	USA	n/c	Firm size, Firm age	IN, SR
26	Zahra and Hayton	JBV	2008	217	Global	n/c	FRC, Firm size, Firm age	CV
27	Yiu and Lau	ETP	2008	458	China	n/c	FRC, Firm age	IN, CV
28	Burgers et al.	JBV	2009	240	Netherlands	n/c	BB, Firm size, Firm age	CV
29	Fis and Cetindamar	PICMET	2009	347	Turkey	n/c	BB, Firm size, Firm age	IN, CV
30	Heavey et al.	JMS	2009	349	Ireland	n/c	Firm size, Firm age	CE
31	Jansen et al.	LQ	2009	89	EU	TR-Leadership, Tenure, TMT size	Firm size	IN
32	Hornsby et al.	JBV	2009	458	USA	n/c	BB	IN
33	Coombs et al.	SEJ	2009	174	USA	n/c	Firm age, FRC	IN
34	Poskela and Martinsuo	JPM	2009	137	Finland	n/c	BB	SR
35	Alpkan et al.	MD	2010	184	Turkey	n/c	BB	IN
36	Benitez-Amado et al.	IMDS	2010	203	Spain	GHC	FRC, Firm size	SR
37	Leitner and Güldenberg	SBE	2010	100	Austria	n/c	Firm size, Firm age	SR
38	Nkongolo-Bakenda et al.	JIE	2010	81	Canada	GHC, EHC	FRC, Firm size	IN, SR
39	Zahra	JIE	2010	741	USA	TMT size,	FRC, Firm size, Firm age	CV
40	Dunlap-Hinkler et al.	SEJ	2010	1789	USA	n/c	Firm age	IN
41	Dushnitsky and Lavie	SEJ	2010	2448	USA	n/c	Firm age, Firm size, FRC	CV

42	Goodale et al.	SMJ	2011	177	USA	n/c	BB, Firm size, Firm age	IN
43	Lisboa et al.	IMM	2011	254	Portugal	n/c	Firm age, Firm size, FRC	IN
44	Özdemirci	PSBS	2011	141	Turkey	TR-Leadership	n/c	SR, CV
45	Simsek and Heavey	SEJ	2011	125	Ireland	Tenure	FRC, Firm size, Firm age	CE
46	Bojica and Fuentes	JWB	2012	203	Spain	n/c	FRC, Firm size, Firm age	CE
47	Camelo-Ordaz et al.	ISBJ	2012	80	Spain & Portugal	GHC, Tenure	Firm size	IN
48	Kellermanns et al.	SBE	2012	70	USA	TMT size	BB, Firm size	IN
49	Guerrero and Peña-Legazkue	IEMJ	2013	24740	Asia & Oceania, USA, EU	n/c	Firm size	CV
50	Heavey and Simsek	JPIM	2013	99	USA	TMT size, Diversity, GHC	Firm size, Firm age	CE
51	Basu and Wadhwa	JPIM	2013	477	USA	n/c	FRC	SR, CV
52	Chen et al.	JPIM	2014	151	China	TR-Leadership	Firm size, Firm age	CE
53	Glaser et al.	SBE	2015	496	Netherlands	n/c	BB	IN
54	Kearney and Morris	SBE	2015	134	Ireland	n/c	BB, Firm size, Firm age	SR
55	Wang et al.	JWB	2015	978	USA	n/c	BB, Firm size	CE
56	Wei and Ling	JBR	2015	198	China	GHC	Firm size, Firm age	CE
57	Ahmad et al.	UOHJM	2016	54	Pakistan	n/c	BB	CE
58	Kakapour et al.	JSBE	2016	130	Iran	EHC	FRC, Firm age	CE
59*	Lee et al.	AJTI	2016	101/57	Korea	EHC	FRC, Firm size	CE
60	Sahaym et al.	JBR	2016	172	USA	Diversity, Tenure	FRC, Firm size, Firm age	CV
61	Scifres et al.	HRCE	2016	797	USA	n/c	Firm age	SR

62	Simsek and Heavey	HRCE	2016	120	USA	n/c	Firm size, Firm age	CE
63	Ceptureanu et al.	Entropy	2017	166	Romina	GHC	FRC, Firm size, Firm age	CE
64	Chen and Nadkarni	ASQ	2017	129	China	GHC, Diversity, Tenure, TMT size	FRC, Firm size	CE
65	Daryani and Karimi	JAST	2017	255	Iran	n/c	FRC	IN, CV, SR
66	Franco and Haase	JMO	2017	415	Portugal	TR-Leadership	BB	CE
67	Martín-Rojas et al.	IEMJ	2017	201	Spain	n/c	FRC	IN, SR, CV
68	Tribbitt and Yang	MRR	2017	2610	USA	TMT size	Firm age	IN, CV
69	Yuan et al.	JWB	2017	170	China	GHC, Tenure	FRC, Firm size, Firm age	CE
70	An et al.	JPIM	2018	248	China	EHC	FRC, Firm size, Firm age	CE
71	Hosseini et al.	JIE	2018	140	Iran	GHC	Firm size	CE
72	Jahanshahi et al.	BJM	2018	41	Iran	GHC	Firm size, Firm age	CE
73	Shafique and Kalyar	AS	2018	400	Pakistan	TR-Leadership	FRC	IN, SR, CV
74	Boone et al.	SMJ	2019	165	n/c	TMT size, Diversity	Firm size	CE
75	Jones et al.	IEMJ	2019	2355	USA	Tenure	FRC	CE
76*	Lee et al.	FBR	2019	100/92	Korea	n/c	Firm size, Firm age	CE
77	Verma and Verma	BGS	2019	109	India	TR-Leadership	BB	CE
78	Nabeel-Rehman and Nazri	IJIKM	2019	489	Pakistan	n/c	FRC	CE
79	Kreiser et al.	SBE	2019	177	USA	n/c	Firm age, Firm size, BB	SR
80	Tang et al.	APJM	2019	97	China	n/c	Firm age, Firm size, FRC, BB	CE
81	Jiménez-Barrionuevo et al.	SUS	2019	168	Spain	n/c	FRC	IN, CV, SR

82	Bui et al.	JGM	2020	114	Vietnam	GHC, Tenure, TMT size	n/c	IN, SR
83	Nuscheler et al.	JBV	2019	374	USA	GHC, EHC, Diversity	Firm age	IN
84	Olson et al.	IJEI	2020	294	China	Tenure, GHC	Firm age, Firm size, FRC	CE
85	Cabral et al.	SEJ	2020	3313	USA	n/c	FRC	CV
86	Garrett et al.	MD	2020	47	USA	GHC	Firm age	IN, CV
87	Sakhdari et al.	JSBM	2020	272	Australia & Iran	n/c	Firm size	CE
88	Sakhdari et al.	IJHRM	2020	108	Iran	n/c	FRC, BB, Firm size	CE
89	Hughes et al.	TFSC	2020	143	UK	n/c	BB	CE
90	Rehman et al.	TASM	2020	417	Pakistan	n/c	FRC	CE
91	Hassan et al.	JLSS	2020	384	Pakistan	TR-Leadership	n/c	CE
92	Mahmood and Arslan	FP	2020	460	Pakistan	n/c	FRC	CE
93	Pan et al.	MOR	2021	145	China	TR-Leadership, Tenure, Diversity	FRC, BB, Firm size, Firm age	CE
94	Vanacker et al.	JWB	2021	9642	EU	n/c	Firm size, Firm age, FRC	CV
95	Chen et al.	JM	2021	110	China	Tenure, GHC, TMT size, Diversity	FRC, Firm size	CE
96	Li et al.	FP	2021	97	China	n/c	Firm age, Firm size	CE
97	Zhang et al.	JPIM	2022	1599	USA	Tenure, GHC	Firm size	IN

AMJ= Academy of Management Journal; APJM= Asia-Pacific Journal of Management; ASQ= Administrative Science Quarterly; ETP= Entrepreneurship Theory & Practice; IJHRM= International Journal of Human Resource Management; IMM= Industrial Marketing Management; JBR= Journal of Business

Research; JBV= Journal of Business Venturing; JIBS= Journal of International Business Studies; JM= Journal of Management; JMS= Journal of Management Studies; JPIM= Journal of Product Innovation Management; JSBM= Journal of Small Business Management; JWB= Journal of World Business; MD= Management Decision; MS= Management Science; RDM= R&D Management; SEJ= Strategic Entrepreneurship Journal; SMJ= Strategic Management Journal; TASM = Technology Analysis & Strategic Management. PICMET=Portland International Centre for Management of Engineering and Technology Conference. NEJE =New England Journal of Entrepreneurship. AEJ= Academy of Entrepreneurship Journal. IJHM =International Journal of Hospitality Management. DS= Decision Sciences. JPM =Journal of product management. IMDS= Industrial Management & Data Systems. SBE =Small Business Economics. JIE= Journal of International Entrepreneurship. PSBS= Procedia - Social and Behavioural Sciences. ISBJ= International Small Business Journal. IEMJ= International Entrepreneurship and Management Journal. UOHJM= University of Haripur Journal of Management. JSBE= Journal of Small Business & Entrepreneurship. AJTI= Asian Journal of Technology Innovation. HRCE= Handbook of Research on Corporate Entrepreneurship. JAST= Journal of Agricultural Science and Technology. MRR= Management Research Review. AS= Administrative Sciences. FBR= Family Business Review. BGS= Business Governance and Society. IJKIM= Interdisciplinary Journal of Information, Knowledge, & Management. JGM= Journal of General Management. IJEI= International Journal of Entrepreneurship and Innovation. TFSC= Technological Forecasting and Social Change. JLSS= Journal of Law & Social Studies. MOR= Management and Organization Review. BJM= Baltic Journal of Management. JMO= Journal of Management & Organization. Sus= Sustainability. FP= Frontiers in Psychology. LQ=Leadership Quarterly

*.n/c = not possible to code due to missing information or overlapping categorizations. * = studies with multiple samples*

3.5.2 Variable classification and coding procedures

To minimize errors and guarantee consistency in the coding, a coding manual that details the data to be taken from each research was employed (Eisend 2017). To ensure coding reliability, the researcher coded all of the primary studies, and the research supervisor randomly cross-checked them (Borenstein et al. 2009). Any coding issues were resolved by discussion with the research supervisor. The intercoder reliability estimate (Cohen's kappa) was 0.96, suggesting that the coding process had a high level of reliability (Valentine et al. 2010). Because scholars have a tendency to use slightly varied terminology to refer to comparable structures (Pigott 2012), additional care was taken by consulting the scales presented in the source research to avoid incorrectly combining diverse factors and not coding conceptually comparable variables differently.

Dependent variable: CE. As was the case in (Bierwerth et al. 2015a) meta-analysis, it was found that most of the studies in the meta sample measured CE through innovation, corporate venturing, strategic renewal, or a combination of these variables.

Independent variables. The two main sets of independent variables capture individual/group-level factors and firm-level factors. Table 3.2 below provides the coding schemes and examples of the measurements of the variables used as antecedents of CE.

Table 3.2 Definition of antecedents of CE and their coding schemes

Theory/ level	Antecedent	Definition	Coding scheme Examples
Individual/Group-Level Factors *Theory/theme:* Upper Echelons Theory (Hambrick & Mason, 1984) *Focus*: TMT characteristics and human capital are a key determinants of strategic decisions and organizational outcomes	TMT Diversity	"The distribution of personal attributes among interdependent members of a work unit" (Jackson et al. 2003, p.802).	Diversity in education, tenure and functional background and experiences (Hayton 2005; Chen and Nadkarni 2017).
	TMT size	Based on the number of members	TMT size (Heavey and Simsek 2013)
	Transformational Leadership	The leader's capability to utilise his charisma and to be a role model to persuade and encourage others to go beyond their immediate interests (Bass 1999; Day et al. 2014)	Transformational leadership (e.g., Chen et al. 2014)
	TMT Tenure	Years spent working for the firm or holding a role as a TMT member (Certo et al. 2006)	Company tenure (Olson et al. 2020), top management team tenure (Pan et al. 2021)
	TMT's General Human Capital	"Skills and knowledge that individuals acquire through investments in schooling, on-the-job training, and other types of experience" (Unger et al. 2011, p.343).	Education (Ahmad et al. 2016); Experience (Jahanshahi et al. 2018)
	TMT's Entrepreneurial Human capital	Specific skills and knowledge related to entrepreneurship tasks (Begley and Boyd 1987; Toth 2012; Amin 2018)	Scanning, evaluation (Nkongolo-Bakenda et al. 2010; Lee et al. 2016);
Firm level- Building Blocks	TMT's Support	Managerial support towards entrepreneurship (Kuratko et al. 2005)	Perceived support (Ahmad, Khattak, and Siddiqui 2016).

Theory/theme: Organizational preparedness for CE (Hornsby et al., 2002; Hornsby et al. 2013) *Focus:* Factors that promote entrepreneurial action	Rewards/Reinforcement	The support of entrepreneurship by implementing rewards and reinforcement systems (Hornsby et al. 2002)	Finical benefits (Goodale et al. 2011)
	Time Availability	Considering the workloads in light of time availability and job structure (Agapie et al. 2018)	Time allocation (Alpkan et al. 2010)
	Autonomy	Employees' perception of empowerment in terms of their way of performing tasks (Johanna de Villiers-Scheepers 2012).	Freedom to do work tasks (Hornsby et al. 2009).
	Collective Culture	A culture that prioritises work involvement, cooperation, and harmony while placing individual interests behind those of the group (Morris 1993)	Participative culture (Zhou, Tse, and Li 2006)
	Informal and Decentralized Structure	Where the informal control system and authority delegations are embraced (Lilliestam and Hanger 2016)	Flexible boundaries (Goodale et al. 2011); empowerment climate (Chang, Chang, and Chen 2017).
Firm level-Resources and Capabilities *Theory/theme* Resourced based view (Barney, 1991) *Focus:* Possession of strategic resources, and skills/capabilities by a firm.	General Resources & Capabilities	"Tangible and intangible assets which are valuable, rare, and unique, together with an appropriate firm's organisation (VRIO framework)" (Pindado and Sánchez 2017, p.5)	Managerial, technological, and marketing capabilities (Ceptureanu, Ceptureanu, and Popescu 2017).
	Discretionary Slack	A resource pool in an organization that is larger than what is required to create a particular level of firm output. (Nohria and Gulati 1996),	Skilled labour and managerial talents (Ceptureanu, Ceptureanu, and Popescu 2017), net assets (Morrow 2002), liquidity (Zahra and Hayton 2008).
	Organisational Learning	A process that leads to organization's knowledge modifications and improvements (Argote 2011),	The process of creating the subjective knowledge for the resources in hand (An

			et al. 2018) and the speed of learning (Lee et al., 2016).
	Absorptive Capacity	The process of information gaining and utilising them (Cohen and Levinthal 1990)	Knowledge acquisition (Bojica and Fuentes 2012).
	Organisational Social Capital	Firm level interactions, communications, and relationships with diverse external stakeholders (Akram et al. 2017)	Organisational Social Capital (Zahra 2010)
Firm level-Characteristics *Theory/theme* Organisation Theory (Barron, West, & Hannan, 1994; Haveman, 1993) *Focus:* Firm characteristics affect how agents make decisions.	Firm Age	Number of years since the firm was established.	(Heavey and Simsek 2013)
	Firm Size	Number of full-time employees.	(Kearney and Morris 2015)

3.5.3 Meta-analytic technique

Following the steps presented in Lipsey and Wilson (2001), random effects meta-analyses were conducted. Two types of analyses were performed: bivariate analysis (Kirca, Jayachandran, and Bearden 2005; Unger et al. 2011; Chliova, Brinckmann, and Rosenbusch 2015) and meta-analytical regression analysis (Beugelsdijk et al. 2018). During the coding stage, Pearson's correlations were extracted to be used to determine the effect sizes (Hunter and Schmidt 2011). As in previous meta-analyses, in the bivariate analyses *r* was corrected for measurement errors before calculating the mean effect (Cooper 2017; Eisend 2017). The 95% confidence interval (CI) was calculated, and the *Q-statistic*, which indicates the homogeneity of the population correlations, was examined. A significant *Q-value* suggests that heterogeneity in effect sizes among studies could be explained via possible moderators (Hunter and Schmidt 2011).

The *I-squared* statistic was also reported. It estimates the proportion of the variance in the study estimates that is because of heterogeneity but eliminates the sensitivity to sample size that would skew the significance test of the *Q-statistic* (Borenstein et al. 2009). The *I-squared* ranges from 0 to 100 percent, with higher values indicating truer score variance in effect sizes relative to sampling error variance. If *I-squared* is low, then the sample has no heterogeneity, and nothing is worth exploring in the subgroup or moderator analysis. In terms of the magnitude of the effect size, Tau is a measure of the variation in genuine effect sizes among studies. File-drawer analyses were conducted to evaluate the sensitivity of the results to availability bias,that is, the propensity for published studies to report larger impact sizes than unpublished ones, which might cause meta-analytic results to be exaggerated (Koricheva et al. 2013). Therefore, the *fail-safe* number to determine the number of unpublished studies that would be required to change the effect size was calculated (Riggle et al. 2009).

A final check ensured no identical or overlapping samples in the studies. The bivariate meta-analysis was complemented with a meta-analytical regression analysis (MARA), a weighted least squares technique that models previously unexplained variance in the distribution of the effect size (Lipsey and Wilson 2001). A key feature of MARA is its ability to incorporate a range of factors from various levels in single regressions, such as individual/group-level factors and firm-level factors (Beugelsdijk et al. 2018). To take into consideration variations in accuracy across effect sizes, weighted regression was utilized (Mueller et al. 2013). The dependent variable in a MARA is the associational strength between

two measured variables (Lipsey and Wilson 2001), so the dependent variable is the associational strength of the relationships of individual/group-level factors and firm-level factors with CE. The main dependent variable, CE, is measured as a latent multi-dimensional construct (Urban and Wood 2017; Schindehutte et al. 2018) that includes innovation, strategic renewal, and corporate venturing indicators. Comprehensive Meta-Analysis 2.0 was used with the random effects model, which includes the weighted mean observed correlations among all pairwise relationships (Borenstein et al. 2009).

Lastly, by employing the analysis of variance–analogue test, explanatory moderator analyses were conducted (Lipsey and Wilson 2001). Independent meta-analyses were performed for each antecedent using the reliability-corrected correlations to weigh the actual population associations of categories (Hunter and Schmidt 2011). The effect sizes for five cultural dimensions (measuring the low and high groups separately), as well as the between-group goodness-of-fit statistic *Q-between*, were reported. A statistically significant *Q-between* suggests that the mean effect size varies among clusters (Joshi and Roh 2009). Effect sizes for moderator classifications were calculated; to ensure the stability of estimates, at least five observations were present for each cultural dimension. (Geyskens, Steenkamp, and Kumar 2006).

3.6 Meta-analytic results

3.6.1 Bivariate results

Table 3.3 below presents the bivariate correlations and other statistics for the multi-level antecedents of CE. Those with statistically significant predictors can be considered dominant drivers of CE. The relationship between *individual/group-level* factors and CE is strong and significant ($\hat{r} = 0.16$, $p < 0.001$), suggesting that these factors play a significant role in CE. The relationship between TMT tenure and CE is not significant ($\hat{r} = 0.05$, $p > 0.05$), but the relationships of TMT size ($\hat{r} = 0.21$, $p < 0.001$), TMT diversity ($\hat{r} = 0.08$, $p > 0.001$), and transformational leadership ($\hat{r} = 0.36$, $p < 0.001$) with CE are positive. As for TMT's human-capital-related factors, the TMT's general human capital ($\hat{r} = 0.11$, $p < 0.001$) and the TMT's entrepreneurial human capital ($\hat{r} = 0.38$, $p < 0.001$) both positively affect CE.

Table 3.3 Bivariate Analysis of Antecedents of Corporate Entrepreneurship (CE)

Construct	k	N	Min r	Max r	r	$\hat{r}$	Rank	se	95% CI	I^2	z	TU^2	Q	fk
Overall antecedents with overall CE	585	277337	-0.15	0.78	0.20	0.19***		0.01	0.18,0.22	96.31	20.926	0.05	16873.48***	28463
Detailed Antecedents with CE														
Individual/Group (Overall)	165	45202	-0.15	0.72	0.18	0.16***		0.00	0.15 to 0.19	81.27	17.57	0.01	1014.72***	8189
TMT Diversity	28	9472	-0.07	0.38	0.10	0.08***	18	0.00	0.07 to 0.14	8.34	5.84	0.00	22.91	646
TMT Size	26	15547	0.00	0.46	0.19	0.21***	11	0.00	0.15 to 0.21	59.25	12.752	0.00	56.44***	2757
Transformational Leadership	17	3449	0.16	0.67	0.36	0.36***	2	0.00	0.32 to 0.38	0.00	20.48	0.00	47.249***	2090
TMT Tenure	20	4929	-0.07	0.23	0.08	0.05	19	0.00	0.03 to 0.08	0.00	3.76	0.00	13.45	106
TMT Human Capital (Overall)	74	11805	-0.15	0.72	0.18	0.16***		0.01	0.16 to 0.26	81.84	8.43	0.03	363.40***	9376
General Human Capital	57	9562	-0.15	0.41	0.12	0.11***	16	0.00	0.11 to 0.17	40.57	8.83	0.05	84.14**	2516
Entrepreneurial Human Capital	17	2243	-0.01	0.72	0.38	0.38***	1	0.02	0.34 to 0.52	80.93	8.13	0.00	78.65***	2178
Firm Level (Overall)	420	232038	-0.20	0.78	0.20	0.19***	---	0.01	0.19 to 0.24	97.19	16.98	0.054	15504.39***	32941
Building Blocks (Overall)	59	15030	0.01	0.67	0.25	0.25***	---	0.01	0.21 to 0.31	89.11	10.44	0.033	541.68***	20662
TMT support	8	2436	0.06	0.67	0.38	0.35***	4	0.03	0.25 to 0.51	92.85	5.16	0.05	97.86***	1008
Rewards/Reinforcements	15	4504	0.03	0.52	0.27	0.27***	7	0.02	0.18 to 0.38	91.56	5.35	0.04	165.83***	1804
Time Availability	4	1341	0.02	0.32	0.13	0.16***	13	0.03	0.10 to 0.21	89.12	1.58	0.03	27.58***	40

Autonomy	4	953	0.01	0.43	0.17	0.14***	15	0.02	0.01 to 0.32	81.87	2.11	0.02	16.55***	33
Collective Culture	5	1085	0.14	0.32	0.19	0.20	9	0.00	0.13 to 0.26	15.35	5.73	0.00	4.72	72
Informal/Decentralised Structure	22	4534	0.03	0.59	0.23	0.25***	8	0.01	0.17 to 0.32	86.27	6.07	0.03	160.28***	2103
Resources & Capabilities (overall)	160	94971	0.00	0.78	0.25	0.25***	---	0.02	0.22 to 0.31	98.45	10.68	0.10	10208.69***	25247
General Resources & Capabilities	33	10592	0.01	0.64	0.31	0.31***	6	0.01	0.27 to 0.38	92.81	10.25	0.03	431.34***	11899
Discretionary Slack	68	66112	0.00	0.72	0.19	0.24***	10	0.05	0.12 to 0.29	99.19	4.66	0.13	8387.13***	77454
Organisation Learning	22	3879	0.03	0.77	0.33	0.32***	5	0.03	0.25 to 0.46	92.42	6.32	0.07	277.17***	3989
Absorptive Capacity	18	4888	0.03	0.78	0.33	0.30***	3	0.04	0.24 to 0.51	96.31	5.00	0.10	406.48***	3175
Organisational Social Capital	19	9500	0.02	0.28	0.16	0.16**	14	0.02	0.09 to 0.27	96.47	3.85	0.04	5338.83***	1646
Firm Characteristics														
Firm Size	110	70901	0.01	0.77	0.16	0.16***	12	0.02	0.14 to 0.21	95.48	8.96	0.04	2346.15***	17395
Firm Age	91	51136	-0.02	0.59	0.12	0.11***	17	0.00	0.10 to 0.15	85.29	10.22	0.010	611.95***	13134

k = number of correlations analysed; N = total sample size; r = corrected mean correlation coefficients; $\hat{r}$ =sample weighted average correlation; Rank = rank order of the antecedent on the dependent variable; se =standard error; I^2 = I squared, TU^2 = TU squared, Q = Heterogeneity; *** $p < 0.001$, fk =fail-safe-k (number of additional unpublished or overlooked studies to reduce the cumulative effect across studies to the point of non-significance; Lipsey & Wilson, 2001)

Aggregating 91 empirical studies and 420 effect sizes revealed that *firm-level* factors are positively associated with CE ($\hat{r}$ = 0.19, p < 0.001), and the bivariate meta-analysis revealed that firms' building blocks ($\hat{r}$ = 0.25, p < 0.001) positively influence CE. A building block is made up of six sub-factors: TMT support ($\hat{r}$ = .35, p < 0.001), rewards/reinforcements ($\hat{r}$ = 0.27, p < 0.001), time availability ($\hat{r}$ = 0.16, p < 0.001), autonomy ($\hat{r}$ = 0.14, p < 0.001), and informal/decentralized structures ($\hat{r}$ = 0.25, p < 0.001). All of these sub-factors except collective culture ($\hat{r}$ = 0.20, *n.s.*) are positively associated with CE. Moreover, a positive relationship between firm resources and capabilities ($\hat{r}$ = 0.25, p < 0.001) with CE was found. This firm-level factor is made up of five sub-dimensions: general resources and capabilities ($\hat{r}$ = 0.31, p < 0.001), discretionary slack ($\hat{r}$ = 0.24, p < 0.001), organizational learning ($\hat{r}$ = 0.32, p < 0.001), absorptive capacity ($\hat{r}$ = 0.30, p < 0.001), and the firm's social capital ($\hat{r}$ = 0.16, p < 0.01). Finally, in terms of firm-level characteristics, it was found that firm size ($\hat{r}$ = 0.16, p < 0.001) and firm age ($\hat{r}$ = 0.11, p < 0.001) are positively associated with CE. As for publication bias, large fail-safe k values indicate that the meta-analytic effect sizes are resistant to unpublished null effects.

To investigate variances in the antecedents of CE, Evanschitzky et al. (2012) rank the weighted effect sizes. Among the top ten factors are two individual/group-level factors—the TMT's entrepreneurial human capital and transformational leadership—and eight firm-level factors: absorptive capacity, TMT support, organizational learning, general resources & capabilities, rewards/reinforcements, informal/decentralised structures, collective culture, and discretionary slack. These factors could be called universal factors that promote CE.

3.6.2 Meta-Analytical Regression Analysis (MARA)

In an attempt to quantify the relative impact on CE of each factor level and its sub-factors, multivariate analyses using MARA was also conducted. The results are presented in Table 3.4. First, two multivariate models were run based on the focal relationship: the associational strength between individual/group-level factors and CE in Model 1 and the associational strength between firm-level factors and CE in Model 2. Model 3 includes both levels in a single regression. Both TMT tenure and firm age were drooped for collinearity issues.

Table 3.4 Results of mixed-effects meta-analytic regression analysis (MARA)

Variable / Model	Model 1	Model 2	Model 3
Control			
Publication Quality	-0.03 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Individual/Group-Level			
TMT Diversity	0.03 (0.04)		-0.02 (.04)
TMT Size	0.13*** (0.04)		0.08* (0.04)
Transformational Leadership	0.29***(0.05)		0.24***(0.04)
TMT General Human Capital	0.04 (0.04)		-0.00 (0.03)
TMT Entrepreneurial Human Capital	0.33*** (0.04)		0.27***(0.05)
Firm-Level			
Firm-Level Building Blocks		0.11***(0.03)	0.12**(0.03)
Resources and Capabilities		0.11***(0.02)	0.12***(0.02)
Firm Size		0.04† (0.03)	0.06* (0.02)
K	155	381	536
Q (model)	106.06 ***	27.06***	90.43***
R-square	0.50	0.06	0.15
Taue2	0.01	0.03	0.02

† < .10; *p < .05; **p < .01; ***p < .001

NOTE: *Model 1* = (Individual/group level-CE Link only), *Model 2* = (Firm level-CE link only), *Model 3* = (Combined levels).

Unstandardized regression coefficients are presented with standard errors in parentheses.

K = number of effects sizes samples.

Q = homogeneity statistic.

Comparing the multivariate findings with the bivariate analysis (Table 3.3) reveals similarities in the pattern of results for Model 1 (Table 3.4). The multivariate findings indicate that TMT size ($\beta = 0.13$; $p < 0.001$), transformational leadership ($\beta = 0.29$; $p < 0.001$), and the TMT's entrepreneurial human capital ($\beta = 0.33$; $p < 0.001$) are positively related to CE. However, no supports were found for TMT diversity, or the TMT's general human capital, in the multivariate analysis. Model 2 tests the firm-level factors of CE. Aggregate-level data were used to test the role of a firm's building blocks and its resources and capabilities in driving CE and included firm size in the same model. In line with the bivariate analysis, the multivariate results indicate that a firm's building blocks ($\beta = 0.11$; $p < 0.001$) and its resources and capabilities ($\beta = 0.11$; $p < 0.001$) have significant positive effects on CE. Also, it was found

that larger firms tend to do better with CE (β = 0.04; p = 0.10) than smaller firms do. When both the individual/group-level factors and the firm-level factors were included in a combined regression with CE (Model 3), the r-square more than doubled, from 6 percent when only firm-level factors were included to 15 percent when individual/group-level factors were also included. This result provides further support for the multi-level paradigm for CE.

3.6.3 Exploratory Moderator Analyses

The potential of meta-analysis in theoretical development is enhanced by its ability to identify the characteristics' effects as moderators (Hunter and Schmidt 2011). The moderating role of the home country's informal institutional context was tested by coding the country and using the values from (Hofstede and Bond 1984) for the five dimensions of national culture: power distance, individuality, uncertainty avoidance, masculinity, and long-term orientation. These five dimensions are most likely to influence innovation and performance-related outcomes and have been studied frequently (Mueller et al. 2013; Dheer 2017). Each study in the sample was classified as either high- or low- scoring on each of these five cultural dimensions, using 50 as a dividing line[1]. Table 3.5 presents the results, which suggest that TMT diversity, TMT size, and transformational leadership are similar across all five dimensions, as indicated by a non-significant *Q-between* statistic. This result might be due to insufficient correlation observations in each group. The moderator analyses also suggest that firm size and publication quality contexts for TMT diversity, TMT size, and transformational leadership have limited value as drivers of CE.

[1] For countries per variable details please see the appendix II

Table 3.5 Subgroup Means by Levels of Moderator Variables

Study characteristic - CE	Level	TMT Diversity - CE	TMT Size - CE	TR-leadership - CE	TMT HC - CE	TMT GHC - CE	TMT ENTHC- CE	BB - CE	R & C - CE	Firm Size - CE
National Culture	Low PWRD	0.10† (15)	0.17*(16)	0.33***(4)	0.16***(37)	0.11***(28)	0.30***(8)	0.26*** (37)	0.23***(60)	0.17**(55)
	High PWRD	0.15**(3)	0.22**(4)	0.37***(8)	0.27***(32)	0.12***(24)	0.57***(7)	0.29*** (16)	0.31***(78)	0.12 (33)
	Q between	0.23	0.29	2.01	**5.86***	**3.82***	**13.98*****	0.36	**4.14***	**3.53***
	Low INDV	0.15**(3)	0.20***(4)	0.34***(7)	0.28***(31)	0.17***(23)	0.57***(7)	0.32*** (16)	0.31***(67)	0.12 (31)
	High INDV	0.10† (15)	0.17***(16)	0.34***(5)	0.16***(38)	0.11***(29)	0.30***(8)	0.25*** (37)	0.28***(71)	0.18*** (57)
	Q between	0.23	0.43	1.79	**5.77***	**3.82***	**13.98*****	1.63	0.32	**4.45****
	Low UA	0.15**(3)	0.17***(4)	0.35***(5)	0.17***(55)	0.13***(45)	0.33***(9)	0.27*** (33)	0.24 (100)	0.17*** (68)
	High UA	0.10†	0.18***(6)	0.36***(7)	0.47***(14)	0.12 (7)	0.58***(6)	0.27*** (20)	0.48***(38)	0.11 (20)
	Q between	0.23	0.16	0.06	**11.28*****	0.30	**12.29*****	0.01	**36.38*****	**3.80***
	Low MAS	0.15**(3)	0.35***(1)	0.40*** (7)	0.38*(16)	0.22*(9)	0.59***(6)	0.23* (19)	0.40***(27)	0.11**(16)
	High MAS	0.10† (15)	0.17*** (19)	0.34***(5)	0.15*(53)	0.12**(43)	0.29*(9)	0.28*(34)	0.24***(111)	0.16* (72)
	Q between	0.23	9.35**	2.90†	**16.14*****	**3.88***	**17.17*****	1.43	**10.10****	**3.12**†
	Low LTO	0.15**(3)	0.17***(16)	0.39***(5)	0.16*(44)	0.11** (34)	0.29* (9)	0.25* (42)	0.27***(83)	0.17*(61)
	High LTO	0.10† (15)	0.22*(4)	0.34***(7)	0.28* (25)	0.17** (18)	0.58***(6)	0.30* (11)	0.28***(55)	0.11**(27)
	Q between	0.23	0.34	2.58	**5.64***	**3.25**†	**15.62*****	0.98	0.11	**5.44***
Size	Large	0.01*(8)	0.22***(11)	0.20 (1)	0.09 (6)	0.09 (5)	-	0.20*** (17)	0.26***(49)	
	SMEs	0.13***(9)	0.10*(4)	0.35 (5)	0.15***(35)	0.08***(28)	0.34***(6)	0.37*** (11)	0.26***(54)	
	Q between	0.5	5.87*	4.05*	0.88	0.02	0	**9.54****	0.00	

Publication Quality	Low	0.11**(7)	0.20† (6)	0.31***(2)	0.21***(46)	0.11***(34)	0.45***(11)	0.33*** (21)	0.27***(26)	0.10***(36)
	High	0.09***(19)	0.20***(18)	0.33***(5)	0.23***(24)	0.12***(19)	0.38***(4)	0.19*** (29)	0.17***(111)	0.20***(67)
	Q between	0.19	0.00	1.55	0.20	**7.63****	0.38	**10.21*****	**5.63***	**13.02*****

*† p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.*

TR-Leadership = Transformational leadership, TMT HC = TMT Human capital (overall), TMT GHC = TMT General human capital, TMT ENTHC = TMT Entrepreneurial human capital, BB = Firm Building blocks, R & C = Firm Resource & capabilities, PWRD = Power Distance; IND = Individualism; UA = Uncertainty Avoidance; MAS = Masculinity; LTO = Long-term oriented

*Numbers in **bold** indicate significant* Q between*, between-group goodness-of-fit statistic; Low, <50 in the Hofstede's cultural dimension scale; High, ≥50 in the Hofstede's cultural dimension scale* (except TMT diversity

The TMT's two types of human capital, general and entrepreneurial, differ significantly between the countries with high and low scores on the cultural dimensions. Overall, the results for the TMT's human capital suggest that the effect of human capital on CE in countries that feature high power distance ($r = 0.27$, *Q-between* = 5.86, $p < 0.05$), uncertainty avoidance ($r = 0.47$, *Q-between* = 11.28, $p < 0.001$), and long-term orientation (r = 0.28, Q-between = 5.64, p < 0.05) and low masculinity ($r = 0.38$, *Q-between* = 16.14, $p < 0.001$) and individualism ($r = 0.28$, *Q-between* = 5.77, $p < 0.05$) is stronger than it is in other cultures. The study also reveals that the directions of general and entrepreneurial human capital are in line with that of overall human capital, although the latter has much stronger effects.

Moderator analyses was performed for three firm-level factors: building blocks, resources and capabilities, and firm size. The findings suggest that building blocks' effect does not differ significantly between low- and high-scoring countries across the five cultural dimensions. These findings indicate that the five dimensions of culture, as moderators, cannot sufficiently clarify the heterogeneity in effect sizes attained for the relationship between the firm's building blocks and CE. Meta-analyses were run for each of the six sub-dimensions of the building blocks, again finding no differences between the low- and high-scoring countries. These findings suggest that the building blocks' effects on CE are generalisable across cultural contexts.

The study reveals that firms' resources and capabilities are context-dependent and that resources and capabilities' effects on CE are strongest in countries that score high in power distance ($r = 0.31$, *Q-between* = 4.14, $p < 0.05$) and uncertainty avoidance ($r = 0.48$, *Q-between* = 36.38, $p < 0.001$) and low in masculinity ($r = 0.40$, *Q-between* = 10.10, $p < 0.01$). As for the firm size, the findings, which are based on exploratory moderator analyses across five culture dimensions, suggest that the effects of firm size on CE may be clarified by the cultural context. For instance, when firms are based in countries that score low in power distance, uncertainty avoidance, and long-term orientation, and high in individualism and high masculinity, the effect of firm size on CE is stronger than it is in other cultures

3.7 Meta-analytic findings

3.7.1 The Top Management Team's Characteristics and Corporate Entrepreneurship

Except for TMT tenure, the bivariate analysis showed that all individual/group-level factors have a positive and significant influence on CE. Regarding the MARA's results, it

reveals no support for previous findings in management research that have shown that general human capital and a diverse TMT is positively associated with firm performance (Li, Terjesen, and Umans 2020). However, the findings show that TMT size positively influences CE, suggesting that larger TMT benefit CE implementation because they have more resources, abilities, and skills that allow gathering and processing more CE-related information (Jin et al. 2017; Bui et al. 2020).

The findings also suggest that a transformational leadership style has a strong positive effect on CE implementation. Transformational leadership has been found to have a significant impact on employee satisfaction and creative performance, both of which may enhance firms' innovativeness and overall firm performance (Nanjundeswaraswamy and Swamy 2014). Through inspirational motivation, intellectual stimulation, and encouragement of creativity, transformational leaders play a vital role in bringing innovation to firms (Chang et al. 2017). In addition, one of the most influential antecedents of CE is the TMT's entrepreneurial human capital. These findings build on and slightly refine earlier meta-analytic studies in entrepreneurship. While Unger et al. (2011) meta-analysis also concludes that an effect of task-related human capital (i.e., entrepreneur's knowledge, competencies, managerial and entrepreneurial skills, and education) on entrepreneurship ($r = 0.11$), this stage found an effect size more than three times that of Unger et al. ($r = 0.33$). The result indicates that the value of the TMT's entrepreneurial human capital for established firms is greater than it is for independent/individual entrepreneurships.

3.7.2 Firm-level Factors and Corporate Entrepreneurship

Firms foster an internal environment that promotes entrepreneurial action to exploit CE opportunities (Covin and Kuratko 2015). In line with firm's preparedness for CE (Kuratko et al. 2014b), it was found that a firm's building blocks help it to implement CE (Hornsby et al. 2002), thus contributing to discussions on the elusive link between the building blocks and CE implementation, which scholars have said is still open to investigation (Ireland et al. 2009; Hayton et al. 2013; Kuratko et al. 2014a). The findings support Herzberg's theory of motivation and indicate that a firm's building blocks are critical internal determinants which positively influence employees' engagement in CE activities (Robbins and Judge 2013). Therefore, the TMT must provide an environment that motivates employees to engage in developing and differentiating the firm's products and services (i.e., successful implementation of CE).

One of the TMT support forms is allocating the appropriate amount of resources at the proper time. A significant positive relationship was found between discretionary slack and CE. It is consistent with the resource-based view, which states that competitive advantage comes from effective use of resources (Aguinis et al. 2017). Therefore, organisations need to accumulate the necessary resources to carry out CE activities without compromising their primary business activities. The meta-analysis's findings also suggest that organisational learning and absorptive capacity positively influence CE (Daryani and Karimi 2017; An et al. 2018). A firm dedication to learning, analysing and using the obtained information (absorptive capacity) improves its opportunity exploration and its strategy renewal to meet its market's demands efficiently

Research has revealed mixed findings on the relationship between firm size and CE. The meta-analysis empirical evidence contributes to this discussion by suggesting that larger firms engage in more CE-related activities than smaller firms do, which contradicts the view that larger firms' bureaucracies prevent them from acting on opportunities (Zahra 1996a; Chang et al. 2017; Jahanshahi et al. 2018). The results support the argument that larger firms control more slack (i.e., financial and human resources), which allows them to invest in CE activities without disturbing their main business activities and to withstand changes in the environment (Sahaym et al. 2016).

3.7.3 The Role of the Informal Institutional Environment

This meta-analysis is the first empirical study that builds on a large sample to consider the informal institutional environment's effect on CE, so it contributes to the handful of extant studies on the institutional environment at the country level with regard to CE (Han and Park 2017; Vanacker et al. 2021). One of the most useful contributions to knowledge in the CE domain is the result of cross-national research. Multiple reviews (e.g., Urbano et al. 2022) on CE have concluded that exploring how institutional conditions influence firm-level CE activities will advance the understanding of the mechanism that will result in high degree of CE. One of the reasons for the lack of evidence may be the challenges of carrying on cross-cultural and international studies on CE, as most research collect their own data (Maula, Autio, and Murray 2009). The exploratory moderator analysis reveals two perspectives: One set of results suggests an institutional environment contingency, whereas another set suggests that the institutional environment is a neutral phenomenon. These perspectives from exploratory moderator analyses indicate that this stream of research has a high potential for advancement.

3.7.3.1 *The institutional environment - contingency perspective.* The results revealed that the relationship of firm-level resources and capabilities with CE is dependent on the institutional context. It demonstrated that institutional conditions influence the patterns of resource allocations in a given firm and that stakeholders have a major impact on CE. Building on neo-institutionalism as the exploratory lens, it was observed that countries that score high in power distance and uncertainty avoidance and low in masculinity encourage their firms to be more competitive and that these firms have rare resources and capabilities with which to perform CE-related activities. Hence, in line with Rosenbusch et al. (2013a), it was found that the benefits derived from CE are dependent on a national culture that promotes a positive attitude towards change and entrepreneurship. The TMTs of firms in such countries will allocate resources to CE-related activities, which drives up engagement across all levels of the firm. Moreover, it was found that informal institutions have a contingent effect on the relationship between the TMT's general and entrepreneurial human capital and CE.

Finally, it was found that the relationship between firm size and CE is more nuanced than previously discussed in the literature (eNason et al. 2015) and that the institutional environment reflects the pattern of resource allocation (Bowen and De Clercq 2008). Thus, this study adds to the literature by elaborating on how, depending on a firm's size, the country-level informal institutional environment can facilitate its CE. Large firms benefit more from an informal institutional environment that is characterized by low power distance, uncertainty avoidance, and long-term orientation and high individualism and masculinity.

3.7.3.2 *The institutional environment - neutral perspective.* In support of the neutral perspective, it was found that most of the TMT factors—diversity, and size—are universal across cultural contexts and that transformational leadership and the firm's building blocks impact CE similarly across informal institutional environments. These results are in line with studies that have found that certain managerial and firm-level aspects of firms are not influenced by the institutional environment (Tihanyi et al. 2005). For example, House et al. (2002) found consistency in aspects of leadership across 61 nations, and Holt et al. (2007) discovered that the cross-national consistency of the structural and procedural drivers of firm performance. These findings are consistent with the view that a set of common factors drive CE across informal institutional environments since firms compete in global markets, with the result that they have some universal elements. However, this conclusion might be due to small

effect sizes for these relationships, so future research in this area could help to clarify whether such is really the case.

3.8 The Way Forward

The meta-analysis confirms that the top-down approach dominates the CE research field. Although the top-down approach dominates the CE literature, empirical evidence drawn from top-down studies illuminates only one part of a larger puzzle. Considering that firm-level and top-management-level factors are vital to CE's successful implementation, that success depends heavily on employees' engagement (Pinchot 1985; Stevenson and Jarillo 1990; Neessen et al. 2019). Therefore, whether CE activities are based on employees' EEB or result from the firm's and top management team's strategic decisions, employees are still a central determinant of a firm's entrepreneurial activities (Schindehutte et al. 2018). As a result, calls have been made for research that facilitates a comprehensive understanding of EEB (Zahra et al. 2013; Monsen and Boss 2018; Pirhadi and Feyzbakhsh 2021; Urbano et al. 2022).

Scholars recognised the importance of employees to CE because they highlighted some critical factors related to the top management team or, at the firm level, factors that motivate employees to engage in CE activities. However, studies that have focused on the role of individual-level factors and how they influence employees' engagement in CE activities are still rare, which raises an important question: *Would a firm's creating the right internal environment for enhancing CE activities guarantee employees' engagement in CE activities*? The answer is no. An employee's decision to behave entrepreneurially is voluntary because EEB is rarely specified in the standard job description (Rigtering and Weitzel 2013). This conclusion raises another question: *Despite favourable factors at the top-management or firm level, why do some employees behave entrepreneurially while others do not?* Firms and managers need to know who is developing and engaging in entrepreneurial activities and why (Gawke et al. 2019). Hence, researchers have called for studies on the micro-foundations of CE, such as EEB (Zahra et al. 2013; Monsen and Boss 2018; Pirhadi and Feyzbakhsh 2021; Urbano et al. 2022). Therefore, the role of individual-level factors like the three socio-cognitive traits of entrepreneurial self-efficacy, opportunities perception, and fear of failure in promoting EEB emerges as a critical knowledge gap in the literature. Theoretically sound and empirically tested models can help firms and their managers to understand whether a reinforcing effect of

socio-cognitive traits can increase the likelihood that a firm's employees will pursue entrepreneurship.

The meta-analysis also confirms that the CE literature has largely ignored the multi-dimensional aspect of CE, as few studies have addressed multi-level factors (Pirhadi and Feyzbakhsh 2021). Although with limitations, the meta-analysis addresses the multi-dimensional aspect of CE by examining factors from the top-management-team level, the firm level, and the country-institutional level. However, there is still a need to address the multi-dimensionality of CE from other angles. The meta-analysis investigated the role of five dimensions of national culture as instruments for the country-level institutional context, but other country-level institutional proxies remain unexamined in the CE literature that may influence CE. In addition, compared to the literature on independent entrepreneurship, the CE literature rarely examines the impact of a country's formal institutions (Urbano et al. 2022). Hence, examining the direct and the indirect impact of various formal and informal institutions on CE's various determinants, such as employees, would help to clarify how these institutions promote or hinder CE activities because these institutions influence how much employees (and other determinants) are willing to invest in CE activities (Gawke et al. 2019).

Moving forward, Chapter 4 will focus on the micro-foundations of CE at the employee level and examines the influence of three socio-cognitive traits—entrepreneurial self-efficacy, opportunity perception, and fear of failure—on EEB. The chapter then examines how the country context (i.e., informal and formal institutions) influance that relationship using a blend of SCT and institutional economic theory to develop a multi-level framework of EEB.

3.9 Conclusion

Theoretical and empirical research across disciplines has been dedicated to explore the factors that influence CE. However, the fragmented and inconclusive nature of the research limits knowledge in this area and impedes the progress of the field. Using a multi-level framework and a meta-analysis that combines findings from 102 independent samples obtained from 97 articles published between 1994 up to 2022, this chapter combined empirical findings on the antecedents of CE across the individual/group and firm levels. This chapter aimed to answer the thesis' research question 3: *What are the most commonly investigated antecedents of CE?*; and research question 4: *What are the gaps in the CE literature?* The cumulative evidence, examined using a meta-regression, showed that a top management team's

entrepreneurial human capital and transformational leadership, and its firm's building blocks, resources, and capabilities are positive drivers of CE. The chapter also used moderator analyses to show that the relationships vary based on their informal institutional contexts. This meta-analysis, the first to assess the relative importance of CE's antecedents at multiple levels, demonstrated that several of the relationships between CE and its antecedents are contingent on the informal institutional context.

The chapter also concluded that studies that have focused on the role of individual-level factors and how they influence employees' engagement in CE activities are rare in the CE literature. This knowledge gap in the literature is critical because an employee's decision to behave entrepreneurially is due to the person himself or herself. Hence, firms and managers need to know who is developing and engaging in entrepreneurial activities and why. The chapter also confirms that CE is a multi-dimensional context-related phenomenon and calls for examination of the influence of various formal and informal institutions that may promote or hinder CE activities. Hence, this chapter provides a roadmap for the next chapter, which aims to fill this gap in the literature. Moving forward, chapter 4 will primarily focus on employees, which is a neglected antecedent in the CE literature, and how employees' socio-cognitive traits influence their EEB. The chapter also addresses the multi-dimensional aspect of CE and examines the direct impact of the country context (i.e., informal and formal institutions) on EEB, as well as its moderating impact on the relationship between employees' socio-cognitive traits and EEB.

Chapter 4 Employees' Entrepreneurial Behaviour: The influence of employees' socio-cognitive traits and country-level institutional context

"if you need to innovate, you need intrapreneurs' because they are the ones who effectively roll up their sleeves and get things done"

(Pinchot and Pellman 1999 p.63).

4.1 Introduction

This chapter seeks to address the research question 5 (*What is the role of employees' socio-cognitive traits in promoting their entrepreneurial behaviour?*), research question 6 (*How do country-level institutional factors influence employees' entrepreneurial behaviour?*) *and research question 7* (*How do formal and informal country-level institutional factors interact with individual-level socio-cognitive traits to promote employees' entrepreneurial behaviour?*). In doing so, this chapter presents and tests a systematic multi-level framework of EEB. As shown in Figure 4.1, the rest of this chapter starts by a preface to employees' entrepreneurial behaviour, followed by highlighting the gaps identified in chapters 2 and 3. Then it presents a literature review that underpins a multi-level framework for examining the interactions between employees' key socio-cognitive traits and EEB, as well as the direct and moderating effects of country-level institutions on these relationships.

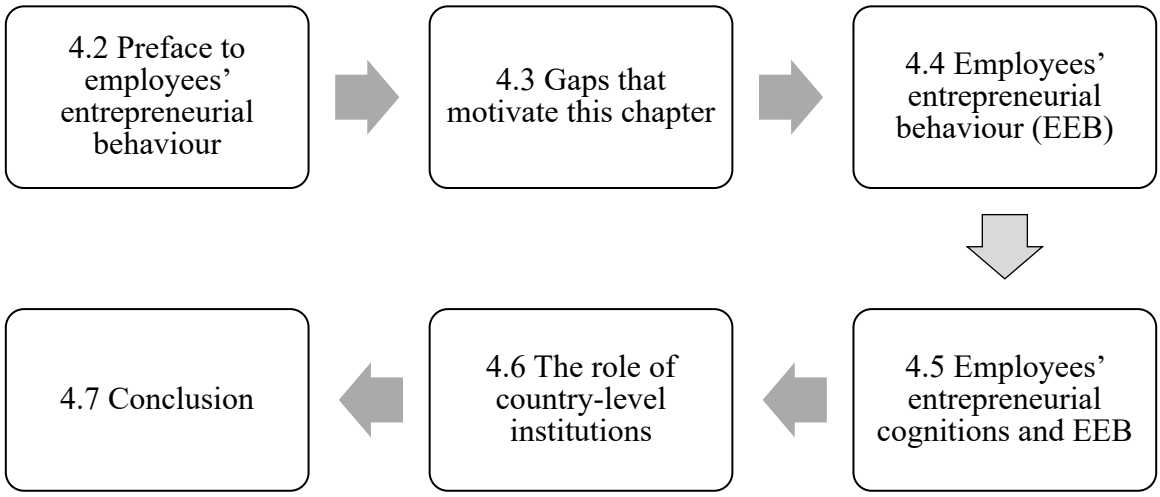


Figure 4.1 Outline of Chapter 4

4.2 Preface to employees' entrepreneurial behaviour

As organisations seek to grow and maintain their competitive advantages, they engage in entrepreneurship at the organisational level, often referred to as CE. As chapters 2 and 3 discussed, the extant CE literature focuses on CE's organisation-level (e.g. structure and culture), function-level (e.g. accounting and marketing) or group-level (top management team; TMT) antecedents to identify the factors that foster organisational entrepreneurial activities (e.g., Chen and Nadkarni 2017; Yuan et al. 2017; Jahanshahi et al. 2018; Aparicio et al. 2021). Prior research also establishes that employees' entrepreneurial behaviour (EEB) is vital to organisations' entrepreneurial growth (Guerrero and Peña-Legazkue 2013; Blanka 2018), innovativeness (Niemann et al. 2022), and overall performance (Goosen et al. 2002; Rauch et al. 2009; Hoeltgebaum, Dra. et al. 2018). However, little is known about what employee characteristics benefit employees' involvement in CE (Mustafa et al. 2018). Therefore, information about what drives employees' engagement in entrepreneurial activities remains disparate and scarce (Neessen et al. 2019).

Social cognitive theory (SCT), which is widely used to explain the mechanism behind individual behaviour, suggests that individuals' career choices are influenced by their cognition (Bandura 1988). Research on independent entrepreneurs suggests that entrepreneurial socio-cognitive traits like self-efficacy, opportunity perception and fear of failure affect independent entrepreneurs' decisions to engage in entrepreneurial action (e.g., Yousafzai et al. 2015; Lu et al. 2018; Rehman et al. 2020). Furthermore, North (1990, p.3) indicates, institutions mould "the subjective mental constructs that individuals use to interpret the world around them and make choices." Accordingly, SCT suggests that socio-cognitive traits and their impact on individuals also depend on the context in which they operate (Wood and Bandura 1989). Therefore, in addressing the phenomena of entrepreneurial behaviour, research must focus more on the relationships between the antecedents at the individual (micro) and contextual (macro) levels (Zahra and Wright 2011; Bjørnskov and Foss 2013).

The extent to which socio-cognitive traits influence behaviour depends on the country-level institutional context (Baumol 1990; North 1990; Williamson 2000). Formal (e.g. rules and laws) and informal (e.g. culture and norms) institutions play important roles in promoting or hindering the independent entrepreneurs' decisions to engage in entrepreneurial actions by

controlling the socio-cognitive resources an entrepreneur is willing to allocate and invest (Boudreaux et al. 2019; Schade and Schuhmacher 2022). Nevertheless, the critical roles that individual- and country-level factors may play in ensuring that employees engage in entrepreneurial action and in their motivations receive little scrutiny in the CE literature (Kuratko 2017; Kreiser et al. 2021). Furthermore, while country-level institutional factors are found to affect a firm's entrepreneurial actions (e.g., Vanacker et al. 2021), exploring the impact of and the mechanisms for how the institutions influence such actions tend to be assumed rather than deeply investigated (Perlines et al. 2022), which may lead to substantial errors in the conclusions drawn (Wennberg et al. 2013). Finally, the influence of institutions varies substantially between the outcomes and behaviours in the firm and individual contexts, so it requires further investigation (Kostova et al. 2020).

Against this background, to answer calls to study EEB as a multi-level phenomenon in which employees' decisions to engage in entrepreneurship depend on the multi-level context (Zahra and Wright 2011; Schindehutte et al. 2018), and under the integrative framework of the SCT (Bandura 1988) and institutional economics theory (North 1990; Williamson 2000), this chapter presents and tests a systematic multi-level framework of EEB.

4.3 Gaps motivate this chapter

Ireland et al. (2009) propose that external environmental factors affect firms' CE activities, arguing that these factors' effects on firm members' pro-entrepreneurship cognition and their engagement in EEB are critical to firms' entrepreneurial activities. Although Ireland et al.'s model states that pro-entrepreneurship cognition and EEB are not limited to managers but include all firm members at all levels, scholars focus on TMT members' cognition and entrepreneurial behaviour and how organisation-level and external factors influence them. This focus continues in the literature regardless of the many research calls to clarify who at the employee level engages in firms' entrepreneurial activities and why (Brundin et al. 2008; Neessen et al. 2019). Therefore, a critical part of the management puzzle on what leads to EEB as a 'micro foundation' of CE is neglected (Zahra et al. 2013, p. 364), and the individual-level factors that explain EEB, without limiting them to those that relate to managerial employees, emerge as a fundamental knowledge gap in the CE research field (Zhao et al. 2010; Gaglio 2018). As Kuratko et al. (2015, p.247) put it, "the theoretical and empirical knowledge about

the domain of CE and the entrepreneurial behaviour on which it is based are still key issues that warrant a deeper understanding".

Ireland et al.'s (2009) model also indicates that external environmental factors affect the relationship between pro-entrepreneurship cognitions and EEB, so while country-level institutional factors affect opportunity recognition and economic growth (e.g., Aparicio et al. 2016), they also control the socio-cognitive resources an entrepreneur is willing to invest (Williamson 2000; Boudreaux et al. 2019). Furthermore, in the context of family firms, the country-level institutional environment (i.e. national culture) not only directly influences EEB but also has a moderating effect through internal personal proxies (Eddleston et al. 2012). Such research findings are still rare in the EEB and CE contexts. Furthermore, while country-level institutional factors are found to affect overall CE activity (e.g., Vanacker et al. 2021), the effect of and the mechanism for how these institutions influence CE activity tend to be assumed rather than deeply investigated (Perlines et al. 2022), which may lead to substantial-conclusion errors (Wennberg et al. 2013). Finally, institutions' effects may vary substantially depending on the industry, the firm, and the individual, so these effects require further investigation in the CE context (Kostova et al. 2020). Thus, as depicted in Figure 4.2, this chapter presents a systematic multi-level framework of EEB.

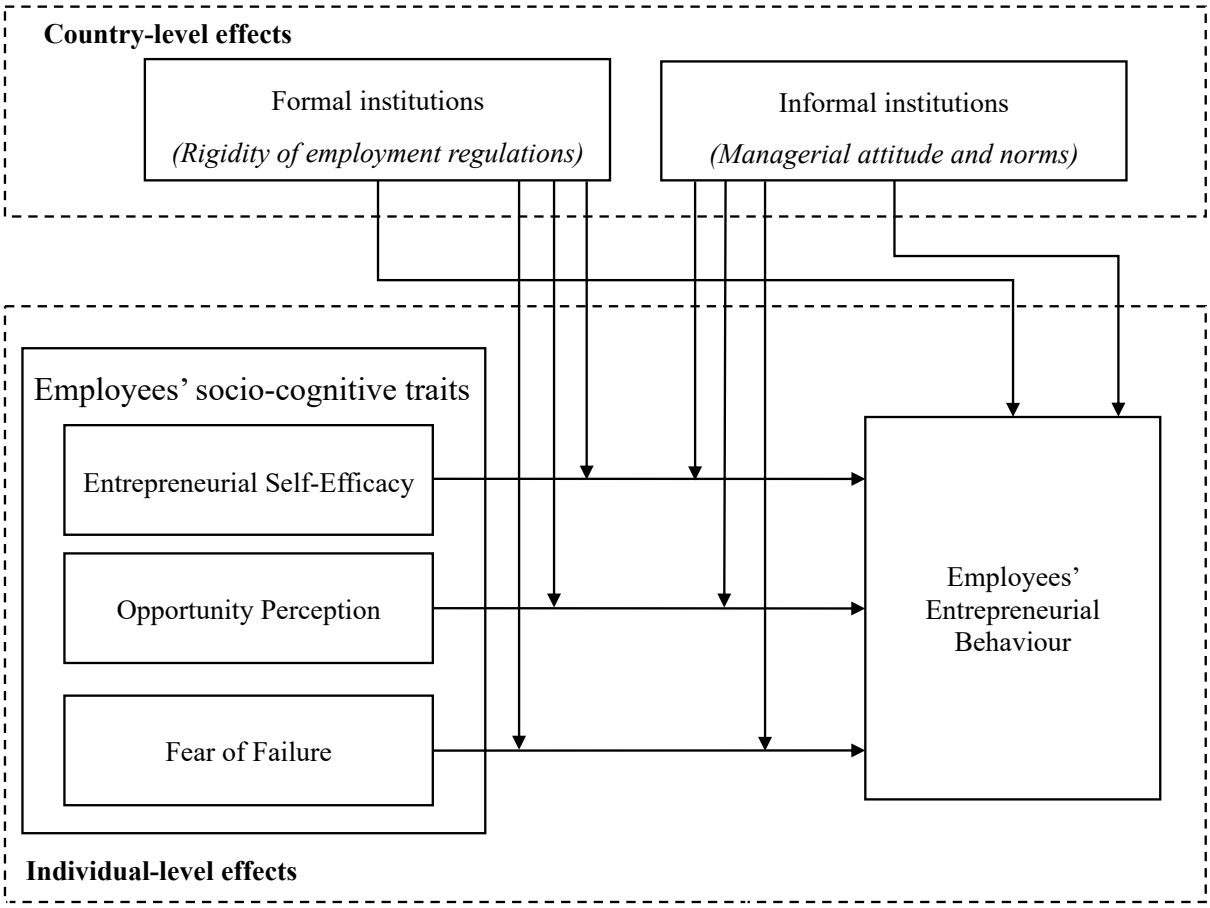


Figure 4.2 Conceptual framework of employees' entrepreneurial behaviour

4.4 Employees' entrepreneurial behaviour (EEB)

In line with extant research (e.g., de Jong 2016), this study defines EEB as employees' self-determined entrepreneurial actions (Åmo and Kolvereid 2005). Entrepreneurial employees are a valuable asset in a firm because their ideas and actions contribute to their firms' product innovations, process development, and self-renewal, thereby enhancing their market positions and overall performance (Schindehutte et al. 2018; Fellnhofer 2019; Neessen et al. 2019). With their ability to deal with daily challenges, solve problems and create out-of-the-box solutions (de Jong et al. 2015), entrepreneurial employees 'walk the extra mile' (Huhtala and Parzefall 2007) in overcoming the barriers that may obstruct their engagement in entrepreneurial action (Hernandez 2019). Mustafa et al. (2018, p.290) argue that "firms will only be innovative to the extent that their human resources are innovative," so understanding the micro-foundations of EEB will help organisations identify who is likely to engage in entrepreneurial activity and

why (Gawke et al. 2019) and will help them assess the internal practices that increase these activities.

Over the last five decades, the CE literature has focused on a top-down structured and formal approach to studying CE, suggesting that organisation-level factors (e.g. culture, structure, resource allocation, processes, and administrative instructions) influence the processes of exploring and exploiting opportunities (Covin and Slevin 1991; Zahra et al. 1999b; Baruah and Ward 2015). Other organisation-level factors, such as reward/reinforcement (Kühn et al. 2016; Agapie et al. 2018), time availability (Hornsby et al. 2002; Turner and Pennington 2015), collective firm culture (Zu et al. 2010), corporate support (Engelen et al. 2018) and flexible organisational structure (Kreiser et al. 2021), are also found to be critical for EEB. Another stream of research focuses on group-level factors (e.g., the top management team's experience, education, and tenure; Kuratko 2017), while research also finds that elements of job design, such as hierarchical position (Hornsby et al. 2002), the level of autonomy (Thi and Trang 2018), and whether rational thinking and boldness are required (Salanova and Schaufeli 2008) are positively associated with EEB. On the other hand, the bottom-up approach argues that, while organisation- and group-level factors are vital to CE's success, employees' decisions to behave entrepreneurially originate from the employee perspective, as they are voluntary and are seldom specified in job descriptions (Rigtering and Weitzel 2013).

Entrepreneurial actions that are pursued through employees' engagement using a bottom-up approach, also known as intrapreneurship (Åmo and Kolvereid 2005; Rigtering and Weitzel 2013), are influenced by individual-level factors like personality traits (Farrukh et al. 2016; Woo 2018) and innovativeness (Duradoni and Di Fabio 2019). For example, Afriyie et al. (2019) find that employees' self-efficacy has a positive effect on their intrapreneurial behaviour, especially when they have access to their firms' resources. Nevertheless, research on how individual-level factors like employees' socio-cognitive traits impact EEB remains limited (Zahra et al. 2013).

4.5 Employees' entrepreneurial cognitions and EEB

Originating from psychology research and its associated disciplines, SCT refers to the process behind an individual's decision, theorising that "behaviour, cognition and other personal factors, and environmental events all operate as interacting determinants" (Bandura 1988, p.276). Entrepreneurship scholars identify entrepreneurial self-efficacy and opportunity

perception as positive motivations for entrepreneurial action and fear of failure as a negative motivation (e.g., Yousafzai et al. 2015; Lu et al. 2018; Rehman et al. 2020). This study follows Mitchell et al. (2002, p.97) in defining entrepreneurial cognition as "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth." Entrepreneurial cognition is shaped by individuals' beliefs in their entrepreneurial abilities, knowledge, learning processes, and experiences (Shepherd and Patzelt 2018). The following sub-sections discuss the influence of these types of entrepreneurial cognition on EEB (Figure 4.3), thus contributing to solving the management puzzle regarding who at the employee level is engaging in firms' entrepreneurial activities and why (Brundin et al. 2008; Zahra et al. 2013; Neessen et al. 2019).

4.5.1 Employees' entrepreneurial self-efficacy and EEB

Self-efficacy refers to individuals' "belief in their capabilities to mobilise the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives" (Wood and Bandura 1989, p.364). Self-efficacy is context-dependent because it reflects individuals' beliefs about engaging in specific task-related activities or domains (Miao et al. 2017; Çetin and Aşkun 2018). Drawing from SCT, entrepreneurial self-efficacy (ESE) is defined as the resilient beliefs that entrepreneurs hold regarding their skills and abilities to accomplish objectives and control their environments (Baron 2007; McGee et al. 2009; Godwin et al. 2016). ESE is fundamental to entrepreneurial thinking (Günzel-Jensen et al. 2017), as it influences individuals' decisions to dedicate personal resources like time and effort to developing and launching new ideas (Wood and Bandura 1989; Cassar and Friedman 2009). The level of ESE required for entrepreneurial action is based on the difficulty of the entrepreneurial task, the strength of the employee's confidence in the ability to perform it and his or her understanding of it (Blanka 2018; Eniola and Dada 2020). A high level of ESE inspires individuals to set high entrepreneurial goals and commit to achieving them (Smith et al. 2019) and influences them to be persistent, passionate, and keen to translate their initiatives into new ventures (Globocnik and Salomo 2015). Accordingly, ESE is likely to have a positive effect on an employee's engagement in entrepreneurial activities, from planning to launching.

EEB is a complex process that integrates various traits, actions and behaviours, including ESE, goal-setting, planning and resource allocation (Wei et al. 2020). Few studies address the role of employees' ESE or suggest that it has a positive influence on their entrepreneurial intentions (Douglas and Fitzsimmons 2013; Fini and Toschi 2016; Yeganegi et al. 2016) or the

venture's CE activities (Ibrahim 2016) and growth (Kolvereid and Isaksen 2017). Following Newman et al.'s (2019) call to examine the impact of ESE on EEB, the following hypothesis is formulated:

> **Hypothesis 1a:** *Employees' entrepreneurial self-efficacy is associated with their entrepreneurial behaviour.*

4.5.2 Employees' opportunities recognition and EEB

According to Bandura (1995), individuals are future-oriented in general and tend to set goals that motivate them to engage in the behaviour that is required to achieve their goals. In that sense, opportunity recognition may be the foundation for goal-setting, as it establishes awareness of purpose and direction, which motivates commitment to accomplishing a goal (Baron 2007; Pidduck et al. 2021). The process starts when an individual is alert to factors in the environment so he or she can identify and evaluate valuable opportunities that turn into goals (Ardichvili et al. 2003; Urban and Wood 2015). Factors like one's education, social network and experience may influence the individual's ability to recognise opportunities (Ardichvili and Cardozo 2000). Opportunity perception, considered the first pillar of entrepreneurship and the seed of any entrepreneurial action (Shepherd et al. 2009; Wennberg et al. 2013), is a fundamental socio-cognitive trait for entrepreneurs (An et al. 2018; Boudreaux et al. 2019). To act entrepreneurially, one should be able to recognise opportunities that not everyone can see, understand how they arise, and exploit them, regardless of resource availability (Schumpeter 1934).

The literature emphasises that, to engage in entrepreneurial action, employees must undertake ongoing opportunity scanning and evaluation, especially if the employees' firms operate in a dynamic environment (Zahra 1991). The more accustomed employees become to ongoing scanning and evaluation, the higher the chance that they will not just exploit existing opportunities but also create them, thus increasing entrepreneurial engagement (Gordon et al. 2000; Hosseini et al. 2018). An individual's opportunity-recognition ability distinguishes him or her from other employees because the former perceive and evaluate the potential value of identified opportunities differently from others (Gaglio 2018). Hence, the following hypothesis is proposed:

> **Hypothesis 1b:** *Employees' opportunity recognition is associated with their entrepreneurial behaviour.*

4.5.3 Employees' fear of failure and EEB

Individuals' decisions to behave in a certain way is motivated by direct, indirect, and self-produced motivations (Wood and Bandura 1989). Individuals will engage in a behaviour if it leads to valuable and positive consequences, if they observe others being rewarded for performing similar activity, and if the behaviour results in self-satisfaction rather than self-doubt or disappointment. In short, if the behaviour-evaluation process reflects a high failure rate or an undesirable consequence, individuals are reluctant to participate in the activity (Engel et al. 2021).

Scholars identify five categories of fear of failure that can prevent individuals from engaging in a behaviour (Shepherd and Patzelt 2018). First, fear of feeling guilty and humiliated refers to worries that failure will reveal one's personal faults to others (Sabini et al. 2001). This fear triggers other unwanted emotions, such as regret and guilt (Byrne et al. 2016) and is negatively associated with creativity, especially when an abusive leader keeps reminding the employee of past failures (Cui et al. 2012). The second category of fear of failure is the fear of harming one's estimation of one's compared to those of others (Gilinsky 1949). This fear lowers self-esteem and leads to doubting one's skills and knowledge in terms of the ability to master a task (Gatewood et al. 2002; Hoang and Gimeno 2010). Perfectionist leaders can induce this kind of fear, thus having a negative effect on the employee's creativity (Xu et al. 2021). Third, the fear of uncertainty and not knowing the future (Byrne et al. 2016) usually occurs in complex, turbulent, and unpredictable environments (Milliken 1987). Fourth, the fear of negative social consequences (Hogg and Cooper 2007) causes employees to assume that the consequences of their activities will cost them their social prestige such that their opinions and behaviour no longer influence others (Shepherd and Patzelt 2018). Employees who are fearful of negative social consequences tend to adopt passive behaviours and prefer to maintain the status quo, reducing the likelihood that they will engage in entrepreneurial activities (Lin et al. 2023). Finally, the fear of upsetting others causes employees to think that people, especially superiors and social leaders, could disapprove of their behaviour (Selden and Fletcher 2015). All five of these categories have a negative influence on employees' decisions to engage in EEB.

Entrepreneurial activities are usually surrounded by high uncertainty, so a willingness to endure uncertainty (McMullen and Shepherd 2006) and take risks, rather than focusing on fear of failure, is required (Schumpeter 1934). An employee's decision to practise EEB may depend

on his or her readiness to deal with uncertainty (Heavey and Simsek 2013; Chang et al. 2018; Arslanagic-Kalajdzic et al. 2019), as the fear of failure does not just prevent the employee from engaging entrepreneurial behaviour but also induces negative emotions like regret, shame, and self-blame, all of which have negative effects on self-confidence (Shepherd 2003; McGregor and Elliot 2005). Thus, the following hypothesis is proposed:

> **Hypothesis 1c:** *Employees' fear of failure is associated with their entrepreneurial behaviour.*

4.6 The role of country-level Institutional contexts

Employees' decisions to participate in entrepreneurial activities is influenced not only by personal factors but also by context-level factors (Bandura 1988; Wood and Bandura 1989; North 1990; Urbano et al. 2019). Therefore, a comprehensive understanding of the entrepreneurial process requires looking at both how individuals think and how their behaviour is affected by where they operate (Williamson 2000). Therefore, this section proposes a multi-level framework that incorporates both the socio-cognitive traits of individual employees and the country-level institutional context. Individuals who operate in institutional contexts evaluate their surroundings, make decisions, and form their own subjective mental and behavioural frameworks based on those surroundings (North 1990), which suggests that the decisions regarding EEB that individuals who have similar socio-cognitive traits may differ based on the frameworks they have developed because of their surroundings (Corbett and Hmieleski 2007).

As shown in Figure 4.3, the 2019 Global Entrepreneurship Monitor data indicates a noticeable country-level variation in the rate of employee engagement in entrepreneurial activities. This variation suggests that the country-level institutional environment, in addition to influencing firms' operations, may either support or hinder employee entrepreneurial activities and the socio-cognitive resources and efforts that they are willing to commit to engaging in EEB (Bogatyreva et al. 2022). Urbano et al. (2022) argue that, while individual-level factors influence EEB, neglecting external factors could lead to incorrect conclusions. Gawke et al. (2019) also call for further explanation of the variations in and the mechanisms behind country-level factors' influence on EEB. The following sub-sections present the arguments behind proposing that a country's formal and informal institutions have direct

effects on EEB and moderating effects on the relationship between employees' socio-cognitive traits and EEB.

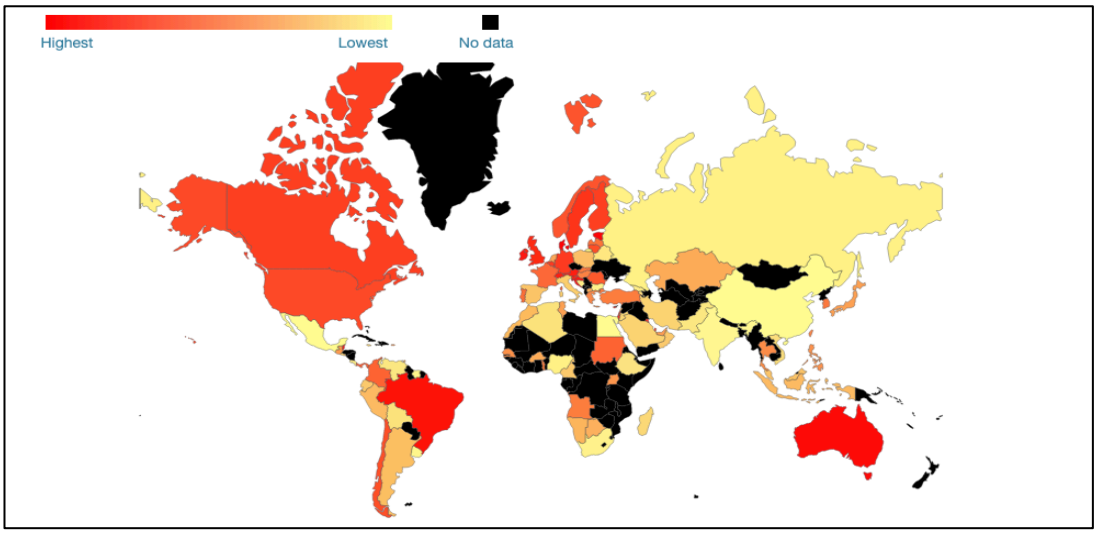


Figure 4.3 The differences of involvements in Entrepreneurial Employee Activity Worldwide (GEM 2019)

4.6.1 The role of formal institutions (i.e., rigidity of employment regulations)

Formal institutions include the rules, laws, and constitutions that set a country's boundaries and control economic activities. These institutions' role is to minimise uncertainty and risks and control the activities that can affect the country's economic performance (Dheer 2017). Employment regulations that organise the labour market, such as regulations related to hiring and firing and contractual and wage regulations, frame the interactions between employees and their employers and affect employees' activities and performance. For example, flexible labour regulations allow employees to move easily to a better job where they can contribute in ways they find meaningful and invest their resources in ways they prefer, such as in entrepreneurial activities (Aparicio et al. 2020). As a result, flexibility and mobility often promote entrepreneurial action among employees. Flexible labour regulations also create an atmosphere in which entrepreneurial employees can negotiate directly with their employers regarding working conditions without interference. Since unions often work on wage equality for workers in an industry (du Caju et al. 2008; Keune and Pedaci 2020), empirical studies show that unions have a negative effect on employees' entrepreneurial activities (Block et al. 2019). Direct employee-employer wage negotiation often leads to a higher wage than centralised collective bargaining does (Plasman et al. 2007), which can have a positive effect

on employees' performance (Card and de La Rica 2006). Therefore, entrepreneurial employees prefer more flexible labour regulations, as they allow them to get better jobs and wages, exchange knowledge with various workforces, and increase their experience by transferring and working in a different departments or for different employers, all of which can increase their willingness to engage in EEB. Thus, the following hypothesis is proposed:

> **Hypothesis 1d:** *At the country-level, the rigidity of employment regulations is associated with their entrepreneurial behaviour.*

ESE is based primarily on the individual's knowledge, skills and experience (Abun et al. 2021). While individuals who have high levels of ESE may engage in entrepreneurial activities even in challenging environments (Brinckmann and Kim 2015; Arslanagic-Kalajdzic et al. 2019; Renko et al. 2021), the institutional context still influences employees' ESE-EEB relationship (Wood and Bandura 1989). For example, scholars suggest that knowledge-sharing and experience exchanges are among the most effective ways to enhance ESE (Jessri et al. 2020). However, rigid employment regulations may impede them by limiting firms' ability to attract talented people from the local or international labour markets, thus limiting the chances for interaction in the workforce and reducing the development of employees' ESE (Zhu 2017). Rigid employment legislation is also associated with increasing employees' tenure (Polyviou et al. 2020), which may increase their knowledge and experience related to a particular firm but may also increase engagement in tasks that have become routine and do not improve their ESE (Camelo-Ordaz et al. 2012; Alessa and Alajmi 2017).

Rigid employment regulations like rules related to hiring and redundancy can increase labour costs (Tian and Wu 2022), so firms are less likely to invest in entrepreneurship and its related activities in such environments. Bratti et al. (2021) find that rigid employment regulations have a negative influence on firms' investment in human capital, such as through employee training and development programs, which affects employees' ESE. The effect of low investments in human capital and entrepreneurship reduce firms' and markets' attractiveness to potential new employees, so those who have high levels of ESE seek other markets that value the ability to recognise opportunities (Langer et al. 2017). Rigid labour rules also affect firms that need to relocate their employees under the same or new contracts when the firm is engaging in international venture creation (Vanacker et al. 2021), thus reducing the chance that their employees will engage in international entrepreneurial activities and gain experience (Dixon et al. 2020). Rigid employment regulations also lead to standard contracts

that are assumed will fit everyone but are not ideal for entrepreneurial employees (Block et al. 2019).

Standardised contracts, centralised bargaining and wage equality all induce in employees the feeling that they do not have control over their careers, so these elements negatively influence their ESE and EEB (Borah et al. 2022). ESE requires that employees deal with some challenging tasks, experience some failures, take some risks, leave their comfort zones, seek better opportunities and have control over their careers and innovations (Bandura 1995), all of which are limited by strict employment regulations. Therefore, ESE's effect on EEB weakens in countries that have rigid employment institutions, leading to the following hypothesis:

> **Hypothesis 2a:** *The association between employees' ESE and EBE is negatively moderated by the rigidity of employment regulations.*

The ability to recognise *opportunity* is a critical trait for EEB because a central role of entrepreneurial employees is that of exploring and exploiting valuable opportunities. The process of opportunity recognition includes forecasting the unknown future, although the greater the uncertainty, the more hesitation, decision-making delays, self-questioning and procrastination are likely to take place, all of which impede opportunity recognition and EEB (Rigtering et al. 2019). While "institutions reduce uncertainty by providing a structure to everyday life" (North 1990, p.3), such is not always the case with country-level formal institutions. For example, rigid employment regulations reflect too much government interference with the labour market, as they may lead to conflicts or include frequent changes in regulations (Boudreaux et al. 2019; Shu et al. 2019) that make it difficult for firms and their employees to navigate them (Williamson 2000) such that firms decide not to invest in opportunity exploitation to avoid institutional uncertainty (Bylund and McCaffrey 2017; Ali et al. 2020). In addition, to cope with increasing regulations, firms must allocate more resources to deal with and respond to changes (Estrin et al. 2016), leaving them fewer resources for opportunity recognition. Rigid employment regulations are often associated with bureaucracy (Galindo-Martín et al. 2019), which also interferes with opportunity recognition (Zahra 1996b; Rangus and Slavec 2017; Jahanshahi et al. 2018).

Furthermore, strict employment regulations limit the workforce's mobility from external to domestic markets and within the domestic market itself (Balz 2017), preventing new knowledge, technology, and talented individuals from entering the market and employees from recognising or creating opportunities (Francis et al. 2018). To avoid being subject to the legal

consequences of rigid employment regulations, firms avoid hiring new, productive employees and laying off unproductive ones (Autor et al. 2007), which affects the firm's performance and its attractiveness to talented individuals in the labour market. Thus, they miss out on the knowledge and experience exchange that has a positive effect on employees' opportunity recognition (Urban and Wood 2015). Rigid employment regulations may also lead to employees' being passive about their performance, as they have little chance of being let go, and passivity is associated with low levels of opportunity recognition (Bradley and Klein 2016). Finally, strict contractual and wage laws reduce the wage gap, forcing talented and skilled labours to search for alternative markets so as to be paid what they are worth, thereby reducing the opportunities for creation and recognition in the market (Block et al. 2019). These issues suggest that employees' opportunity recognition will have a weaker effect on EEB in countries that have rigid employment institutions than they do in markets that enjoy high levels of economic freedom, leading to the next hypothesis:

> **Hypothesis 2b:** *The association between employees' opportunity recognition and their EEB is negatively moderated by rigid employment regulations.*

The effect of rigid employment regulations (formal institutions) on the relationship between *fear of failure* and EEB is ambiguous. It could be argued that rigid employment regulations have a positive moderating impact because they prevent firms from arbitrarily firing employees, thereby increasing the employees' job security, which plays a vital role in increasing employees' productivity (Ederer and Manso 2011). Belloc (2019) finds that increasing employees' feelings of job security reduces the negative consequences of failure. Nevertheless, dismissal based on failure could still occur with strict labour legislation, even when a long notice period and high severance pay are required. For instance, in countries that have rigid employment regulations, dismissals for personal misconduct are possible and can also be justified for economic and production-related reasons (Böckerman et al. 2016). Employers can also bar employees from entering the workplace and use the notice period as their severance pay (Liebregts and Stam 2019). Hence, the desired results of having rigid employment regulations in place to reduce the fear of consequences like dismissals cannot be taken for granted.

When it comes to reducing employees' fear of failure, some scholars argue that firms' internal factors, such as policies that are related to tolerance for failure, play much more important roles than country-level formal institutions do (Stopford and Baden-Fuller 1994;

Alpkan et al. 2010). For example, in the absence of internal supportive factors, employees' fear of failure will be higher when employment regulations are rigid because their ability to change employers is limited (Dutta and Sobel 2021). Therefore, following Shepherd and Patzelt's (2018) five categories of individuals' fear of failure, the rigidity of employment regulations does not decrease the five fears' effect. Instead, it reduces employees' passion to contribute to their firms' goals, increases their fear of uncertainty (and the other four types of fear) (Ali et al. 2020), and leads them to embrace a risk-averse perspective where they tend to be reluctant to participate in EEB (Turro et al. 2016). Therefore, the following hypothesis is formulated**:**

> **Hypothesis 2c:** *The association between employees' fear of failure and their EEB is negatively moderated by rigid employment regulations.*

4.6.2 The role of informal institutions (managerial attitude and norms)

Informal institutions are unwritten "rules" that are passed down through the years and are difficult to change (Tonoyan et al. 2010; Dheer et al. 2015). They include the norms, beliefs, and values that shape a society's cultural framework and play a central role in defining what is expected and accepted and what is not (North 2005; Beugelsdijk and Welzel 2018). While some CE studies focus on the role of national culture in influencing CE, others examine the culture's effect on individuals' decisions concerning whether to become independent or employee entrepreneurs (e.g., Turró et al. 2014; Stephan and Pathak 2016; Boone et al. 2019). Liebregts (2018) suggests that a culture that has a high level of uncertainty avoidance is associated with employees' decisions to become employee entrepreneurs because using their firms' resources reduces the consequences of failure and, thus, the level of uncertainty. Other scholars find that trust is associated with a high level of autonomy, which is one of firms' internal factors that can promote CE (Hughes et al. 2018; Elert et al. 2019). However, while the literature explores some country-level informal institutions' effects on the micro-foundations of CE, investigating the direct and moderating effects of country-level informal institutions on EEB and the relationships between socio-cognitive traits and EEB would help to explain the mechanism related to how these institutions influence such relationships.

While a requirement for behaving entrepreneurially is not usually stated in employees' job descriptions but is a voluntary choice by the employees (de Jong et al. 2015), it is an unwritten expectation in many firms (Kuratko et al. 2021) and is motivated by the social

reference group's attitudes, beliefs, and expectations (Krueger et al. 2000). Therefore, if the employee's evaluation of the reference group is that it supports entrepreneurial activities by promoting pro-entrepreneurship managerial attitudes and norms, it is likely that the employee will engage in such activities. For instance, based on the theory of planned behaviour (TPB), the perception of entrepreneurial and social support increases employees' engagement in entrepreneurial activities (Kirby 2006). Hence, a society in which entrepreneurship is embraced and supported by managerial attitudes and norms that tolerate failure, reward successes and support a high-quality relationship between the employee and the immediate supervisor (Chouchane et al. 2021) will increase employees' engagement in EEB. Thus, the following hypothesis is proposed:

> **Hypothesis 1e:** *At the country-level, the supportive managerial attitudes and norms is associated with their entrepreneurial behaviour.*

SCT suggests that the role of *ESE* in supporting entrepreneurial activities is influenced by informal institutional factors (Williamson 2000), so it theorises that the country's supportive managerial attitudes and norms have a positive moderating effect on the relationship between employees' ESE and their EEB. The positive effect of employees' ESE is likely to be much more substantial in countries that have positive managerial attitudes and norms. According to SCT, ESE is linked to self-confidence and self-motivation, and because external contextual factors influence how individuals perceive the world (Ostapenko 2017), ESE is influenced by values and norms at the country level (Al-Awbathani et al. 2019; Marques et al. 2019). For example, in societies that have supportive norms like tolerance for failure and that recognise and reward successful engagement in entrepreneurial activities (Martín-Rojas et al. 2020), especially those with highly positive social or economic outcomes, individuals' confidence increases, encouraging them to delve into new activities, learn, and enhance their skills (Aparicio et al. 2016). Furthermore, research suggests that ESE is linked to individuals' evaluations of how they use resources like their knowledge and skills at one end and the outcomes on the other end (Stephan and Uhlaner 2010). Thus, if employees' forecasts indicate no threats nor negative consequences of EEB but instead acknowledgement of their efforts and rewards for using their resources, they are much more likely to engage in EEB.

ESE depends on experiences, social learning, verbal persuasion, and physiology, all of which are both directly and indirectly influenced by norms at the country level (Cheema et al. 2020). Managerial attitudes that embrace cooperation are associated with entrepreneurial

outcomes, with a strong employee–employer cooperation relationship as the key (Dheer 2017). This strong relationship has many advantages, such as increasing trust and support (Hughes and Mustafa 2017; Usman et al. 2020), which are central to increasing employees' ESE and engagement in EEB. Cooperative employee–employer relationships also allow employers to use verbal persuasion to increase employees' confidence in their skills and abilities (Honicke and Broadbent 2016; Ng 2017; Nair et al. 2020). Studies indicate that positive managerial attitudes and norms ensure that employees' voices and thoughts are heard and appreciated, thus enhancing their confidence in their skills, ideas and abilities (Wang et al. 2015; Block et al. 2019). Since individuals' knowledge is one of ESE's determinants, embracing cooperative managerial attitudes and norms is associated with a strong flow of information exchange among employees, so they benefit from others' experiences and capabilities in serving a particular purpose (Lepak and Snell 2002; Lepak et al. 2003), such as engaging in EEB (Busch et al. 2020). These aspects of employees' reactions to managerial attitudes and norms suggest that the ESE-EEB relationship is stronger in countries that have positive managerial attitudes and norms, so the following hypothesis is proposed:

> **Hypothesis 3a:** *The association between employees' ESE and their EBE is positively moderated by supportive managerial attitudes and norms.*

Opportunities are openings for profitable consequences and are explored by those with related idiosyncratic knowledge (Shane 2000). Opportunities like new products and ventures exist in the institutional matrix (North 1993), but they are recognised, not by everyone but by those who understand and take advantage of the institutional framework (He et al. 2020). Thus, for several reasons, the positive relationship between employees' ability to recognise *opportunity* and EEB may be positively moderated by the country's managerial attitudes and norms. For example, the literature confirms that employees' opportunity recognition relies on their knowledge and experiences (Chouchane et al. 2021), so in economies in which the managerial attitudes and norms emphasise knowledge- and information-sharing through training and development programmes, entrepreneurial activities thrive at all levels (Aparicio et al. 2016). In addition, scholars suggest that opportunity recognition is linked to individuals' cooperation with others, allowing more information, knowledge, and ideas to be exchanged (Gedajlovic et al. 2013; Cui et al. 2019). Therefore, supportive national managerial attitudes and norms promote the exchange of knowledge by embracing cooperative relationships to ensure a strong flow of information and knowledge among employees, thus enhancing the positive relationship between employees' opportunity recognition and EEB.

Since informal institutions are the unwritten rules set by society's members to define what is expected and what is not, they can also create opportunities. It is evident that national managerial attitudes and norms have a significant impact on employee entrepreneurial behaviour, so managers must take into account the country's prevailing attitudes and norms when developing strategies to promote CE. These considerations include the views of stakeholders like customers, employees, and investors (Javalgi et al. 2014; Herhausen et al. 2018; Reyes 2019) to help create a supportive environment for successful employee entrepreneurial activity. For example, Alwakid et al. (2020) suggest that embracing values and norms that concern the environmental impacts of economic activities is related to increasing green entrepreneurship. Society's members are also valuable sources of knowledge and information. The literature indicates that new products developed by R&D teams that lack customer orientation usually fail (Pihlajamaa et al. 2013), while full customer engagement leads to recognising unique opportunities, which translates into innovative products and services through EEB (Marques et al. 2019; Ali et al. 2020). These considerations suggest that the association between employees' opportunity recognition and EEB is stronger in countries that have supportive managerial attitudes and norms than it is in countries that do not. Therefore, the next hypothesis is formulated as:

> **Hypothesis 3b:** *The association between employees' opportunity recognition and their EEB is positively moderated by supportive managerial attitudes and norms.*

Individuals evaluate the possible consequences of their behaviours through a complex cognitive matrix that includes evaluating the role of country-level informal institutions (Stuetzer et al. 2014; Oehmichen et al. 2018). The fear of failure negatively influences the decision to engage in entrepreneurial activity (Engel et al. 2021). When employees engage in EEB, they expect either success or failure as an outcome, and the national-level managerial attitudes and norms play a central role in increasing the former and reducing the latter (Dutta and Sobel 2021). For example, national-level managerial attitudes and norms like reliance on professional management increase entrepreneurial activities' success rate and reduce employees' feelings of failure that may be due to slow resource allocations or bureaucracy (Urbano and Turró 2013; Kafouros et al. 2022). Since employees' activities are a form of exchange between employees and employers (facilitated by trust), managerial attitudes and norms like delegation of authority may increase individuals' confidence in their abilities and reduce their fear of failure (Chulanova 2019; Elert et al. 2019). Similarly, while entrepreneurship is usually surrounded by uncertainty, such supportive national-level

managerial attitudes and norms as customer orientation reduce both uncertainty and the fear of failure (Pihlajamaa et al. 2013; Herhausen et al. 2018; Reyes 2019).

The literature studies the effect of fear of failure on an individual's behaviour in parallel with examining the effect of risk-taking on entrepreneurial decisions (Kihlstrom and Laffont 1979). As (Ekvall 1997, p.197) observe, "As risk-taking and anxiety are ingredients of creative acts, culture elements that make risk-taking and failure less threatening and dangerous are promoting of creative behaviour, whereas in situations where creative initiatives are met with suspicion, defensiveness and aggression, the fear of failure becomes strong and holds creativity back." Thus, risk aversion has more influence in countries that have unsupportive national-level managerial attitudes and norms because the consequences of entrepreneurial failures, such as shame and embarrassment, occur more often than they do in other countries (Pereira 2004; Vaillant and Lafuente 2007). Furthermore, research suggests that people are risk-averse in general (Dutta and Sobel 2021), but employees' forecast of failure negatively affects their decision to engage in EEB. As a result, increasing the level of support and information flow in workplaces that is due to embracing the norm of cooperative relationships reduces the negative impact of fear of failure and promotes EEB (Bavil 2017; Ujoatuonu et al. 2018; Block et al. 2019). Scholars suggest that policymakers and managers consider embracing more entrepreneurially favourable national-level managerial attitudes and norms, such as rewarding successful risk-taking and tolerating failed risk, to reduce the negative effects of employees' fear of failure (Alpkan et al. 2010; Mancilla and Amorós 2015) and increase EEB. Therefore, the following hypothesis is proposed:

> **Hypothesis 3b:** *The association between employees' fear of failure and their EEB is positively moderated by supportive managerial attitudes and norms.*

4.7 Conclusion

This chapter addressed the thesis' research question 5: *What is the role of employees' socio-cognitive traits in promoting employees' entrepreneurial behaviour?* It also addressed research question 7: *How do institutional-level factors influence employees' entrepreneurial behaviour?* Finally, it addressed research question 7: *How do context-level factors (the country's formal and informal institutions) interact with employee-level socio-cognitive traits to promote employees' entrepreneurial behaviour?* The chapter examined the influence of three socio-cognitive traits—entrepreneurial self-efficacy, opportunity perception, and fear of failure—on

employees' entrepreneurial behaviour and how the country-level institutional context moderates that relationship. The chapter blends SCT with institutional economics theory to develop a multi-level model of EEB in response to calls for more multi-level systematic studies that address the multi-dimensional nature of the CE phenomenon. Therefore, the chapter hypothesised that employees' self-efficacy and opportunity perception, as well as supportive managerial attitudes and norms, promote EEB, while fear of failure and rigid employment regulations discourage it. In addition, the chapter hypothesised that the strength of the relationships between socio-cognitive traits and EEB depends on the institutional context such that employees who have high levels of entrepreneurial self-efficacy and opportunity perception and low fear of failure are less likely to engage in EEB when the employment regulations are rigid than when they are not. In contrast, the chapter hypothesised that the country's supportive managerial attitudes and norms positively moderate the relationships between employees' socio-conative traits and EEB.

Chapter 5 Methodology

5.1 Introduction

Chapter 5 explains the positioning of this thesis in relation to the major scientific research paradigm and describes the methodology employed to collect and analyse the data used to explore the hypotheses proposed in Chapter 4. The chapter links the proposed conceptual framework of the individuals' socio-cognitive traits and country-level institutional context and the related hypotheses with the empirical results presented in Chapter 6.

As Figure 5.1 shows, this chapter starts with a scientific research paradigm, followed by the research strategy. Then it presents the method and analytical techniques for stage two[2].

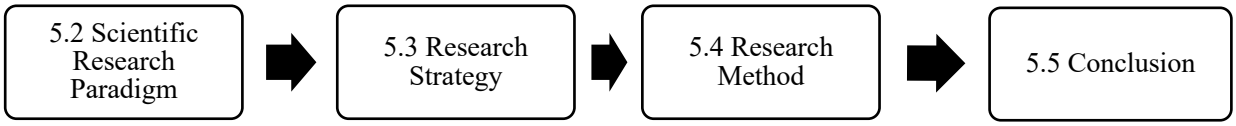


Figure 5.1 Outline of Chapter 5

5.2 Scientific Research Paradigm

A cornerstone of sound research is that the choice of research method is motivated by and suitable for the research questions and is navigated in keeping with scientific research paradigms (Saunders et al. 2016). Research paradigms "provide beliefs and dictates, which, for scholars in a particular discipline, influence what should be studied, how it should be studied, and how the results of the study should be interpreted" (Kivunja and Kuyini 2017, p.26). Positivism, post-positivism, critical theory, and constructivism are the main four research paradigms, each one based on one's beliefs or assumptions about reality and how it is structured (Guba and Lincoln 1998; May 2011). Table 5.1 presents each of these philosophical paradigms' related ontology, epistemology, and methodology.

[2] Stage one methodology was previously discussed in section 3.3

Table 5.1 Basic beliefs (metaphysics) of alternative inquiry paradigms (Source: Guba and Lincoln 1998)

Item	Positivism	Postpositivism	Critical theory et al.	Constructivism
Ontology	Naive realism — "real" reality but apprehendable	Critical realism — "real" reality but only imperfectly and probabilistically apprehendable	Historical realism — virtual reality shaped by social, political, culture, economic, ethnic, and gender values; crystalized over time	Relativism — local and specific constructed realities
Epistemology	Dualist/objectivist; findings true	Modified dualist/objectivist; critical tradition/community; findings probably true	Transactional/subjective; value mediated findings	Transactional/subjectivist; create findings
Methodology	Experimental/manipulative; verification of hypotheses; chiefly quantitative methods	Modified experimental/ manipulative; critical multiplism falsification of hypotheses; may include qualitative methods	Dialogic/dialectical	Hermeneutical/dialectical

The choice of research paradigm reflects the compatible and influential elements of (i) ontology, or the perspective of reality; (ii) epistemology, or what shapes adequate knowledge of that reality; and (iii) methodology, or the research data's interpretation of reality (Tennis 2008). Ontology concerns whether a social phenomenon might or must be viewed as a social construct based on social actors' perceptions and behaviour. Epistemology, which stems from ontology, is the philosophical foundation that "concerns assumptions about knowledge–how we know what we say we know, what constitutes acceptable, valid and legitimate knowledge, and how we can communicate knowledge to fellow human beings" (Saunders et al. 2016, p.151). Epistemology validates knowledge and the framework for the research process. Methodology comprises research techniques that provide answers that can be true, replicable, and representative. Thus, ontology is the 'reality' under study, epistemology is the bridge between that reality and the researcher, and methodology is the technique used to examine that reality (May 2011). Thus, the decision made at the ontological level influences the epistemological position and the choice of methodology.

Since subjectivity occurs in all kinds of research and at various levels (Sayer 2000), the ontological position of this study considers that reality genuinely and physically exists beyond the knowledge and comprehension, yet it is also created, moulded, and impacted by the experiences, knowledge, and preferences. In addition, reality can be comprehended only to a certain point, so it is difficult (if not impossible) to gain a complete understanding of phenomena. As a result, generalisations are based on probabilities. In contrast to interpretivism, studying complex reality in social science is possible through simple models that become real because they are structured according to the social world's rules and principles. This study steers clear of both radical positivism, which holds that only one truth represents reality, and interpretivism, which emphasises that truth is debatable and might not be consistent with reality. The place between these radical positions is called 'constructivist realism' (Cupchik 2001) and is an alternative to positivism, with its objective view of reality, and constructivism, with its subjective view of reality. This middle ground is based on the argument that social life is real to everyone but exists only when social actors link it to a special meaning (Tcytcarev et al. 2019). From this position, the researcher is an integral element of reality who has the power to determine how reality is simultaneously observed, examined, and impacted.

Epistemology is the theory of knowledge (i.e. what is known) and the interaction between the researcher and the subject being researched (Ruwhiu and Cone 2010). The present study

stands on the middle ground between the positivism and interpretivism paradigms and is unconcerned with creating knowledge for the sake of knowledge creation. Instead, it seeks to clarify CE and its antecedents with a focus on its micro-foundation of EEB and how factors at either the individual level or the country-institutional level promote or hinder EEB. Thus, this research is not limited to investigating the relationship between employees' socio-cognitive traits and EEB but goes beyond that to examine the impact of the context in which those employees reside. Therefore, the study chooses realism—between positivism, with its view of physical reality, and interpretivism, with its cognitive view.

Realism sees reality as consisting only of social actors' cognition and as unable to be assessed but only described because the researcher is part of the observed reality. This view is between positivism and interpretivism, which embrace reality and cognition, respectively. While traditional positivism argues that the researcher is an independent observer who does not interfere with the object of the study, it also states that 'what' and 'how' questions must be defined and answered objectively. However, social science does not accept such views because reality is produced and reproduced by social actors (May 2011); besides, social science researchers cannot be independent of their research, and all research stages require some level of intervention (Sayer 2000). In addition, research is motivated and supported by social and political interests (Idowu 2017). Therefore, while realism as an ontological assumption directly affects defining what to study and how to study it, in this study, the researcher defines the research subject, the study's angle, and the theories and creates models with which to understand reality.

As for the methodological position, the current research uses quantitative methods, which provide a comprehensive meaning for social phenomena and in which theoretical frameworks are tested and supported through statistical interactions (Saunders et al. 2016). Quantitative methods also establish a solid ground from which future research can re-examine the statistically significant interactions in descriptive depth (May 2011). It also goes beyond the sample-related limitations of qualitative methods and allows findings to be generalised (Gray 2016). Relying on a large sample contributes to presenting a solid, thoughtful conclusion for policymakers, academics, and managers. Hence, this approach is appropriate for the present study, where the variables are quantitatively measured and statistically analysed.

5.3 Research strategy

Generally, the research strategy guides the researcher in planning and executing the research project (Johannesson and Perjons 2014) and is driven by the research goals and questions. The research strategy links the research philosophy, data collection, and methods of analysis (Denzin and Giardina 2009) and outlines how the researcher will answer the research questions through the research design that underpins the theory development. There are three approaches to theory development: inductive, deductive, and abductive (Table 5.2; Saunders et al. 2016). In the deductive approach, the researcher adopts a theory from the literature, develops hypotheses, collects the data, and analyses it to confirm the theory. Conversely, in the inductive approach, the researcher starts by collecting data to understand a phenomenon and introduce a theory. In the abductive approach, a mix of the inductive and deductive approaches, the data generate or moderate a theory and then the theory is tested again with additional data.

This study embraces the core idea behind scientific research, where a theory is tested over time and in various contexts until it is confirmed, modified or proven inaccurate (Bhattacherjee 2012). The study adopts the *deductive approach* by forming and evaluating explanatory hypotheses against theories (Sousa 2010; Kuratko and Hoskinson 2018). It follows the sequential stages of the deductive approach that Robson (2002) defines. The approach starts with deducing hypotheses (in Chapter 4) about the relationships among the three socio-cognitive traits, country-level institutional factors and EEB based on social cognitive theory and institutional theory. Then, as will be addressed in section 5.3, it indicates how the variables are measured and how the hypotheses are quantifiably tested. Finally, Chapter 7 discusses the results of the tested hypotheses against the theories.

Table 5.2 Approaches to theory development (Source: Saunders et al. 2016)

	Deduction	Induction	Abduction
Logic	In a deductive inference, when the premises are true, the conclusion must also be true	In an inductive inference, known premises are used to generate untested conclusions	In an abductive inference, known premises are used to generate testable conclusions
Generalisability	Generalising from the general to the specific	Generalising from the specific to the general	Generalising from the interactions between the specific and the general
Use of data	Data collection is used to evaluate propositions or hypotheses related to an existing theory	Data collection is used to explore a phenomenon, identify themes and patterns, and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth
Theory	Theory falsification or verification	Theory generation and building	Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory

The choice of research approach must also align with the research purpose. The three main research purposes are exploratory, descriptive and explanatory. Exploratory studies explore what is going on in new phenomena, descriptive studies describe what is happening in as detailed and accurate a way as possible, and explanatory studies explain phenomena using correlation (Saunders et al. 2016). This study's purpose supports the choice to use a deductive approach. Given this study's goal and the construction of the hypotheses as correlation hypotheses, this study is explanatory. It follows the correlation research by hypothesising relationships among three socio-cognitive traits, country-level institutional factors and EEB. Many scholars use social cognitive and institutional theories to establish correlation frameworks in their research (e.g. Boudreaux et al. 2019; Vanacker et al. 2021; Bjørnskov et al. 2022), and the implications of these theories support and justify the use of a correlation research approach in this study.

Correlation research measures the strength of the interactions between two or more associated variables (Bhattacherjee 2012; Burns and Bush 2014). This study addresses the correlation research questions that are laid out in Chapter 1 (see Table 5.3 below). Stage one's questions focus on the impact of various antecedents of CE on implementations of CE. For instance, a firm that has building blocks is more likely to implement CE than firms that do not. Similarly, in stage two, the extent of an employee's socio-cognitive traits increases the chances that he or she will engage in EEB. In addition, the extent of the country-level managerial attitude and norm promotes engagement in EEB while the rigidity of employment regulations hinders it, so a change in the independent variables is associated with a change in the dependent variable.

Table 5.3 Research goals and questions

Stage	goals	Questions
1	• Review and analyse the current knowledge related to CE based on the research by CE's scholars over the last five decades.	• What is entrepreneurship within established firm? • How it had been defined, conceptualised, and measured? • What are the most commonly investigated antecedents of CE? • What are the gaps in the CE literature?

2	• To explore the relationship between employees' socio-cognitive traits (entrepreneurial self-efficacy, opportunities perception, and fear of failure), country-level institutional factors (formal and informal) and the EEB.	• What is the role of the employees' socio-cognitive traits in promoting EEB? • How do country-level institutional factors influence EEB? • How does the country-level institutional context interact with individual-level socio-cognitive traits to promote EEB?

Before choosing correlation modelling, the researcher must acknowledge some of its aspects—the theory that guides it, the context in which the correlation is tested (especially when presenting the results, as generalisation is conditional), and the advanced statistical methods, such as regression and structure equation modelling, that are proper in correlation research (Cohen et al. 2014). This study uses multi-regression techniques to test the correlation hypotheses that are laid out in Chapter 4.

5.4 Research Methods

To achieve its research goals and objectives, this thesis is carried out in two stages. Stage one uses meta-analysis to consolidate quantitatively the extant knowledge regarding CE's antecedents and their respective boundary conditions. Stage two merges and quantitatively analyses data from the Global Entrepreneurship Monitor (GEM) surveys, the Economic Freedom index (EF), the Global competitiveness index (GCI), WorldBank (WB) and the International Labour Organisation (ILO) to explore the phenomena of employees' entrepreneurial behaviours and how individual- and institutional-level factors can influence employees' entrepreneurial behaviours. The data represent a large sample of 225,640 employees from 70 countries and cover the period from 2015 to 2018. The findings from stage two provide a board picture of the correlations among employees' socio-cognitive traits, institutional factors, and employees' entrepreneurial behaviours.

Table 5.4 summarizes each stage's objectives, the types of data, the sample size, the methods of analysis, and the timeline. The sections that follow explain the methods used for data collection and analyses.

Table 5.4 Summary of stages: methodology

Stage	Objectives	Data types	Sample size	Analysis	Timeline
1	• Review and analyse current CE's literature	Secondary	97 studies	Quantitative	8 months
2	• Examine the impacts of individual level-factors and the institutional-level factors on EEB	Secondary	225,640 employees from 70 countries	Quantitative	16 months

5.4.1 Stage two

In stage two, the researcher implemented the institutional and SCT theories to re-analyse data collected by others and present a coherent model that explains the theoretically significant correlation among the set of variables. Secondary data is usually considered to be of high quality when rigorous sampling procedures minimise the impact of non-response issues, cover many regions of the targeted country, and are carried on by experienced researchers (Bryman 2016). The use of secondary data may also present a new interpretation of the data after new models are proposed and analysed (Burns and Bush 2014; Saunders et al. 2016). In large samples, secondary data also allows the researcher to run subgroups and cross-cultural analyses to deepen the clarify of the examined relationships (Bhattacherjee 2012).

5.4.1.1 *Database development and Dependent variable.* The main hypotheses were tested using the Global Entrepreneurship Monitor (GEM)[3] country-level data on individual employees' entrepreneurial activity. The GEM dataset contains data from 225,640 employees from 70 countries over the period from 2015 to 2018. Eleven percent (23,806) of the employees in this sample are classified as engaged in EEB. While GEM 2011-2014 captured EEB, those years had major political events worldwide (e.g., Arab Spring). Such events may influence the analysis by altering the results (i.e., altering the significance or size of coefficients) (Lihn and Bjørnskov 2017; Boudreaux et al. 2019) Thus, 2015-2018 survey waves are appropriate primarily because they are the most recent data at the time of writing these lines and they included data about EEB. The final database for this study consists of country-level data from

[3] See the appendix I for more details about the GEM database.

the EF, GCI, and the ILO. These databases are commonly used in cross-country studies (e.g., Pathak et al. 2016; Block et al. 2019; Vanacker et al. 2021). Figure 5.2 shows the variation in entrepreneurial employee activities by country, which needs further investigation.

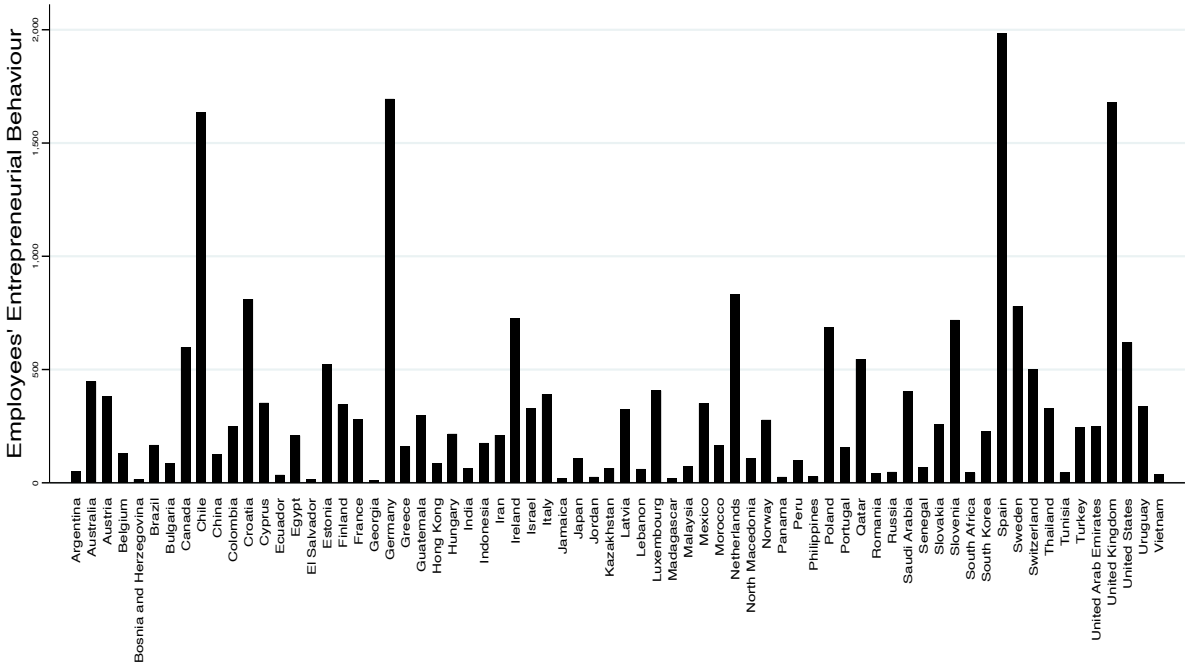


Figure 5.2 Employees engaged in entrepreneurial behaviour by country

Table 5.5 shows that the country with the lowest number of employees who participated in EEB is the Philippines; with 294 survey participants, only 27 were engaged in EEB. Spain has the highest number of employees who participated in EEB; with 31,748 survey participants, 1,985 were engaged in EEB. Examining the impact of formal and informal institutions from multiple countries helps to explain why some employees who have similar socio-cognitive traits engage in entrepreneurial activities while others who have the same traits do not (Schotter et al. 2021; Vanacker et al. 2021).

Table 5.5 Sample summary statistics by country

Country	N	N1	%N1	GDP	UNR	RER	MAN	ESE	OPP	FF
Argentina	1,921	49	3%	$581.2	9%	7.36	4.01	44%	31%	44%
Australia	2,095	447	21%	$1,299.1	6%	1.59	4.94	51%	50%	46%
Austria	1,597	382	24%	$395.8	6%	0.55	5.27	46%	42%	55%
Belgium	733	129	18%	$462.3	9%	0.55	4.99	37%	41%	53%
Bosnia & Herzegovina	481	15	3%	$18.1	21%	3.46	3.49	42%	17%	38%

Country	N	N1	%N1	GDP	UNR	RER	MAN	ESE	OPP	FF
Brazil	3,156	167	5%	$1,891.8	11%	5.32	4.15	54%	40%	46%
Bulgaria	3,191	86	3%	$57.5	7%	2.59	3.93	37%	19%	53%
Canada	3,083	598	19%	$1,615.7	7%	1.41	5.24	58%	59%	48%
Chile	13,624	1,636	12%	$269.6	7%	5.57	4.39	62%	57%	32%
China	3,290	125	4%	$13,178.2	4%	4.29	4.45	24%	34%	42%
Colombia	3,342	250	7%	$305.7	9%	3.14	4.25	65%	53%	32%
Croatia	3,304	811	25%	$55.3	12%	3.46	3.77	59%	30%	48%
Cyprus	3,352	353	11%	$23.2	11%	2.22	4.09	52%	46%	59%
Ecuador	1,348	35	3%	$102.1	4%	7.46	4.15	74%	48%	31%
Egypt	3,531	208	6%	$283.9	12%	4.68	3.70	51%	50%	34%
El Salvador	595	16	3%	$24.2	4%	6.48	4.06	70%	39%	37%
Estonia	2,738	524	19%	$24.6	6%	2.04	4.97	46%	53%	48%
Finland	1,792	346	19%	$238.0	9%	3.05	5.39	35%	50%	45%
France	2,278	279	12%	$2,623.8	10%	4.76	4.84	39%	34%	42%
Georgia	312	10	3%	$15.1	17%	2.04	3.90	49%	33%	31%
Germany	9,377	1,695	18%	$3,635.7	4%	2.42	5.33	42%	45%	46%
Greece	3,033	159	5%	$200.3	22%	4.46	3.92	49%	17%	68%
Guatemala	3,539	296	8%	$69.4	2%	7.70	4.65	65%	53%	34%
Hong Kong	754	87	12%	$320.8	3%	0.25	5.18	34%	58%	44%
Hungary	1,771	216	12%	$127.0	6%	2.51	3.71	39%	28%	51%
India	1,417	64	5%	$2,701.1	5%	3.52	4.52	60%	50%	47%
Indonesia	4,935	176	4%	$957.5	4%	9.45	4.72	66%	54%	50%
Iran	3,643	211	6%	$381.6	12%	4.73	3.53	65%	36%	44%
Ireland	3,818	727	19%	$329.0	8%	2.36	5.31	45%	48%	43%
Israel	2,278	330	14%	$343.1	4%	4.29	4.87	45%	54%	56%
Italy	2,720	391	14%	$1,952.4	11%	2.22	3.84	32%	32%	59%
Jamaica	326	19	6%	$14.1	13%	2.28	4.10	82%	62%	30%
Japan	1,962	108	6%	$4,986.8	3%	0.55	5.43	9%	7%	52%
Jordan	375	26	7%	$39.9	15%	1.12	4.40	58%	32%	40%
Kazakhstan	1,496	65	4%	$164.5	5%	0.37	4.28	60%	50%	49%
Latvia	2,760	323	12%	$28.5	9%	3.62	4.54	50%	36%	48%
Lebanon	485	61	13%	$55.3	6%	2.22	4.23	71%	32%	52%
Luxembourg	1,732	407	23%	$62.7	6%	4.63	5.38	45%	53%	54%
Madagascar	1,013	19	2%	$13.8	2%	6.44	3.89	54%	37%	38%
Malaysia	2,820	71	3%	$307.2	3%	2.88	5.43	29%	31%	37%

Country	N	N1	%N1	GDP	UNR	RER	MAN	ESE	OPP	FF
Mexico	5,976	351	6%	$1,128.7	4%	4.26	4.23	48%	41%	35%
Morocco	1,709	166	10%	$111.0	9%	6.94	3.98	50%	42%	54%
Netherlands	3,692	831	23%	$830.1	5%	2.90	5.52	50%	65%	39%
North Macedonia	1,305	107	8%	$10.4	25%	2.51	4.10	61%	40%	47%
Norway	1,310	278	21%	$385.8	4%	1.38	5.42	34%	70%	33%
Panama	4,128	26	1%	$59.9	4%	6.82	4.26	49%	44%	21%
Peru	1,465	99	7%	$210.0	3%	4.53	4.18	69%	60%	36%
Philippines	294	27	9%	$306.4	3%	4.86	4.82	71%	59%	37%
Poland	5,849	687	12%	$548.4	5%	3.14	4.33	54%	64%	51%
Portugal	1,760	157	9%	$203.0	12%	5.36	4.25	46%	29%	49%
Qatar	5,235	546	10%	$165.2	0.1%	2.59	5.41	51%	48%	35%
Romania	466	43	9%	$177.7	7%	3.05	3.80	52%	37%	49%
Russia	1,899	48	3%	$1,445.5	5%	3.40	4.16	27%	21%	52%
Saudi Arabia	5,215	403	8%	$714.0	6%	3.64	4.51	80%	84%	44%
Senegal	566	69	12%	$17.8	7%	6.40	4.14	93%	75%	16%
Slovakia	1,697	257	15%	$97.0	9%	3.14	4.30	54%	30%	47%
Slovenia	3,078	719	23%	$47.9	7%	4.82	4.23	53%	33%	42%
South Africa	1,857	44	2%	$350.4	26%	3.08	4.51	45%	37%	37%
South Korea	3,877	228	6%	$1,597.1	4%	5.96	4.44	38%	32%	37%
Spain	31,748	1,985	6%	$1,297.1	18%	5.52	4.19	45%	27%	48%
Sweden	4,270	779	18%	$529.7	7%	1.67	5.53	43%	77%	45%
Switzerland	3,850	500	13%	$708.2	5%	0.00	5.85	38%	40%	40%
Thailand	3,487	329	9%	$445.0	1%	6.53	4.53	52%	46%	58%
Tunisia	744	44	6%	$45.8	15%	4.19	3.76	65%	54%	43%
Turkey	1,586	243	15%	$827.1	11%	5.96	4.11	66%	52%	34%
UAE	4,539	250	6%	$385.6	2%	0.00	5.41	61%	40%	54%
UK	11,394	1,678	15%	$2,789.2	4%	1.28	5.31	45%	40%	43%
USA	3,365	620	18%	$19,582.4	4%	0.35	5.54	58%	65%	41%
Uruguay	2,505	338	13%	$59.8	8%	3.71	3.83	58%	34%	40%
Vietnam	757	37	5%	$193.2	2%	4.86	3.86	54%	58%	52%
Total	225,640	23,806	11%							

Notes:

N = total number of participants from a particular country; *N1*= total number of employees who indicate *that they were engaged in Employee's Entrepreneurial Behaviour;* Source*:* Adult Population Survey (APS), Global Entrepreneurship Monitor (GEM).
%N1 = the percentage of the employees per country identified as engaged in Employee's Entrepreneurial Behaviou*r*
GDP current in Billion US $*,* Source: World Bank (WB).
UNR = unemployment rate %. Source*:* International labour organisation (ILO)
RER: rigidity of employment regulations, Source*:* Economic freedom (EF).
MAN: Managerial attitude and norms, Source*:* Global competitiveness index (GCI)
Percentage of all individuals reported to have employee entrepreneurial cognitions: ESE = entrepreneurial of self-efficacy, *OPP* = opportunity perception, *FF* = fear of failure.

Table 5.6 provides the description, type, level, and source of the variables used in this study. The dependent variable, EEB, is a dichotomous variable that captures whether employees were involved in entrepreneurial activities for their employers, as operationalised from the GEM dataset (Bosma et al. 2010; Bosma et al. 2012; Stam 2013; Engelen et al. 2018; Guerrero et al. 2021). The first inclusion criteria was current employees who were engaged in developing new ideas for their employers in the past three years, and the second narrowed the focus to employees who are currently trying to create a new business/venture for their employers as part of their regular work—in other words, employees who are active and involved in their firms' entrepreneurial activities.

Table 5.6 Data description and sources

Variables	Description	Type	Level	Source
Dependent Variable				
Employees' entrepreneurial behaviour (EEB)	1. "Employee has been engaged in the development of new activities for the main employer as part of their normal work in the last 3 years (*1 = yes; 0 = No).*" 2. "Employee is currently engaged in the development of new activities for the main employer as part of their normal work (*1 = yes; 0 = No).*"	Binary	Individual	GEM
Explanatory Variables at Individual-level (Employees' Socio-cognitive Traits)				
Entrepreneurial self-efficacy	"Do you have the knowledge, skill, and experience required to start a new business? (*1 = yes; 0 = No).*"	Binary	Individual	GEM
Opportunity perception	"In the next six months, there will be good opportunities for starting a business (*1 = yes; 0 = No).*"	Binary	Individual	GEM
Fear of failure	"Fear of failure would prevent you from starting a business (*1 = yes; 0 = No).*"	Binary	Individual	GEM
Explanatory Variables at country-level				
Rigidity of employment regulations	The degree of the rigidity of a country labour regulation. Operationalised by the mean of the following variables: 1. *"Difficulty of hiring*. Applicability and maximum duration of fixed-term contracts, and minimum wages for trainee or first-time employees *(10 = highly difficult, 0 = not difficult)"*	Categorical	Country	EF

	2. *"Difficulty of redundancy.* Notification and approval requirements for termination of redundant workers, obligations to reassign or retain, and priority rules for redundancy and reemployment *(10 = highly difficult, 0 = not difficult)"*			
Managerial attitude and norms	The degree that reflect high prosperity environment. Operationalised by the mean of the following eight items: 1. *"Extent of staff training*: In your country, to what extent do companies invest in training and employee development? *(1 = not at all; 7 = great extent)"* 2. *"Capacity for innovation:* In your country, to what extent do companies have the capacity to innovate? *(1 = not at all; 7 = great extent)"* 3. *"Degree of customer orientation:* In your country, how well do companies treat customers? *(1 = poorly; 7 = extremely well)"* 4. *"Pay and productivity:* In your country, to what extent is pay related to employee productivity? *(1 = not at all; 7 = great extent)"* 5. *"Cooperation in labour-employer relations:* In your country, how do you characterize labour-employer relations? *(1 = generally confrontational; 7 = generally cooperative)"* 6. *"Reliance on professional management:* In your country, who holds senior management positions in companies? *(1 = usually relatives/friends without merit; 7 = mostly professional managers chosen for merit and qualifications)"* 7. *"Efficacy of corporate boards:* In your country, to what extent is management accountable to investors and boards of directors? *(1 = not at all; 7 = great extent)"* 8. *"Willingness to delegate authority:* In your country, to what extent does senior management delegate authority to subordinates? *(1 = not at all; 7 = great extent)"*	Categorical	Country	GCI
Control Variables at Individual-level				

Age	The age of the individual at the time of the GEM survey. *(Range from 18 – 64)*	Continuous	Individual	GEM
Gender	*1 = female , 2 = male*	Binary	Individual	GEM
Work arrangement	*1= full time , 0 = part time*	Binary	Individual	GEM
Sector	*1 = working in private sector, 0 = other*	Binary	Individual	GEM
Education level	Reflects high education *(1 = graduate experiences, 0 = otherwise)*	Binary	Individual	GEM
Control Variables at Country-level				
Unemployment rate	The share of the labour force that is without work but available for and seeking employment. Definitions of labour force and unemployment differ by country.	Categorical	Country	ILO
GDP	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in current U.S. dollars.	Continuous	Country	WB

Notes: GEM*: Global entrepreneurship monitor,* EF*: Economic freedom,* GCI*: Global competitiveness index,* WB*: World bank*

5.4.1.2 *Explanatory variables at individual-level.* Employees' socio-cognitive traits are operationalised on the three commonly used explanatory (dummy) variables of entrepreneurial self-efficacy, opportunity perception, and fear of failure (Gemmell et al. 2012; Garrett and Holland 2015; Blanka 2018). All three dummy variables were extracted from GEM's database (Table 5.6; Wennberg et al. 2013; Boudreaux et al. 2019). Forty-three percent of employees who participated in the GEM survey reported having the skills that are required to engage in entrepreneurial activity (entrepreneurial self-efficacy), while half of the employees reported being alert to new business opportunities, and 44 percent reported that fear of failure would prevent them from engaging in entrepreneurial activity (Table 5.5).

5.4.1.3 *Explanatory variables at country-level.* Scholars suggest that composite indicators for country-level institutional factors reflect the pattern of a country's institutions (Botero et al. 2004; He et al. 2013). This study used the EF index to operationalise the countries' formal institutions as the rigidity of employment regulations (Table 5.6; Bradley and Klein 2016; Boudreaux et al. 2019; Vanacker et al. 2021). The EF index captures many country-level factors, but only two factors were extracted: the difficulty of hiring (e.g. the length of a fixed-term contract and minimum pay for interns or new hires) and the difficulty of redundancy (e.g. the hardness and complicated procedures for termination of redundant workers or reemployment). While Vanacker et al. (2021) also uses the rigidity of work hours (e.g. constraints on working days, duration of working time per day and week), this factor had a score of < 0.3 in this study's factor loading analysis, so it was dropped. The original indexes of the two subfactors were standardised and reversed to reflect regulations' rigidity, where top values correspond to stricter employment laws. As shown in table 5.5, the value of employment regulations ranges from 9.45/10 for Indonesia (most rigid) and 0/10 for the United Arab Emirates and Switzerland (least rigid), which indicates significant variations among the countries in the sample. The internal consistency for this variable was assessed using Cronbach's α (0.4). The strength of Cronbach's α is related to the number of items, where a low value might result from having fewer than ten measurement items, which calls for checking the inter-item correlations (Peterson 1994; Engel et al. 2021). A good inter-item correlation was found (0.22), which is within the recommended range of between 0.20 and 0.40 (Briggs and Cheek 1986). The explanatory factor analysis also showed that both subfactors had factor loadings higher than 0.78.

The second country-level explanatory variable is managerial attitude and norms (He et al. 2013). As Table 5.6 shows, this variable was collected using eight items from the GCI: extent of staff training, capacity for innovation, degree of customer orientation, pay and productivity, cooperation in labour-employer relations, reliance on professional management, efficacy of corporate boards and willingness to delegate authority. All items were standardised and checked to ensure they reflected same directions in terms of managerial attitudes and norms (He et al. 2013). These items' internal consistency was assessed (Cronbach's $\alpha = 0.96$), and an explanatory factor analysis showed that the factor loadings ranged from 0.77 to 0.95. Table 5.5 shows significant variations in terms of managerial attitude and norms across the countries in the sample, with Switzerland scoring the highest (5.85/10) and Bosnia & Herzegovina scoring the lowest (3.49/10).

5.4.1.4 *Control variables at individual-level*. The individual-level control variables of age, gender, work arrangement, sector, and education level were all extracted from GEM data (Table 5.6; Yeganegi et al. 2016). Engelen et al. (2018) show that age is significantly associated with individual decision-making and behaviour. While some argue that older employees engage with entrepreneurial activity better than younger employees do because of the high levels of social capital and experience older employees have built over the years (Frosch 2011), others suggest that young to middle-aged employees engage more with entrepreneurial activity because they tend to be more creative and ambitious risk-takers than older employees are (Guerrero et al. 2021). Therefore, employees' age was employed as a control variable using the continuous age variable from GEM (Rehman et al. 2020). Statistics suggest that men tend to be more involved in entrepreneurial activity than women are, whether inside firms or as independent entrepreneurs (Henry et al. 2016; Shinnar et al. 2018), so gender was also used as a control variable. The third control variable, work arrangement, refers to the distinction between full-time and part-time work, as full-time employees tend to be more willing to invest their resources of time, knowledge, abilities and social capital and to engage in entrepreneurial activity than part-time employees are (Guerrero and Peña-Legazkue 2013). Next the distinction between employees who work in the private sector and those who work in all other sectors (government, non-profit) was employed as a control variable, operationalised using GEM's organisation type (Guerrero et al. 2021). Individuals' engagement in entrepreneurial activities in their firms may vary based on the type of sector (private or other) because of differences in the organizations' nature, purpose, governance system, funding, and operations. Such differences may directly or indirectly enhance employees' ability to recognise and exploit

opportunities. For example, employees in the private sector tend to have more flexibility and an internal environment that enhances risk-taking behaviour than those in the public sector do (Kearney and Meynhardt 2016; Xing et al. 2018). The final individual-level control variable is education level, which can play a role in employee entrepreneurs' decision-making and their EEB (e.g., Bosma et al. 2013), as a higher level of education may mean a greater ability to recognise and exploit opportunities (Liebregts and Stam 2019). Employees who have more education might also hold higher positions in the organisation, giving them more access to the organisation's resources and decision-making process (Boudreaux et al. 2019). GEM's harmonised educational attainment variable was employed to create a dummy variable for education level (high vs not high) (Engelen et al. 2018; Rehman et al. 2020).

5.4.1.5 *Control variables at country-level*. Following Ollier-Malaterre and Foucreault (2017) point out that country-level control variables reflect a country's economic development and are operationalised based on its unemployment rate (source: International Labour Organisation) and GDP (source: WorldBank) because employment rate and GDP are significantly associated with entrepreneurial activity (Table 5.6; Engelen et al. 2018; Boudreaux et al. 2019; Rehman et al. 2020). In economically developing countries, employees have less chance to engage in entrepreneurial activities in their firms than those whose firms are in economically developed countries (Liebregts and Stam 2019). Employees in economically developed countries are also more likely to recognise and exploit high-growth opportunities than are those in developing countries (Deephouse et al. 2016). One explanation for this difference could be that an economically developed country attracts talent, capital, and well-established institutions that enhance the country's entrepreneurial environment. South Africa had the highest unemployment rate (26%), while Qatar had the lowest (0.1%), and the United States had the highest GDP ($19,582 billion), while North Macedonia had the lowest ($10.4 billion) (Table 5.5).

5.4.1.6 *Multilevel logistic regression.* The study's sample is classified as a hierarchical data structure, as it contains data at the individual level and the country level. Using linear regression would not be appropriate because doing so would increase type 1 errors and differences may occur between individuals within the same group and between individuals from different groups in a hierarchical data structure (Rehman et al. 2020). Furthermore, the inter-class correlation (ICC) test for the study sample is 0.17, which is higher than the suggested 0.12 (James 1982). Hence, multilevel logistic regression (mixed-effects logistic regression) is recommended for analysing the data (Wennberg et al. 2013), as it is an appropriate approach to considering the differences in social contexts and differences in participants. To run a

multilevel logistic regression, the dependent variable should be located at the lowest level (i.e. the individual level), while the explanatory variables can be at any level (i.e. the individual and/or country level).

A multi-level analysis was conducted using the command 'xtmelogit' in STATA 17 to capture the coefficients, followed by ', or' to capture odds ratios. The coefficients were used to draw the interaction graphs, while the odds ratio were used for the results presented in Chapter 6. Using the odds ratio for the results helps in interpreting the results because the probabilities are easier to understand than simple coefficients and there is just one summary score for the effect (Mickiewicz et al. 2019; Madanoglu et al. 2020). The odds ratios show the likelihood that an event (i.e., EEB) will occur when a certain variable is present (i.e. each of the determinants in the analysis). The interaction has a negative coefficient if *ORs* < 1, and a positive coefficient when *ORs* >= 1 (Langer et al. 2017).

5.4.1.7 *Robustness test.* Two additional tests were carried out to ensure that the stage two findings are robust when a different sets of variables and analytical techniques is used. First, an additional multilevel logistic regression was conducted using a composite variable for the three socio-cognitive traits—entrepreneurial self-efficacy, opportunity perception, and fear of failure (Raza et al. 2018; Vanacker et al. 2021). All components of the composite variable must be in the same direction before being compounded; both entrepreneurial self-efficacy and opportunity perception had a positive direction, while fear of failure had a negative direction, which was reversed using '*recode'* and '*gen'* commands in STATA. Then the composite variable was created using the command '*generate y=x1+x2+x3'*. Second, based on the measurements of country-level institutions (i.e., rigidity of employment regulations and managerial attitude and norms) the database was divided into four groups using a median-split technique, resulting in thirty countries in each half . To examine the effect of the three socio-cognitive traits, multi-group analyses were run (Raza et al. 2020).

5.5 Conclusion

The purpose of this chapter was to explain the study's research approach by linking the proposed conceptual framework of the individuals' socio-cognitive traits, the country-level institutional context, and the related hypotheses with the empirical results presented in chapters 6 and 7. The chapter started by emphasising the importance of choosing the right research paradigm and described three possibilities—the positivism, interpretivism, and constructivist

realism paradigms. It also highlighted the three related elements that determine the choice of research paradigm: the perspective of reality (ontology), what shapes the knowledge of that reality (epistemology), and the interpretation of data (methodology). Accordingly, the chapter positioned the current research in the constructivist realism paradigm, which is between two radical views of reality (i.e. positivism and interpretivism).

The chapter also clarified that this research adopts the deductive approach, in which the explanatory hypotheses are formed first and then evaluated against theories. The choice of deductive approach aligned with the study's research questions (Chapter 1) and the constructed hypotheses (Chapter 4). In addition, the chapter explained that the study followed the correlation research approach to test the interactions between the variables presented in Figure 4.4. The chapter also highlighted the importance of correlation modelling's being instructed by a theory, the role of the context in influencing the model, and the use of advanced statistical methods, such as regression and structure equation modelling.

The chapter explained that quantitative methods were used to provide a comprehensive meaning for the social phenomenon under examination. The chapter delineated the steps taken in conducting the study, starting from exploring sources to merging, cleaning and then quantitively analysing the data of 225,640 employees from 70 countries over the period from 2015 to 2018. The chapter presented the sample characteristics and how variables were constructed, and concluded by describing the steps taken to conduct the two robustness tests to ensure that the stage two findings were robust to a different set of variables and analytical techniques.

Chapter 6 Results

6.1 Introduction

This chapter presents the multilevel-regression results for stage two[4], as performed using STATA 17. The chapter also outlines the descriptive statistics and the multicollinearity diagnostic test. Based on the data of 225,640 employees from 70 countries, this chapter indicates whether the hypotheses theorised in Chapter 4 are supported. As Figure 6.1 shows, the chapter starts by presenting the stage two summary statistics and correlation matrix, followed by multi-level regression results and graphs for interaction plots. The chapter concludes with the results of two robustness tests.

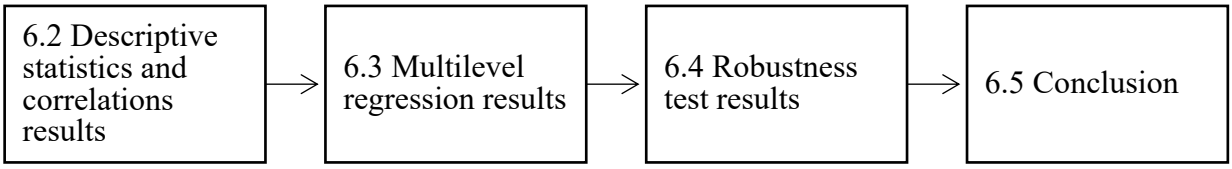


Figure 6.1 Outline of Chapter 6

6.2 Stage two: Descriptive statistics and correlations results

Table 6.1 reports the descriptive statistics (mean, standard deviation, minimum, and maximum) and correlations for all the study variables. At the individual level, both entrepreneurial self-efficacy and opportunity perception correlate positively with EEB, while fear of failure correlates negatively. At the country level, rigidity of employment regulations has a negative and significant correlation with EEB, while managerial attitude and norms correlates positively. A multicollinearity diagnostic test was performed, and the maximum variance inflation factor test for all variables indicates that collinearity is not an issue in the analysis (VIF = 2.82), as the VIF is well below the critical threshold of 10 (Weisberg 2013).

[4] Stage one results were presented in Chapter 3.

Table 6.1 Summary statistics and correlation matrix

Variables	*Min*	*Max*	*Mean*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Employee's Entrepreneurial Behaviour	0	1	0.11	0.31	1												
2. Entrepreneurial Self-efficacy	0	1	0.5	0.5	0.14***	1											
3. Opportunity perception	0	1	0.43	0.5	0.10***	0.19***	1										
4. Fear of Failure	0	1	0.44	0.5	-0.03***	-0.07***	-0.13***	1									
5. Rigidity of employment regulations	0	9.45	3.89	2.10	-0.09***	-0.04***	0.06***	-0.03***	1								
6. Managerial attitude and norms	3.36	6.00	4.58	0.60	0.10***	0.11***	-0.05***	-0.01***	-0.56***	1							
7. Age	18	64	39	11.7	0.01***	-0.06***	-0.01***	0.01***	-0.05***	0.03***	1						
8. Gender	1	2	1.43	0.5	0.06***	-0.04***	0.11***	-0.07***	0.02***	0.00	-0.02***	1					
9. Work arrangement	0	1	0.82	0.39	0.05***	0.00	0.03***	-0.01*	-0.03***	-0.02***	0.05***	0.15***	1				
10. Sector	0	1	1.2	0.89	0.03***	-0.01***	0.07***	-0.01***	0.02***	-0.01***	-0.11***	0.10***	-0.02***	1			
11. Education level	0	1	0.08	0.27	0.10***	0.06***	0.05***	0.00	-0.09***	0.04***	-0.03***	-0.02***	0.04***	-0.09***	1		
12. Unemployment rate	0.1	27.10	8.30	5.92	-0.05***	-0.15***	-0.02***	0.05***	0.25***	-0.52***	0.07***	-0.02***	0.01***	0.01***	-0.02***	1	
13. GDP (thousands billion US$)	0.01	20.60	1.4	2.86	0.02***	0.01***	-0.05***	0.00	-0.23***	0.25***	0.03***	-0.02***	0.00	-0.04***	0.04***	-0.13***	1

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

N = 225,640 observations

6.3 Multilevel regression results

Table 6.2 lists the odd ratios (*ORs*) for the main effect of the variables at the individual and country levels and the effects on EEB of the interaction terms between variables. Models 1–8 show the mixed-effect logistic regression, fixed-part estimates, random-part estimates, and model fit statistics. Model 1 shows all control variables at the individual and country levels, while Model 2 presents the explanatory variables at both levels (Raza et al. 2018). Models 3-8 show the interaction terms of each of the three socio-cognitive traits with the country-level institutional factors.

Consistent with H1a, the results of Model 2 indicate that employees who have high levels of entrepreneurial self-efficacy are more than twice ($ORs = 2.49$, $p < 0.001$) as likely to engage in EEB than those with low entrepreneurial self-efficacy. Similarly, the model indicates that employees who have high levels of opportunity perception are 54 percent more likely to engage in EEB ($ORs = 1.54$, $p < 0.001$), which is consistent with H1b. The results also support H1c in showing that employees who have a fear of failure are 8 percent less likely to engage in EEB ($ORs = 0.92$, $p < 0.001$).

Although the direct impacts of country-level institutions on EEB were not hypothesised, Model 2 reports the rigidity of employment regulations' and managerial attitude and norms' influence on the odds that an employee will engage in EEB ($ORs = 0.57$, $p < 0.001$ and $ORs = 1.11$, $p < 0.05$, respectively). The model indicates that a one-unit increase in the rigidity of employment regulations is linked to a 43 percent decrease in EEB, while a one-unit increase in managerial attitude and norms is linked to an 11 percent increase in EEB.

Models 3, 4, and 5 present the moderation effects of employment regulations' rigidity on the relationships between the three socio-cognitive traits and EEB. The results show that, as the rigidity of employment regulations increases, entrepreneurial self-efficacy ($ORs = 0.85$, $p < 0.001$) and opportunity perception ($ORs = 0.90$, $p < 0.001$) weaken as predictors of EEB, while fear of failure ($ORs = 1.05$, $p < 0.01$) strengthens as a deterrent to EEB. These results are consistent with the theoretical predictions in H2a, H2b, and H2c.

Table 6.2 Multilevel regression results for the effects on EEB of employees' socio-cognitive traits and country-level institutional variables

	Model 1 *ORs (Std. Err.)*	**Model 2** *ORs (Std. Err.)*	**Model 3** *ORs (Std. Err.)*	**Model 4** *ORs (Std. Err.)*	**Model 5** *ORs (Std. Err.)*	**Model 6** *ORs (Std. Err.)*	**Model 7** *ORs (Std. Err.)*	**Model 8** *ORs (Std. Err.)*
Fixed part estimates								
Individual-level control								
Age	1.00* (0.00)	1.00*** (0.00)	1.00*** (0.00)	1.00***(0.00)	1.00***(0.00)	1.00***(0.00)	1.00***(0.00)	1.00***(0.00)
Gender	0.69*** (0.01)	0.77*** (0.01)	0.77*** (0.01)	0.77***(0.01)	0.77***(0.011)	0.77***(0.01)	0.77***(0.01)	0.77***(0.01)
Work arrangement (Full time)	1.52*** (0.03)	1.50*** (0.03)	1.5*** (0.03)	1.50***(0.03)	1.5***(0.032)	1.50***(0.03)	1.50*** (0.01)	1.50*** (0.03)
Sector (Private)	1.22*** (0.01)	1.17***(0.01)	1.17***(0.01)	1.17***(0.01)	1.17***(0.01)	1.17***(0.01)	1.17*** (0.01)	1.17***(0.01)
Education	2.34*** (0.03)	2.11*** (0.05)	2.11*** (0.05)	2.11*** (0.05)	2.11*** (0.05)	2.11***(0.05)	2.11*** (0.05)	2.12*** (0.05)
Country-level control								
Unemployment rate	0.86***(0.03)	0.96 (0.04)	0.96 (0.04)	0.96 (0.04)	0.96 (0.04)	0.95 (0.05)	0.96 (0.04)	0.96 (0.04)
GDP Current	1.12 (0.09)	1.01 (0.08)	1.01 (0.08)	1.01 (0.08)	1.02 (0.08)	1.00 (0.08)	1.01 (0.09)	1.02 (0.08)
Individual level main effect								
Entrepreneurial self-efficacy (ESE)		2.49*** (0.04)	2.49*** (0.04)	2.44*** (0.04)	2.48*** (0.04)	2.49*** (0.04)	2.44*** (0.04)	2.49*** (0.04)
Opportunity perception (OPP)		1.54*** (0.02)	1.53*** (0.02)	1.55*** (0.02)	1.55*** (0.02)	1.51*** (0.02)	1.55*** (0.02)	1.55*** (0.02)
Fear of Failure (FF)		0.92*** (0.01)	0.92*** (0.01)	0.92*** (0.01)	0.923*** (0.01)	0.92*** (0.01)	0.92*** (0.01)	0.93*** (0.01)
Country level main effect								
Rigidity of employment regulations (RER)		0.57*** (0.05)	0.6*** (0.05)	0.64** (0.06)	0.59*** (0.05)	0.57*** (0.05)	0.57*** (0.05)	0.57*** (0.05)

Managerial attitude and norms (MAN)		1.11 * (0.08)	1.12* (0.05)	1.12* (0.05)	1.12* (0.05)	1.06 (0.05)	1.06 (0.05)	1.13 * (0.06)
Interaction terms								
ESE χ RER			0.85***(0.02)					
OPP χ RER				0.90***(0.02)				
FF χ RER					1.05**(0.02)			
ESE χ MAN						1.07***(0.02)		
OPP χ MAN							1.09***(0.02)	
FF χ MAN								0.98 (0.02)
Random part estimates								
Variance of intercept	0.84 (0.1)	0.74 (0.1)	0.74 (0.1)	0.74 (0.1)	0.74 (0.1)	0.73 (0.1)	0.74 (0.1)	0.74 (0.1)
Model fit statistics								
Number of observations	225,640	225,640	225,640	225,640	225,640	225,640	225,640	225,640
Number of group (countries)	70	70	70	70	70	70	70	70
Degree of freedom (number of variables)	7	12	13	13	13	13	13	13
Chi-square	3,226.46	7,618.98	7,660.8	7,632.3	7,624.4	7,625.46	7,636.97	7,620.23
Probability > Chi-square	***	***	***	***	***	***	***	***
Log likelihood	-70128.07	-67589.3	-67563.3	-67575.3	-67586	-67578	-67581	-67588.5
LR test for goodness of fit	***	***	***	***	***	***	***	***
Mean VIF[5]	1.03	1.19	1.63	1.30	1.30	1.31	1.30	1.30

** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ORs* > 1 shows a positive relationship while *ORs* < 1 shows a negative relationship

[5] For all variables' VIF check appendix III

Regarding the moderation impacts of managerial attitude and norms on the relationships between the three socio-cognitive traits and EEB, Models 6, 7, and 8 show positive influences for all interactions, albeit with variances in the levels of significance. As the level of managerial attitude and norms increases, entrepreneurial self-efficacy (*ORs* = 1.07, $p < 0.001$) and opportunity perception (*ORs* = 1.09, $p < 0.001$) strengthen as predictors of EEB, supporting H3a and H3b. However, although fear of failure (*ORs* = 0.98, n.a.) is still a deterrent to EEB, the relationship is not significant, so it provides no support for H3c.

Scholars suggest plotting interaction relationships to improve interpretation of the interaction coefficients from logistic regressions (Ai and Norton, 2003), so the unstandardized solutions for the two-way interaction between the variables were plotted, using β coefficients, for all significant interaction terms (Figure 6.2). The probability that employees engage in EEB is plotted against the country-level institutional factors. The interaction plots in Figures 6.2a, 6.2b and 6.2c show the prediction that employees with varying levels of entrepreneurial self-efficacy, opportunity perception, and fear of failure, respectively, will engage in EEB at varying levels of employment regulations' rigidity. All three plots suggest that employees are less likely to engage in EEB when labour market regulations are rigid, regardless of the employees' socio-cognitive resources. For instance, the plot in Figure 6.2a indicates that, as the rigidity of employment regulations increases, employees who have entrepreneurial self-efficacy and those who do not are both less likely to engage in EEB than their counterparts who live in countries that have more flexible employment regulations, and the gap between the two groups decreases as the rigidity of employment regulations increases. Similarly, employees with high levels of opportunity perception and low fear of failure are more likely to engage in EEB when rigidity is low (Figures 6.2b and 6.2c). In addition to the results of models 3, 4 and 5 shown in Table 6.2, these plots support the theoretical predictions of H2a, H2b and H2c, respectively.

The interaction plots in Figures 6.2d and 6.2e show the prediction that employees with varying levels of entrepreneurial self-efficacy and opportunity perception, respectively, will engage in EEB at different levels of managerial attitude and norms. The plot in Figure 6.2d suggests that, as managerial attitude and norms increases, employees who have entrepreneurial self-efficacy and those who do not are both more likely to engage in EEB than their counterparts who live in countries that have low managerial attitude and norms. In addition, the gap between the two groups increases as managerial attitude and norms increases. The case

is the same for employees who have high levels of opportunity perception (Figure 6.2e). Therefore, in addition to the results of models 3, 4 and 5 shown in Table 6.2, these plots support the theoretical predictions of H3a and H3b.

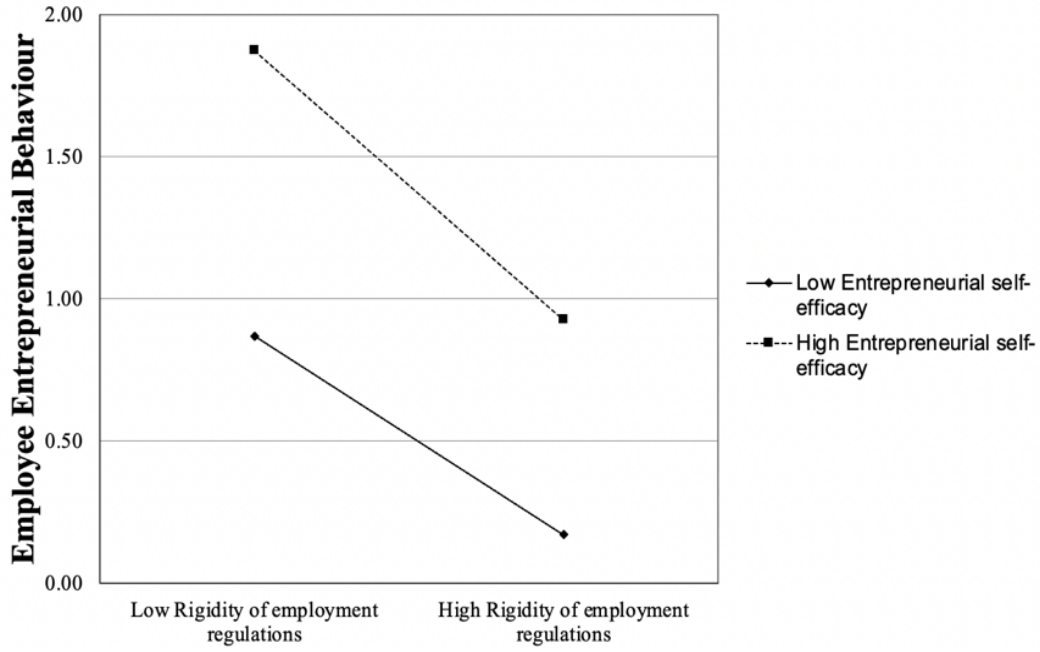


Figure 6.2a. Interaction plots between the employees' Entrepreneurial self-efficacy & rigidity of employment regulations

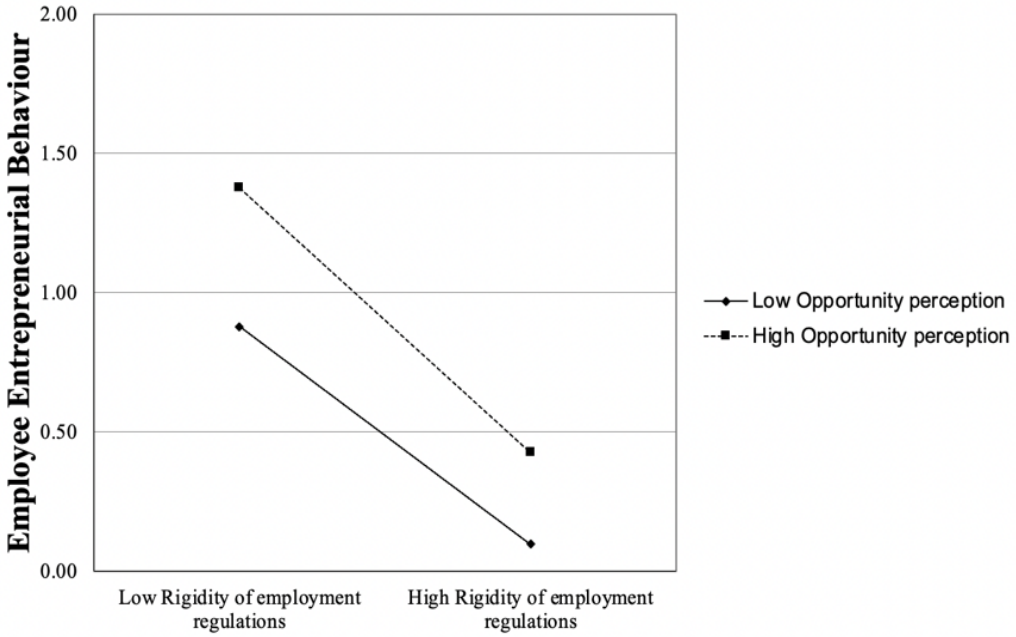


Figure 6.2b. Interaction plots between the employees' opportunity perception & rigidity of employment regulations

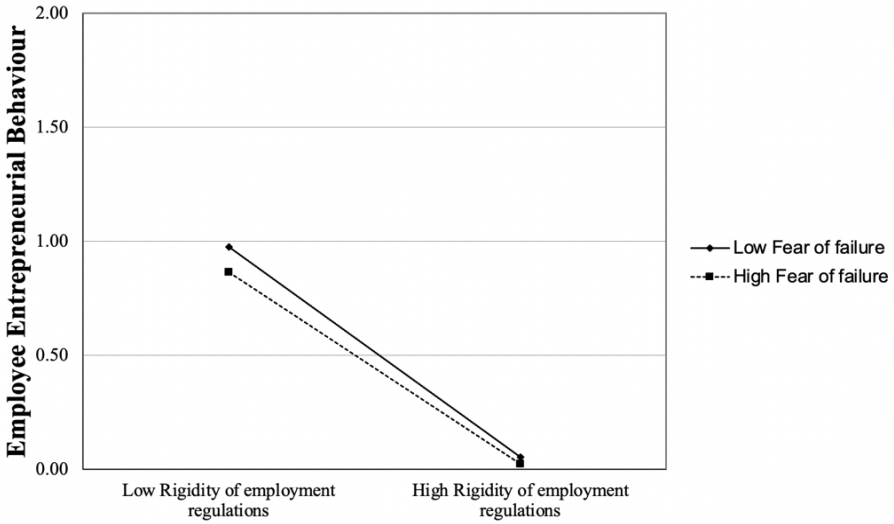


Figure 6.2c. Interaction plots between the employees' fear of failure & rigidity of employment regulations

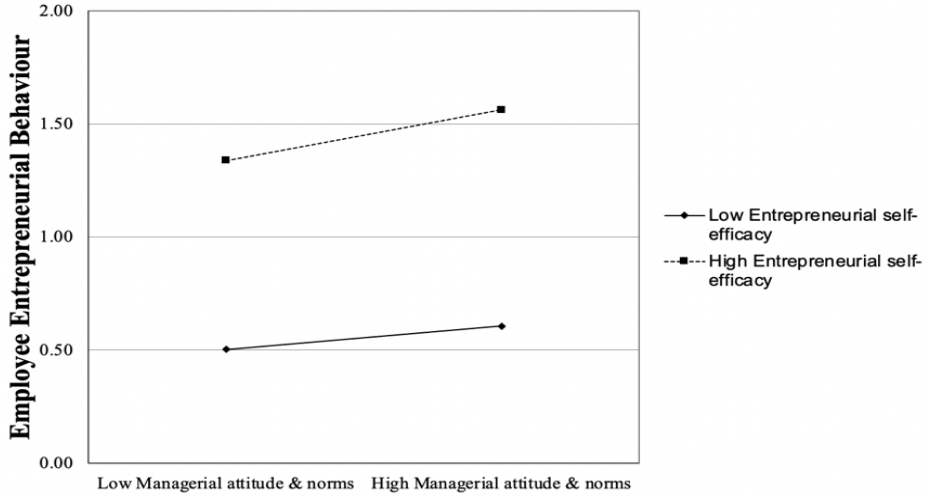


Figure 6.2d. Interaction plots between employees' Entrepreneurial self-efficacy & Managerial attitude and norms

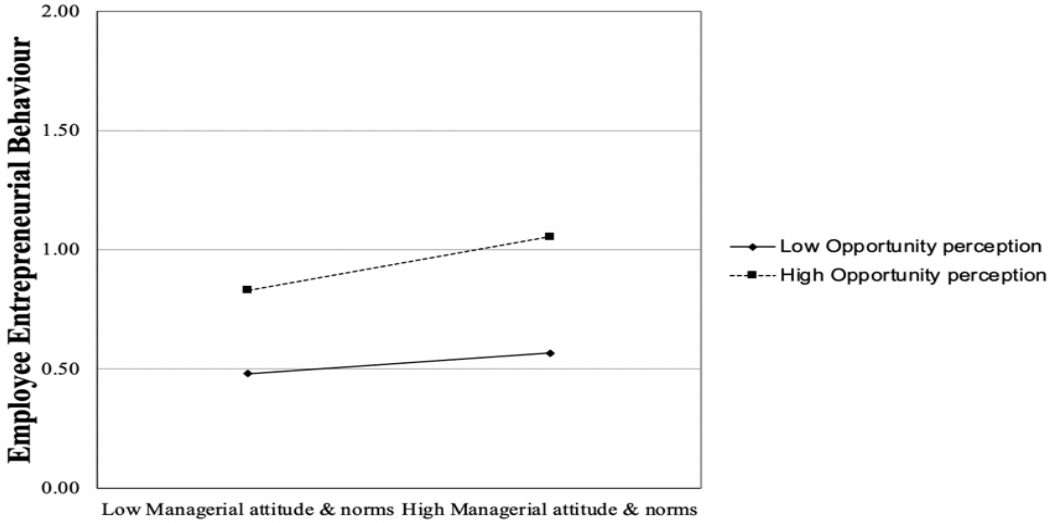


Figure 6.2e. Interaction plots between employees' opportunity perception & Managerial attitude and norms

Figure 6.2 Interaction Plots

6.4 Additional analyses and robustness checks

Two additional tests were conducted to ensure that the findings are robust when a different set of variables and analytical techniques is used. First, an additional multilevel logistic regression was conducted using a composite variable for the three socio-cognitive traits—entrepreneurial self-efficacy, opportunity perception, and fear of failure (Raza et al. 2018; Vanacker et al. 2021). Before creating the composite variable for employees' socio-cognitive traits using the command '*generate'*, fear of failure was reversed using the '*recode'* and '*gen'* commands because all components must be in the same direction. The results of using the composite variable are consistent with the primary analysis results (Table 6.3).

Second, based on the country-level institutional factors, the primary database was divided into two groups (Table 6.4) using a median-split technique (Raza et al. 2020). The results show that employees who live in the 30 countries with more rigid employment regulations have lower levels of the socio-cognitive traits than those who live in the 30 countries with more flexible employment regulations. The results also suggest that employees who live in the 30 countries with higher managerial attitude and norms have higher levels of socio-cognitive traits than their counterparts who live in the 30 countries with low managerial attitude and norms. These results suggest that the primary analysis results are robust.

Table 6.3 Composite variable for employees' socio-cognitive traits

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	ORs (Std. Err.)	*ORs (Std. Err.)*	*ORs (Std. Err.)*	*ORs (Std. Err.)*	*ORs (Std. Err.)*	*ORs (Std. Err.)*
Individual level control						
Age	1.00**(0.00)	1.00*(0.00)	1.00*(0.00)	1.00* (0.00)	1.00** (0.00)	1.00** (0.00)
Gender	0.68***(0.01)	0.69***(0.01)	0.76***(0.01)	0.77*** (0.01)	0.76*** (0.01)	0.76*** (0.01)
Work arrangement (Full time)	1.52***(0.03)	1.52***(0.03)	1.52***(0.03)	1.52*** (0.03)	1.52*** (0.03)	1.52*** (0.03)
Sector (Private)	1.21***(0.01)	1.22***(0.01)	1.2***(0.01)	1.2***(0.01)	1.12***(0.01)	1.12***(0.01)
Education	2.35***(0.05)	2.34***(0.03)	2.17***(0.05)	2.18*** (0.05)	2.18*** (0.05)	2.18*** (0.05)
Country level control						
Unemployment rate		0.86*** (0.03)	0.94 (0.03)	0.96 (0.04)	0.96 (0.04)	0.95 (0.04)
GDP Current		1.12 (0.09)	1.09 (0.08)	1.02 (0.08)	1.02 (0.08)	1.02 (0.08)
Individual level main effect						
Employee socio-cognitive traits (ESCT)			1.61*** (0.01)	1.61*** (0.01)	1.6*** (0.01)	1.6*** (0.01)
Country level main effect						
Rigidity of employment regulations (RER)				0.56*** (0.05)	0.66*** (0.05)	0.56*** (0.05)
Managerial attitude and norms (MAN)				1.11* (0.08)	1.11* (0.05)	1.00 (0.05)
Interaction terms						
ESCT χ RER					0.91 *** (0.00)	
ESCT χ MAN						1.06*** (0.01)

Random part estimates Variance of intercept	0.81 (0.07)	0.81 (0.07)	0.82 (0.07)	0.75 (0.07)	0.75 (0.07)	0.75 (0.07)
Log likelihood	-70140.8	-70128.07	-68275.78	-68248.45	-68214.14	-68227.9
Chi-square	3,205.45	3,226.46	6,533.37	6,580.7	6,619.6	6,598
Probability > Chi-square	***	***	***	***	***	***
ICC	0.17 (0.02)	0.17 (0.02)	0.17 (0.02)	0.15 (0.02)	0.15 (0.02)	0.15 (0.02)
Likelihood ratio (LR) test for goodness of fit	***	***	***	***	***	***
Number of observations	225,640	225,640	225,640	225,640	225,640	225,640
Number of group (countries)	70	70	70	70	70	70

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. *ORs* > 1 shows a positive relationship while *ORs* < 1 shows a negative relationship

Table 6.4 Group analysis based on high and low country-level variables

	Top and low 30 countries			
	Rigidity of employment regulations		Managerial attitude and norms	
	High	Low	High	Low
	Model 1	Model 2	Model 3	Model 4
Individual level control				
Age	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 *** (0.00)
Gender	0.73 *** (0.02)	0.79 *** (0.02)	0.8 *** (0.02)	0.80 *** (0.02)
Work arrangement (Full time)	1.31 *** (0.04)	1.7 *** (0.05)	1.62 *** (0.05)	1.5 *** (0.06)
Sector (Private)	1.18 *** (0.02)	1.14 ***(0.01)	1.11 *** (0.01)	1.21 *** (0.02)
Education	2.76 *** (0.10)	1.9 *** (0.06)	1.73 *** (0.5)	2.62 *** (0.11)
Country level control				
Unemployment rate	0.84 *** (0.04)	0.88 (0.07)	0.85 (0.08)	0.82 *** (0.04)
GDP Current	0.86 (0.13)	1.13 (0.09)	1.08 (0.13)	0.24 * (0.14)
Individual level main effect				
Entrepreneurial self-efficacy	2.1 *** (0.06)	2.7 *** (0.06)	2.62 *** (0.06)	2.3 *** (0.07)
Opportunity perception	1.44 *** (0.03)	1.7 *** (0.04)	1.7 *** (0.04)	1.53 *** (0.04)
Fear of Failure	0.95 † (0.02)	0.91 *** (0.02)	0.90 *** (0.02)	0.93 *** (0.02)
Random part estimates Variance of intercept	0.82 (0.11)	0.71 (0.07)	0.74 (0.1)	0.85 (0.12)
Log likelihood	-28,446.9	-30,746.1	-34,811.3	-22,096.51
Chi-square	2,636.79	4,320.86	4,399.7	2,257.3
Probability > Chi-square	***	***	***	***
ICC	0.17 (0.04)	0.13 (0.03)	0.14 (0.03)	0.18 (0.04)
Likelihood ratio (LR) test for goodness of fit	***	***	***	***
Number of observations	113,596	84,223	98,216	87,986
Number of group (countries)	30	30	30	30

*† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.* Stander errors were reported in parentheses

6.5 Conclusion

This chapter presented stage two's multilevel-regression results, as performed using STATA 17. The chapter outlined the descriptive statistics and the multicollinearity diagnostic

test and concluded by discussing the results of the additional robustness tests. This chapter's objective was to use analyses of the data of 225,640 employees from 70 countries to determine whether the theorised hypotheses in Chapter 4 are supported.

The correlation matrix indicated that, at the individual level, both entrepreneurial self-efficacy and opportunity perception correlate positively with EEB, while fear of failure correlates negatively. The matrix also indicated that, at the country level, rigidity of employment regulations has a negative and significant correlation with EEB, while managerial attitude and norms correlates positively.

Table 6.2 presented the multilevel-regression results for eight models related to the hypotheses theorised in Chapter 4. Consistent with H1a, H1b and H1c, the results suggested that employees who have high levels of entrepreneurial self-efficacy and opportunity perception and a low level of fear of failure are more likely to engage in EEB. The results also showed that rigid employment regulations hinder employees from engaging in EEB, while a high level of managerial attitude and norms promotes it.

The results of the analyses of moderators supported H2a, H2b and H2c, as they showed that employees who have high levels of entrepreneurial self-efficacy and opportunity perception and a low fear of failure are less likely to engage in EEB when employment regulations are rigid. However, in terms of the moderation impact of managerial attitude and norms, only H3a and H3b were supported, while H3c was not. Therefore, managerial attitude and norms enhances the positivity of the relationships between employees' entrepreneurial self-efficacy and EEB and employees' opportunity perception and EEB.

Finally, two robustness tests were performed: an additional multilevel logistic regression using a composite index for employees' socio-cognitive traits, which is consistent with prior theory and empirical work (e.g. Raza et al. 2018; Vanacker et al. 2021), and dividing the primary database into two groups (per institution) using a median split (e.g. Raza et al. 2020). The two robustness tests indicated that the preliminary results remained robust. Table 6.5 presents a summary of the primary analyses' findings from this chapter.

Table 6.5 A summary of the primary analyses' findings

No.	Description	*ORs*	Sig.	Results
Main effect				
H1a	ESE and EEB	2.49	***	Supported
H1b	Opportunity perception and EEB	1.54	***	Supported
H1c	Fear of failure and EEB	0.92	***	Supported
H1d	Rigidity of employment regulations and EEB	0.57	***	Supported
H1e	Managerial attitude and norms and EEB	1.11	*	Supported
Moderation effect				
H2a	ESE χ Rigidity of employment regulations	0.85	***	Supported
H2b	Opportunity perception χ Rigidity of employment regulations	0.90	***	Supported
H2c	Fear of Failure χ Rigidity of employment regulations	1.05	***	Supported
H3a	Self-efficacy χ Managerial attitude and norms	1.07	***	Supported
H3b	Opportunity perception χ Managerial attitude and norms	1.09	***	Supported
H3c	Fear of Failure χ Managerial attitude and norms	0.98		Not Supported

Chapter 7 Discussion, Implications and Future Research Directions

7.1 Introduction

This chapter, the final chapter, discusses the thesis' findings, explains their implications for theory and practice, and points out the study's limitations and directions for future research. As Figure 7.1 shows, Chapter 7 starts by providing a summary of previous chapters. Then presents the key findings and contributions, followed by implications for theory, research, and practice, and finally limitations and directions for future research.

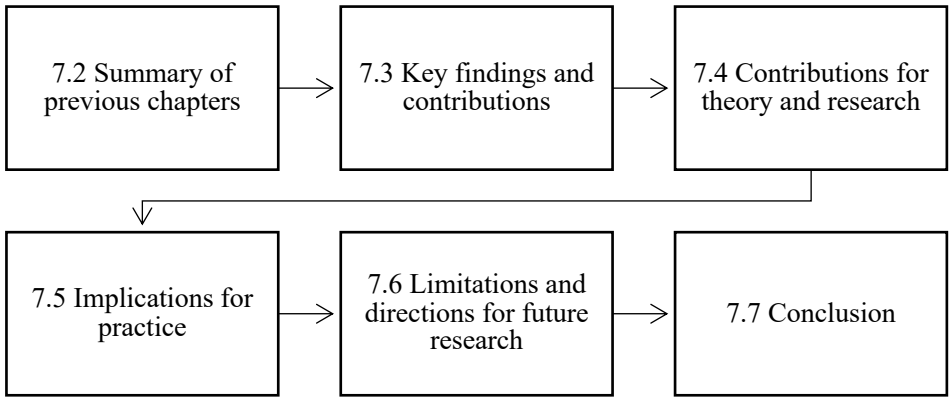


Figure 7.1 Outline of Chapter 7

7.2 Summary of previous chapters

CE has emerged as an area of research that has tangible benefits for scholars, managers and policymakers. CE leads to organizational growth (Fini et al. 2012), updated firm strategy (Phan et al. 2009; Crawford and Kreiser 2015), and improved financial and non-financial performance (Bierwerth et al. 2015). The benefits of CE extend to nations' economic development as well (Zahra et al. 1999a; Antoncic and Hisrich 2003), so it attracts significant research attention. The research field has evolved significantly since the 1970s (Kuratko 2017), which has led to some fragmentation and a lack of common ground in concepts, definitions, terminologies, and methodologies (Pirhadi and Feyzbakhsh 2021). As discussed in sections 2.2 and 2.3, these fragmentations increase the difficulty of assessing and linking studies' findings (Yang et al. 2009), limit the overall understanding of CE, and have a negative effect on scholars' ability to contribute to research and practice (Shepherd et al. 2015).

Despite these fragmentations, a growing body of the CE literature discussed in section 2.3.2 adopts the top-down approach, focusing on CE's antecedents at the organisation level or the top-management-team (TMT) level. However, empirical evidence illuminates only one part of a larger explanatory puzzle and lacks quantitative integration across the various levels. The resulting emergence of fragmented research lacks clarity regarding the relative importance of CE's drivers (Phan et al. 2009). Chapter 3 presented a multi-level framework for the meta-analytic examination of CE's antecedents from the individual/group level, the firm level, and the country level.

The domination of the top-down approach continues regardless of the many research calls to address CE's multidimensional nature (Schindehutte et al. 2018) and to clarify who is developing and engaging in firms' entrepreneurial activities and why (Brundin et al. 2008; Neessen et al. 2019). Neglecting this critical part of the management puzzle omits understanding what leads to EEB as a 'micro foundation' of CE (Zahra et al. 2013, p. 364). By moving away from the dominant approach while addressing the multi-dimensional nature of CE, Chapter 4 blended SCT and institutional theory to develop a multi-level conceptual framework of EEB. It examined the role of employees' socio-cognitive traits of entrepreneurial self-efficacy, opportunity perception, and fear of failure in promoting EEB and proposed that countries' formal institutions (i.e. employment regulations) and informal institutions (i.e. managerial attitudes and norms) have both direct and moderating effects on EEB and its relationship with employees' socio-cognitive traits.

Chapter 5 positioned the current research within the constructivist realism paradigm. Several data sources were consulted to build the study's database. The chapter also described the data-processing and analytical techniques used for the primary analysis and robustness tests. Chapter 6 presented the summary statistics and correlation matrix, followed by multi-level regression results and graphs of interaction plots. The chapter concluded with a presentation of the results of two robustness tests. Finally, this chapter discusses the thesis' findings, explains their implications for theory and practice, and points out the study's limitations and directions for future research.

7.3 Key findings and contributions

7.3.1 Stage 1 (meta-analysis of CE and its antecedents)

The bivariate analysis showed that all individual/group-level factors except TMT tenure have a positive and significant influence on CE. The cumulative evidence from the meta-regression showed several similarities in the pattern of results to that of the bivariate results. First, the meta-analysis showed that TMT size has a positive influence on CE, a finding that is aligned with findings from the management research field that address the positive influence of a large TMT on firm performance (Li et al. 2020). A larger TMT benefits CE implementation because it has more resources, abilities, and skills than smaller TMTs do, so it can gather and process more CE-related information (Jin et al. 2017; Bui et al. 2020).

Second, the meta-analysis revealed the transformational leadership style's positive influence on CE, which aligns with previous studies' findings (Ocak and Ozturk 2018; Boukamcha 2019) and is attributed to the style's positive associations with employees' satisfaction and creativity that can enhance firms' innovativeness and overall performance (Nanjundeswaraswamy and Swamy 2014). Transformational leaders also embrace concepts like inspirational motivation and intellectual stimulation and encourage creativity, all of which help CE to thrive (Chang et al. 2017). Third, the meta-analysis revealed the critical role of the TMT's entrepreneurial human capital as one of the most influential antecedents of CE, strengthening prior meta-analytic findings in entrepreneurship (e.g. Unger et al. 2011). Hence, the analysis' findings suggest that the TMT's entrepreneurial human capital has a greater effect on entrepreneurship activities in the firm context than it does in the independent/individual entrepreneurship context.

The meta-analysis also investigated the effects of several firm-level factors on CE. While the effect of the firm's building blocks, a proxy for factors in its internal environment, is still open for investigation, this study revealed that building blocks are central to promoting employees' engagement in CE (Hornsby et al. 2002), thus contributing to organisational behaviour research and theories of motivation (Robbins and Judge 2013). Similarly, the meta-analysis finds that discretionary slack has a positive influence on CE because the required resources must be available at the right time for CE to be implemented successfully (Yuan et al. 2017; Olson et al. 2020). This finding corresponds to the resource-based theory, which

emphasises that resources' availability and efficient use result in competitive advantage for the firm (Aguinis et al. 2017).

The meta-analysis also found that organisational learning and absorptive capacity have a positive influence on CE's implementation. These findings add evidence that a firm's commitment to learning and processing the acquired information efficiently (absorptive capacity) can ensure that it can recognise opportunities and adjust its strategies to keep up with the market's changes (Daryani and Karimi 2017; An et al. 2018). Finally, contrary to the assumption that larger firms usually feature anti-CE aspects like bureaucracy and rigid, complicated hierarchical structures (Zahra 1996a; Chang et al. 2017; Jahanshahi et al. 2018), the meta-analysis revealed that larger firms engage in more CE-related activities than smaller firms do. This finding contributes to the argument that larger firms benefit from abundant resources, allowing greater engagement in CE activities (Sahaym et al. 2016).

In responding to calls to examine the country context's influence on CE (Urbano et al. 2022), the meta-analysis explored the moderating effect of the country-level institutional environment—that is, the contingency perspective—on the relationships between individual/group-level factors and CE and that between firm-level factors and CE. The findings revealed that the influence of firms' resources and capabilities on CE depends on the institutional context, suggesting that institutional conditions affect the patterns of a firm's resource allocation and that stakeholders have a major effect on CE. More precisely, the meta-analysis indicated that countries that score high in power distance and uncertainty avoidance and low in masculinity encourage their firms to be competitive and that these firms have rare resources and capabilities with which to perform CE-related activities. The meta-analysis also found that the benefits derived from CE depend on a national culture that promotes a positive attitude towards change and entrepreneurship, a finding that aligns with Rosenbusch et al. (2013b). The TMTs of firms in such countries will allocate resources to CE-related activities, which drives engagement across all levels of the firm. In addition, the meta-analysis revealed that informal institutions have a contingent effect on the relationships between the TMT's general and entrepreneurial human capital and CE.

The meta-analysis showed that the relationship between a firm's size and CE is more nuanced than previously discussed in the literature (Nason et al. 2015) and that the institutional environment reflects the pattern of resource allocation (Bowen and De Clercq 2008). Thus, this study adds to the literature by elaborating on how the country-level informal institutional

environment can facilitate a firm's CE, depending on its size. Large firms benefit more from an informal institutional environment that is characterized by low power distance, uncertainty avoidance, and long-term orientation and high individualism and masculinity than they do from other institutional environments.

Finally, the meta-analysis revealed that the roles of the TMT's size in their firms' CE is universal across cultural contexts and that transformational leadership and the firm's building blocks affect CE similarly across informal institutional environments. These results are in line with studies that find that certain managerial and firm-level aspects of firms are not influenced by the institutional environment (Tihanyi et al. 2005). For example, House et al. (2002) find consistency in aspects of leadership across 61 countries, and Holt et al. (2007) find that the influence of internal factors like structure and process on firm performance are steady across nations. These findings are consistent with the view that a set of common factors drive CE across informal institutional environments since firms compete in global markets, with the result that they have some universal elements. However, this conclusion might be due to small effect sizes for these relationships, so future research in this area could help to clarify whether such is really the case.

7.3.2 Stage 2 (employees' entrepreneurial behaviour: The influence of employees' socio-cognitive traits and country-level institutional context)

This study responds to calls for research that addresses firms' entrepreneurial activities as a multi-level phenomenon (Schindehutte et al. 2018) and comparable calls to examine the micro-foundations of CE and the role of context in promoting or hindering EEB (Zahra and Wright 2011; Arz 2017). While CE-related activities are important for organisational performance and competitiveness, the success or failure of these entrepreneurial activities depends on employees' capabilities, skills and engagement (Niemann et al. 2022). This study explored the socio-cognitive aspects of employees that are critical to successful implementation of CE-related activities. Few studies examine the individual-level and contextual-level antecedents that may play a role in motivating employees to engage in entrepreneurial action (Kuratko 2017; Kreiser et al. 2021). Motivated by these gaps, this study has three critical findings: employees' socio-cognitive traits affect EEB, country-level institutions may promote or hinder employees' engagement in EEB, and country-level institutions influence the relationship between employees' socio-cognitive traits and EEB. These findings contribute to understanding EEB as a micro-foundation of CE and the mechanism behind it.

While previous studies examine independent entrepreneurship and employee entrepreneurship as career choices, they "failed to recognise the intermediate case where the individual, as an intrapreneur, can behave entrepreneurially as an employee within a corporate context" (Douglas and Fitzsimmons 2013, p.116). The few studies that address employees' role in their firms' entrepreneurship investigate the influence of organisation- or group-level factors in promoting entrepreneurial activities in firms and take employees' engagement for granted. By investigating the role of employees' socio-cognitive traits in promoting EEB, the present study fills a critical gap in the CE literature and explains who is engaging in firms' entrepreneurial activities and why (Gawke et al. 2019). Building on SCT, this study found that employees' socio-cognitive traits are associated with EEB and that ESE and opportunity perception promote engagement in EEB, while fear of failure hinders it. These findings align with similar studies' findings that some of employees' socio-cognitive traits are associated with their entrepreneurial intentions (Fini and Toschi 2016; Huyghe et al. 2016) and firms' entrepreneurial growth (Kolvereid and Isaksen 2017).

Building on institutional economics theory, this study found that country-level institutional factors directly affect EEB and the degree to which employees are willing to invest their socio-cognitive resources in EEB. For instance, the results provide evidence that the rigidity of a country's employment regulations negatively affects EEB. This finding is aligned with those of previous studies that indicate that strict labour laws have a negative effect on a firm's innovativeness (Francis et al. 2018). Moreover, rigid employment regulations are usually associated with reducing wage gaps, which hinders EEB (Block et al. 2019).

This study also found that the negative effect of rigid employment regulations negatively moderates the relationships between employees' socio-cognitive traits and EEB. More specifically, the study found that employees' ESE and opportunity perceptions have weaker effects on EEB in countries that have rigid employment institutions than they do in countries that have more flexible employment regulations. Rigid employment regulations also increase the negative effect of employees' fear of failure such that they become more reluctant to participate in EEB.

Countries that have rigid employment regulations limit the workforce mobility that is associated with attracting new knowledge, technology, and talent to the labour market (Kong et al. 2020), hence limiting the development of employees' socio-cognitive traits and EEB engagement. Rigid employment regulations lead firms to hire temporary contractors or engage

the help of workers' agencies (Autor et al. 2007), thus investing less in training and development programs, leaving employees less willing to invest their socio-cognitive resources and less engaged in EEB. On the other hand, countries that have flexible employment regulations reduce the costs of and barriers to EEB (Foss et al. 2019) and increase the exchange of new knowledge and technologies that enhance employees' entrepreneurial socio-cognitive traits.

Regarding the direct and moderating effects of country-level informal institutions, the study's findings suggest that a country's supportive managerial attitudes and norms positively influence EEB and its relationships with employees' ESE and opportunity perception. These findings align with previous studies that conclude that entrepreneurship activities thrive in the presence of supportive attitudes and norms in the country (Hughes et al. 2018; Elert et al. 2019). Moreover, the presence of supportive country-level managerial attitudes and norms are usually associated with increased engagement in entrepreneurial activity (Ali et al. 2016).

The study showed that supportive attitudes and norms strengthens the positive associations between employees' socio-cognitive traits and EEB. More specifically, as shown in the preliminary and robustness results, employees' ESE and opportunity perceptions have a more substantial effect on EEB in countries that feature supportive managerial attitudes and norms than they do in countries that have less or no supportive managerial attitudes and norms. These findings suggest that supportive norms based on the eight country-level informal elements, such as the extent of staff training and authority delegation, positively influence the relationships between EEB and employees' ESE and opportunity perception. These findings align with previous studies that conclude that, when country-level informal institutions value entrepreneurial thinking and innovation, employees' engagement in entrepreneurial activities increases (Urbano et al. 2019).

7.4 Contributions for Theory and Research

7.4.1 Contributions for CE research

This study contributes to the CE literature in several ways. By reviewing the research in the CE field since the 1970s, the study provided a summary of the two streams that dominate the CE literature—conceptualisations of CE and implementations of CE—and responded to calls to clarify the multidimensional nature of CE and its antecedents. The review suggested that CE is the umbrella under which various levels of determinants, behaviours, activities,

processes, and practices lie and which are not alternative to each other and may exist collectively or alone in a firm. While new terminologies and concepts could emerge as the research field expands, researchers should refrain from permanently altering the definitions or overlapping them with various other terminologies. Researchers must also identify their study constructs and level of analysis to avoid the measurement issues that have been identified here.

The study also contributes to the top-down structured formal approach to studying CE by suggesting that organisation-level factors (e.g. culture, structure, resource allocation, processes, and administrative instructions) influence the processes of exploring and exploiting opportunities (Covin and Slevin 1991; Zahra et al. 1999b; Baruah and Ward 2015). The study's meta-analysis, the first of its kind in the CE research field, presented a statical summary of work in the CE research field over the last twenty-eight years that contributes to the CE research field in several ways. First, the meta-analysis contributes to research that focuses on synthesizing and generalising evidence that addresses the multi-dimensional and multi-level nature of the antecedents of CE (Szymanski and Henard 2001; Evanschitzky et al. 2012; Kirca et al. 2012; Storey et al. 2016). In the absence of such empirical comparisons, firms may underestimate the consequences of ignoring an antecedent that is central to its ability to meet CE's objectives (Schindehutte et al. 2018; Kreiser et al. 2021). Second, the meta-analysis provided aggregated meta-analytic evidence from assessing complex models of antecedents that drive CE at multiple levels (Kuratko, Hornsby, and Hayton 2015; Kuratko and Hoskinson 2018) and developed a multi-level framework to test the predictions of a series of level-specific theories. Because the literature generally holds a positive view of CE-related activities' performance implications, obtaining differentiated findings regarding CE's antecedents can contribute to future theory-building.

Third, the meta-analysis' integrating the field's fragmented research into one study provides fine-grained insights into the nomological network that surrounds the influence of individual/group- and firm-level factors on CE. By uncovering the moderating role of the institutional environment and the type of firm in the relationships between individual/group- and firm-level factors and CE, this study contributes to the emerging research that argues that the CE phenomena is context-dependent (Doh and Pearce 2004; Guerrero et al. 2021a). This contribution responds to calls from researchers to examine the relationship between the institutional context and CE and suggests areas of study for a more detailed examination of this

relationship and of contexts where future research may not be promising (Hughes and Mustafa 2017; Schindehutte et al. 2018; Urbano et al. 2022).

Moving away from the dominant top-down approach and focusing on the micro-foundations of CE allow this study to contribute to an under-researched area of CE literature and fill a critical knowledge gap. The study contributes to the literature on corporate entrepreneurship by highlighting the importance of employees' personal characteristics (e.g. cognitive traits) in the implementation of CE. By understanding the employee-level socio-cognitive traits that influence CE initiatives, this study contributes to Zahra et al.'s (2005) and Zahra et al.'s (2013) calls to study CE from a psychological/cognitive approach to assist firms' in developing their entrepreneurial capacity.

This study provides a more nuanced view regarding EEB by going beyond the organizational behaviour literature's limited discussion on the determinants of employees' engagement (Young et al. 2018) to emphasise employees' cognitive traits as central to regulating their motivation to engage in opportunity exploration and exploitation. In doing so, the study extends the cognition-based research stream to CE (Newman et al. 2019). The study's findings contest the majority of the literature's tendency to take employees' engagement for granted and focuses instead on the role of the firm-level environment in employees' entrepreneurial activities (Guth and Ginsberg 1990; Covin and Miles 1999; Dess et al. 1999; Antoncic and Hisrich 2001). Thus, it underscores the role of employee-level cognitive abilities in promoting EEB and conceptualises who is likely to participate in firms' entrepreneurial activities and why (Gawke et al. 2019). By examining the role of employees' socio-cognitive traits in promoting EEB, the study answers Ireland et al.'s (2009) call to include all of a firm's actors, as pro-entrepreneurship cognitions and EEB are not limited to top managers.

7.4.2 Contributions for institutions research

By implementing institutional economics theory, this study extended the theoretical and empirical treatment of context's effects on firm employees' entrepreneurial activities. Previous CE research that explores the influence of country-level institutional factors (e.g., Vanacker et al. 2021) assumes that firms benefit equally from home-country institutions. However, this study finds an integrative mechanism (between individual-level social cognitive traits and country-level institutional factors) that motivates employees to engage in entrepreneurial activities (Perlines et al. 2022). By doing so, the study identifies the country-level institutional

context in which EEB will thrive. While it offers a refinement to SCT's application in EEB literature, it also suggests an explanation for how SCT is context-related and influenced by the institutional environment. Thus, this study contributes to the discussion that "one-size-fits-all" does not work when it comes to how formal institutions' employment regulations and informal institutions' managerial attitudes and norms influence entrepreneurial behaviour (Belloc 2019; Block et al. 2019).

Institutions are complex and multifaceted, and their effects on firms' CE-related actions are interdependent (Batjargal et al. 2013) and characterised by a multiplicity of interrelated institutions (Ostrom 2005). By aggregating various elements of employment regulations, this study examined the effect of employment regulations' rigidity, thus contributing to theoretical reasoning and focusing on a composite index for country-level institutional factors that reflect the pattern of a country's institutions (Botero et al. 2004; He et al. 2013; Boudreaux 2019).

Finally, while scholars have long been interested in exploring informal institutions' effects on entrepreneurial activities, they focus on the role of national culture (Cullen et al. 2014), as is also the case with employee-level research (e.g., Turró et al. 2014; Stephan and Pathak 2016; Boone et al. 2019). However, this study constructed its country-level informal institutional factors in a way that the CE literature does not use. The study used a composite of eight country-level informal institutions to reflect the country's admiration for entrepreneurship. In doing so, this study presented a new comprehensive construct that reflects country-level managerial attitudes and norms that are favourable to entrepreneurship. Thus, it responds to Stephan and Pathak's (2016) call to move beyond the overused country-level informal institutional factors, contributing to this area of research and moving the focus from national cultural values to more practical and objective measures of country-level informal institutions.

7.5 Implication for practice

The study's frameworks and empirical findings have several implications for practitioners and policymakers. They lay out evidence for practitioners that successful CE implementation is influenced by internal factors at the individual/group and firm levels. In advancing research on the role of individual/group-level factors as determinants of CE (Schindehutte et al. 2018; Urbano et al. 2022), the meta-analysis has practical implications for managers. While research makes notable contributions to the TMT's critical role in

implementing CE, understanding of how certain TMT factors interact with CE adoption is still lacking. This meta-analysis filled this research gap by identifying how several TMT characteristics influence CE, so the TMT must treat these characteristics in a way that supports their firms' CE implementation. For instance, they must engage in ongoing scanning and evaluation of the environment to identify potential opportunities and use the advantages of large TMTs by allocating their diverse resources to serve the purpose of CE implementation.

This study also explored the roles of many factors at the internal and external levels in influencing CE, highlighting why firms vary in their implementations of CE. Hence, the study underpins some critical firm-level factors that managers must develop to implement CE successfully. For instance, the study revealed the vital role of the firm's building blocks in CE implementations. While opportunities in the external environment are available to those who execute them first, managers must ensure that they provide the required resources and support to their employees at the right time and in the right amounts.

While firms must behave entrepreneurially to stay in the game, this study shed light on the importance of taking employees' behaviour into account when implementing CE-related activities. Taking individual-level characteristics into consideration instead of relying solely on the institutional context may help top managers to understand and promote EEB in their organizations. The insights from this study may be particularly useful when firms are designing and implementing CE-related activities and when they are assessing EEB, as they offer practitioners an extended view of the antecedents, moderators and outcome variables that are associated with EEB and that they may use to tailor their CE initiatives to increase employees' engagement. The findings revealed that employees who have high ESE and opportunity perception and low fear of failure are more willing than others are to engage in EEB, so managers must attract such employees to be more competitive and engage in more CE activities. Furthermore, based on the argument that socio-cognitive traits that are related to a certain behaviour or attitude are constructed by the reference group (Krueger et al. 2000), managers must ensure that they create an internal culture that reflects admiration of entrepreneurship and supports entrepreneurial activities.

Based on social information processing theory, research indicates that human resource management practices like investing in training and development programs are positively associated with employees' entrepreneurial attitudes (Liu et al. 2020). The results of this study suggest that reinforcing the effect of socio-cognitive traits that are associated with knowledge

and the learning process through training and development can increase the likelihood of a firm's employees pursuing entrepreneurship (Wakkee et al. 2010; Afsar et al. 2017). A diverse workforce could also have a positive effect on employees' socio-cognitive traits because such a workforce enriches knowledge and experience through information exchange (Lin and Lee 2011). Another source of enhancing employees' knowledge is longer-tenured middle managers who, because of their experience and more extensive social capital, are more likely than new managers are to guide their employees to recognise feasible opportunities (Simsek 2007).

Research indicates that appreciation of and a reward system for innovative initiatives enhance employees' engagement in EEB (Goodale et al. 2011). Research and the current findings indicate that managers should increase their employees' EEB engagement by working to reduce the negative impact of employees' fear of failure, so having a failure-tolerance policy would boost employees' self-confidence when they deal with failure and uncertainty (Alpkan et al. 2010). Having a collective internal culture also increases the information exchange among employees, enhancing their knowledge, reducing uncertainty, and reducing the negative impact of fear of failure (Zu et al. 2010).

To increase employees' engagement in EEB, managers should not be interested just in the impact of employees' socio-cognitive traits but also in "their relation to the wider meaning systems and theories embedded in cultural elements such as categories, conventions and discourse" (Lounsbury and Crumley 2007, p.1007). Thus, through its multi-level modelling and by analysing the impact of country-level institutional factors on EEB, this study offers practitioners a comprehensive understanding of the mechanism behind employees' engagement in entrepreneurial activities. The results reveal that rigid employment regulations hinder EEB, while supportive managerial attitudes and norms promote it. The finding reveals that country-level institutions have moderating effects on EEB.

These findings have several implications for managers and policymakers. Managers must adopt internal policies that reduce the negative effects of rigid employment regulations. For instance, such regulations limit the firm's ability to hire employees who have strong socio-cognitive traits based on regular contracts, but managers could use sub-contractors, distance working, and part-time contracts as solutions. By doing so, their firms can benefit from newly hired employees' engagement in EEB and ensure some knowledge and experience exchange with their current workforce, thus enhancing their socio-cognitive traits and EEB engagement.

Managers should understand country-level managerial attitudes and norms' effects on the interactions between their employees' socio-cognitive traits and EEB. More specifically, they must take advantage of supportive managerial attitudes and norms and deal with their absence through appropriate policies and strategies. For instance, when the national culture endorses hierarchy and individualism, which may have negative influences on EEB, managers should endorse strategies that enhance trust and autonomy, both of which are positively related to enhancing employees' socio-cognitive traits (Bosma et al. 2013). Similarly, charismatic leadership might overcome the absence of country-level supportive managerial attitudes and norms (Stephan and Pathak 2016).

Since EEB contributes to countries' economies through its contributions to firms' financial performance, policymakers must endorse the proper formal institutions. The findings present to politicians a way to enhance employee engagement in EEB. Previous research highlights that strict laws and regulations like entry barriers and strict fiscal policies hinder entrepreneurial activities (Aparicio et al. 2016). This study add to what other scholars identify in suggesting to politicians that rigid employment regulations hinder engagement in EEB even when employees have the required socio-cognitive traits. Therefore, it might be better to set the general framework and give employees and employers more freedom to decide the form of their contractual relationships, as doing so might increase employee' engagement by increasing their feelings of having control over their career paths, which is essential to entrepreneurial employees (Borah et al. 2022).

7.6 Limitations and directions for future research

Although stage 1 of the current study provides insights into CE's multi-level drivers and their boundary conditions, it has limitations that should be borne in mind when interpreting and evaluating the findings. First, the antecedents of CE that are included in the meta-analysis are limited to those for which satisfactory data were presented in the original studies (Hunter and Schmidt 2011). In addition, not all of the studies identified in the initial search provided the information necessary to be included in the meta-analysis, which limited the sample size. Therefore, while the antecedents that were included in the meta-analysis illustrate the most frequently investigated relationships and presenting empirical generalizations for these antecedents could be useful, the framework should not be viewed as a full list but as a review of CE's drivers that are researched most often. Second, because of the study's cross-sectional nature, it is not possible to establish causal conclusions about the relationship between CE and

its antecedents. Third, considerable heterogeneity across the studies remained in the analysis, indicating the possible presence of moderating variables other than those that were integrated into the meta-analysis. Because of the limited information on some study characteristics that reported main effects, a more thorough moderator analysis was not possible.

In addition, inadequate study-to-study variations in some study characteristics, such as measuring the dependent variable based on absolute or relative terms, meant that service-innovation-related performance was found to be significantly influenced by most antecedents. This result is not surprising, as non-significant research results are rarely reported in journals. Despite these limitations, this meta-analysis offered the first largest quantitative review of research on the relationships between CE and its antecedents. Since the study answers some persistent questions and points to directions for future research, its conclusions are useful in assessing the current state of knowledge in the CE research field and in designing future research.

Although stage 2 of this study made theoretical and practical contributions, it is not free of limitations, some of which lead to promising avenues for future research. For instance, while the use of the most recent GEM's data (i.e., 2015-2018) was justified based on the literature (e.g., Lihn and Bjørnskov 2017; Boudreaux et al. 2019) and clarified in section 5.4.1.1, examining the EEB framework based on wide range database will profound the results of this thesis. Also, since GEM release the data every 4 years, re-test the presented multi-level framework of EEB for the last 10 years is a promising avenue for future research.

Also, while GEM is considered the leading source of data on entrepreneurship activities worldwide, it has limitations that must be acknowledged. GEM's measurements provide only simplified images of EEB and the socio-cognitive traits, which are rich, complex and built over time. Therefore, this study could not capture the in-depth dynamic interactions between EEB and the socio-cognitive traits over time, making the collection of longitudinal data that capture the interactions between these factors over time and provide detailed information a promising opportunity for research. In addition, GEM's measures of socio-cognitive traits may suffer from subjectivity because they rely on employees' self-evaluations, so future research could use a combination of subjective and objective measures. Another limitation is related to the participants in GEM surveys, as while necessary steps to limit the database to employees are taken, GEM surveys do not ask for hierarchical information. Future researcher may find

another reliable source that captured EEB or maybe GEM captures the hierarchical information in the future.

Regarding the country-level institutional factors, the measure for the rigidity of employment regulations was constructed based on two sub-factors, the difficulty of hiring and the difficulty of redundancy, since the rigidity of work hours had to be dropped because of low factor loading. Future studies may include it and other employment regulations to enhance the composite factor representation of employment regulations. Although the decision to use a composite index for country-level institutional factors to reflect the country's overall institutional position regarding EEB is underlined theoretically (Vanacker et al. 2021), addressing the multidimensional nature of each index by exploring which of the index components hinders or promotes EEB is a promising avenue for future research.

Another avenue for future research is based on SCT, which argues that individuals seek to test their abilities and perfect their skills when they are confident in their ability to accomplish a particular activity (Wood and Bandura 1989). Therefore, all three socio-cognitive traits and EEB could be connected and even circular, such that the more employees are engaged in EEB, the more experience and knowledge they gain, the higher their perceptions of their abilities, the more enhanced their skills will become and the more likely they are to engage in EEB again. Similarly, the higher their perceptions of their abilities, the more they will seek opportunities to achieve, test and enhance their skills, thus engaging in more EEB. Likewise, the more knowledge, experience and positive consequences they gain by engaging in EEB, which will positively feed back to their behaviour-evaluation process, the less negative effect the fear of failure will have on their decision to engage in EEB again. Therefore, exploring this circular relationship between EEB and the three socio-cognitive traits is promising.

7.7 Conclusion

This study had two main objectives, which were addressed in stages 1 and 2. Stage 1's objective was to explore the current state of knowledge and to develop and test a multi-level framework that included the most frequently identified CE antecedents over the last five decades. The multi-level framework and meta-analysis in stage 1 integrated factors from the individual/group level (i.e. TMT characteristics) and the organisation level (e.g. firms' building blocks) and provided a conclusion based on empirical evidence regarding the drivers on which CE is based. Stage 2's objective was to use a developed and tested multi-level framework to

clarify the individual- and country-level contextual factors that shape EEB. Under the integrative framework of SCT and institutional theory, stage 2 presented and tested a systematic multi-level framework of EEB.

The results of both stages related to the seven research questions indicate that, first, CE is a multi-dimensional phenomenon that is influenced by factors from various levels, thus validating the multi-level approaches in the proposed models. Second, researchers must be aware of several conceptualisations and methodological issues before engaging with the literature. Third, the top-down approach, where researchers focus on organisation-level (e.g. structure and culture), function-level (e.g. accounting and marketing) or individual/group-level (TMT) antecedents of CE to understand the factors that foster an organisation's entrepreneurial activities dominates CE research. Fourth, more quantitative integration across the various levels is needed, and research that uses the bottom-up approach is rare in the CE literature. (This study addresses both gaps.) Fifth, employees' socio-cognitive traits play a role in either promoting or hindering EEB. Finally, country-level institutional factors play a role in that rigid employment regulations have negative direct and moderating effects on EEB, while supportive managerial attitudes and norms have positive direct and moderating effects.

Stage 1 concluded that most of the identified TMT characteristics and firm-level factors are associated with CE activities. In addition, the integrative meta-regression showed that a TMT's entrepreneurial human capital and transformational leadership and its firm's building blocks, resources, and capabilities are positive drivers of CE. Furthermore, while stage 2 offered a refinement to the CE literature's application of SCT, it provided a possible explanation for how SCT is context-related and influenced by the institutional environment. For instance, the findings showed that employees' ESE, opportunity perception, and fear of failure influence their engagement in EEB. However, the interaction at the micro level (the employee level) is influenced by country-level formal and informal institutional factors. For instance, ESE and opportunity perception positively influence EEB, yet this influence weakens in the context of rigid employment regulations.

To conclude, although the relationships between CE and its antecedents are complex, CE remains a vital part of firms' ability to grow and maintain their competitive advantages. Since the 1970s, scholars have contributed to the CE research field by defining it and exploring its nature and relationships with various antecedents and consequences. The multi-level

framework models proposed and validated in this thesis can advance the theory and implications in the CE research field.

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Appendix

Appendix I: Global Entrepreneurship Monitor (GEM)

The Global Entrepreneurship Monitor (GEM) has been the leading source for studies and data on entrepreneurship and its related phenomenon since 1999. Built on the Panel Study of Entrepreneurial Dynamics (PSED), international data were systematically collected over the last 20 years from over one hundred countries and a yearly minimum of 2000 participants per country (Acs and Audretsch 2010). Due to the multidisciplinary and the richness of GEM data, it has been used in the work of other scholars, such as dissertations, journal articles and country reports (e.g.,(Bosma et al. 2013; Yousafzai et al. 2015; Ali et al. 2016; Dheer 2017; de la Vega et al. 2017; Mohsen et al. 2019).

Each year GEM collects its data based on two types of surveys: 1) GEM's Adult Population Survey (APS) and 2) The National Expert Survey (NES). APS is more focused on the entrepreneurs themselves, whether independent or employees, and covers different related aspects such as their motivations and social towards entrepreneurship. In comparison, NES is more related to the national context associated with motivating individuals to become entrepreneurs. This study has used data from GEM APS.

For each year, GEM publishes two versions of APS data: (i) aggregated national data and (ii) individual-level data. This study used the raw individuals' data only. GEM mainly targeted individual entrepreneurs, categorised under the "total early-stage entrepreneurial activity (TEA)" label in GEM's APS. Since 2011, GEM APS has started to target entrepreneurs within firms, categorised under the "entrepreneurial employee activity (EEA)" label in GEM's APS. Each section has its sub-question in each APS wave.

Appendix II: Countries included in meta-analysis group analysis

Countries/variables	Individual/Group level (TMT)						Firm level		
	Diversity	Size	Transformational leadership	Human capital	General human capital	Entrepreneurial human capital	Building blocks	Resource & capabilities	Size
Austria									✓
Canada				✓	✓	✓		✓	✓
China	✓	✓	✓	✓	✓	✓	✓	✓	✓
Finland							✓		
India			✓				✓		
Iran				✓	✓	✓	✓	✓	✓
Ireland							✓	✓	✓
Netherlands							✓		✓
Pakistan			✓				✓	✓	
Portugal			✓				✓	✓	✓
Romania				✓	✓			✓	✓
South Korea				✓		✓		✓	✓
Spain				✓	✓			✓	✓
Turkey			✓				✓		✓
United Kingdom							✓		
USA	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vietnam		✓		✓	✓				

Appendix III: VIF for all study variables

Model 1		
Variables	VIF	1/VIF
Age	1.02	0.97
Gender	1.04	0.96
Work arrangement (Full time)	1.03	0.97
Sector (Private)	1.03	0.96
Education	1.01	0.98
Unemployment rate	1.02	0.97
GDP Current	1.02	0.97
Model 2		
Variables	VIF	1/VIF
Age	1.03	0.97
Gender	1.05	0.94
Work arrangement (Full time)	1.03	0.96
Sector (Private)	1.04	0.96
Education	1.03	0.97
Unemployment rate	1.39	0.71
GDP Current	1.08	0.92
Entrepreneurial self-efficacy (ESE)	1.08	0.92
Opportunity perception (OPP)	1.07	0.93
Fear of Failure (FF)	1.03	0.97
Rigidity of employment regulations (RER)	1.50	0.66
Managerial attitude and norms (MAN)	1.91	0.52
Model 3		
Variables	VIF	1/VIF
Age	1.03	0.97
Gender	1.05	0.94
Work arrangement (Full time)	1.03	0.96
Sector (Private)	1.04	0.96
Education	1.03	0.97
Unemployment rate	1.40	0.71
GDP Current	1.09	0.92
ESE	1.09	0.91
OPP	1.07	0.93
FF	1.03	0.97
RER	2.71	0.36
MAN	1.92	0.52
ESE χ RER	2.15	0.46

Model 4		
Variables	VIF	1/VIF
Age	1.03	0.97
Gender	1.05	0.94
Work arrangement (Full time)	1.03	0.96
Sector (Private)	1.04	0.96
Education	1.03	0.97
Unemployment rate	1.41	0.71
GDP Current	1.07	0.91
ESE	1.08	0.92
OPP	1.08	0.92
FF	1.03	0.97
RER	2.32	0.43
MAN	1.91	0.52
OPP χ RER	1.84	0.54
Model 5		
Variables	VIF	1/VIF
Age	1.03	0.97
Gender	1.05	0.94
Work arrangement (Full time)	1.03	0.96
Sector (Private)	1.04	0.96
Education	1.03	0.97
Unemployment rate	1.40	0.71
GDP Current	1.08	0.92
ESE	1.08	0.92
OPP	1.07	0.93
FF	1.03	0.96
RER	2.34	0.42
MAN	1.91	0.52
FF χ RER	1.81	0.55
Model 6		
Variables	VIF	1/VIF
Age	1.03	0.97
Gender	1.05	0.94
Work arrangement (Full time)	1.03	0.96
Sector (Private)	1.04	0.96
Education	1.03	0.97
Unemployment rate	1.39	0.71
GDP Current	1.09	0.92
ESE	1.08	0.92
OPP	1.07	0.93
FF	1.03	0.97
RER	1.50	0.66
MAN	2.82	0.35
ESE χ MAN	1.90	0.52

Model 7			Model 8		
Variables	VIF	1/VIF	Variables	VIF	1/VIF
Age	1.03	0.97	Age	1.03	0.97
Gender	1.05	0.94	Gender	1.05	0.94
Work arrangement (Full time)	1.03	0.96	Work arrangement (Full time)	1.03	0.96
Sector (Private)	1.04	0.96	Sector (Private)	1.04	0.96
Education	1.03	0.97	Education	1.03	0.97
Unemployment rate	1.41	0.71	Unemployment rate	1.39	0.71
GDP Current	1.09	0.92	GDP Current	1.08	0.92
ESE	1.08	0.92	ESE	1.08	0.92
OPP	1.08	0.92	OPP	1.07	0.93
FF	1.03	0.97	FF	1.03	0.96
RER	1.50	0.66	RER	1.50	0.66
MAN	2.77	0.36	MAN	2.70	0.36
OPP χ MAN	1.82	0.54	FF χ MAN	1.81	0.55

Appendix IIII: Ethical forums

SURNAME: ALASADI
Student No. 1761195

ETHICS 0

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

Cardiff Business School
Ysgol Busnes Caerdydd

SECONDARY DATA ONLY

This form should be completed for every research project that involves the use of secondary data (i.e. the applicant is not planning to collect primary data of any kind and intends to use pre-existing data sources which might include; literature reviews, pre-existing data sets, internet sources etc).

The supervisor is responsible for exercising appropriate professional judgement in this review and has approved the use of secondary data only.

SECTION 1

PROJECT DETAILS

Title of Project:	**Corporate Entrepreneurship, its antecedents and firm performance: a meta-analysis**
Name of Lead Student Researcher:	**MOHAMMAD ALASADI**
Status (please circle) :	**/ MBA / MSc /Post Graduate Researcher / other**
Names of other Researchers:	
School:	**CARDIFF BUSINESS SCHOOL**
Email:	**ALASADIM@CARDIFF.AC.UK**
Contact Address:	**35 BARONS' COURT ROAD, CF23 9DG**
Telephone number:	**07463804483**
Start and Estimated End Date of Project:	**25/05/2018-09/01/2019**

SECTION 2

Module name and number	**BST270 Dissertation**
Supervisor's or Module Leader's name	**SHUMAILA YOUSAFZAI**
Email address	**YOUSAFZAIS@CARDIFF.AC.UK**

SECTION 3

Briefly describe the study design to be applied in the project including source/s of secondary data and intended data analysis technique/s.
THIS IS A META-ANALYSIS RESEARCH PROJECT. THE PURPOSE OF THIS PROJECT IS TO BE SUBMITTED AS MY MASTER DISSERTATION FOR SSRM PROGRAM. THE RESEARCH PROJECT AIMS TO QUANTITIVELY SUMMARIES THE RELATIONSHIP BETWEEN CORPORATE ENTREPRENEURSHIP AND SEVERAL FACTORS FROM ITS ANTECEDENTS AND BETWEEN CORPORATE ENTREPRENEURSHIP AND FIRM PERFORMANCE

ETHICS 0

SURNAME: ALASADI
Student No. 1761195

SECTION 4 DECLARATION

I/we hereby agree that I/we have read the Cardiff Business School's Ethics Code of Practice and taken reasonable steps to ensure the independence and transparency of this research project. There are no significant conflicts of interest or partiality that may impact on the findings and outputs of my/our research activities.

SIGNED: [redacted] **DATE:** 8/9/2019

PRINCIPAL RESEARCH INVESTIGATOR

SIGNED: [redacted] **DATE:** 8/1/19

SUPERVISOR (WHERE APPROPRIATE)

APPLICATION APPROVED
Research Ethics Committee
Cardiff Business School
Cardiff University

ETHICS 0

SURNAME: ALASADI
Student No. 1761195

ETHICS 0

Cardiff Business School
Ysgol Busnes Caerdydd

SECONDARY DATA ONLY

This form should be completed for every research project that involves the use of secondary data (i.e. the applicant is not planning to collect primary data of any kind and intends to use pre-existing data sources which might include; literature reviews, pre-existing data sets, internet sources etc).

The supervisor is responsible for exercising appropriate professional judgement in this review and has approved the use of secondary data only.

SECTION 1

PROJECT DETAILS

Title of Project:	**The Influence of Individual and Institutional Level Factors on The Employee's Entrepreneurial Behaviour**
Name of Lead Student Researcher:	**Mohammad Alasadi**
Status (please circle):	**/ MBA / MSc / Post Graduate Researcher / other**
Names of other Researchers:	
School:	**Cardiff Business School**
Email:	**AlasadiM@cardiff.ac.uk**
Contact Address:	**35 BARONS COURT ROAD, CF23 9DG**
Telephone number:	**07463804483**
Start and Estimated End Date of Project:	**01/Oct/2018 30/Sep/2022**

SECTION 2

Module name and number	**RFPDBUSA**
Supervisor's or Module Leader's name	**Shumaila Yousafzai**
Email address	**YousafzaiS@cardiff.ac.uk**

SECTION 3

Briefly describe the study design to be applied in the project including source/s of secondary data and intended data analysis technique/s.

My PhD thesis is three phases project. At the first phase I conduct a meta-analysis where I analyse a secondary data. The second phase of my study is based on secondary data analysis from the databases such as Global Entrepreneurship Monitor (GEM), OECD and The World Bank etc. The aim of the second phase is to investigate the impact of individual, and institutional level factors on employee's entrepreneurial behaviour and how it is different based on the context (i.e., countries).

SURNAME: ALASADI
Student No. 1761195

SECTION 4 DECLARATION

I/we hereby agree that I/we have read the Cardiff Business School's Ethics Code of Practice and taken reasonable steps to ensure the independence and transparency of this research project. There are no significant conflicts of interest or partiality that may impact on the findings and outputs of my/our research activities.
SIGNED: [redacted] **DATE: 6 May 2019** **PRINCIPAL RESEARCH INVESTIGATOR**
SIGNED: [redacted] **DATE:** 8th May 2019. **SUPERVISOR (W**

ETHICS 0