Meta-analytic research on absorptive capacity and entrepreneurial engagement
Essays on antecedents and institutions

Cosaert, L.J.

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Summary

In the first study, I unravel how firms develop absorptive capacity (AC) effectively. AC allows firms to recognize, assimilate and apply new information to commercial ends, critical to innovation. I divide antecedents into two categories: those related to path-dependent processes and factors, and those related to managerial agency. The results indicate that managerial agency tends to be associated more strongly with AC. I find support for a partial mediation model, in which path-dependent variables influence AC partially through their effect on the managerial agency. Using a coevolutionary narrative, this study concludes with an integrative framework.

The second study examines institutional contingencies that influence the AC- firm performance relationship across countries. Distinguishing between intellectual property right (IPR) system strength and IPR enforcement, the meta-analytical assessment shows that IPR system strength positively moderates the effect of AC on innovation performance, but negatively influences its effect on financial performance; the opposite is found for IPR enforcement. This research provides insights into how organizations can effectively use IPR across geographical boundaries.

The third study examines how institutional arrangements affect the relationship between entrepreneurial engagement and firm performance. I posit that value appropriation is influenced by the level of coherence within institutions (i.e., the degree to which they adhere to the same governance principles) and that this relationship also holds at different types of institutional configurations. The results indicate that the focal relationship is weaker when institutional configurations lack coherence and present a potential answer to why some policies are effective, and others are not.

About the author

Lance Cosaert (born July 26th, 1993, in Uithoorn The Netherlands) completed his Bachelor of Science degree in Business Administration and Master of Science Degree in Strategic Management (with Honors) at the Rotterdam School of Management, Erasmus University. He also took coursework at the London School of Economics and Political Sciences and the Chinese University of Hong Kong during his study. The Ph.D. of Lance was supervised by Prof. Dr. Henk Volberda (University of Amsterdam) and Prof. Dr. Jatinder Sidhu (University of Leeds).

During his Ph.D., Lance presented his research at various invitation-only international competitive conferences and consortia, including the Academy of Management in Anaheim (2016), Chicago (2018) and Boston (2019), Strategic Management Society in Minneapolis (2019), European Group of Organization Studies Colloquium in Copenhagen (2017) and Tallin (2018), European Academy of Management in Reykjavik (2018), and Asian Academy of Management in Bali (2019), among others. Lance was nominated for the Carolyn B. Dexter Award and AOM Best Paper award, both at the Entrepreneurship Division, during his last conference in Boston by the Academy of Management. During his Ph.D., Lance supervised M.Sc. thesis students and taught various courses at B.Sc., M.Sc., MBA and EMBA level on topics related strategy, digital strategy, digital transformation and consulting.

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ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctoraan de Universiteit van Amsterdam op gezag

van de Rector Magnificus

prof. dr. ir. P.P.C.C. Verbeek

ten overstaan van een door het College voor Promoties ingestelde commissie,in het

openbaar te verdedigen in de Agnietenkapel

op maandag 3 juli 2023, te 10.00 uur

door Lance Jordan Cosaert

geboren te Uithoorn

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Faculteit Economie en Bedrijfskunde

Preface

When I applied for a selective thesis topic in November 2014 under the supervision of Henk Volberda, I indicated that I was interested in pursuing a Ph.D. When I finished my master thesis, Henk offered me a position as a Ph.D. candidate. Back then, little did I know the extent of intellectual challenges I would encounter as a Ph.D. Candidate and, since then, I have experienced the excitement of translating initial research ideas into sound and practically relevant theoretical research.

I would like to thank my promoter, Henk Volberda, for his encouragement and wisdom. You had faith in me from the start, gave me autonomy and always had a critical but constructive approach to my work that helped me to move forward. I also appreciate your efforts to protect me from doing *too* much and that you presented me with many opportunities to develop myself within academia and beyond. I am also grateful for the conversations with my co-promoter, Jatinder Sidhu. Thank you for the critical suggestions and for mentoring me. You taught me that academic writing is a craft that can always be improved upon. I would also like to thank prof. dr. N.J. Foss, prof. dr. T.J. Mom, dr. S. Khanagha, prof. dr. ir. J.W. Stoelhorst, prof. dr. M. Obschonka, prof. dr. F.D. Belschak and dr. M.P. Tempelaar for being part of my doctoral committee, reviewing this dissertation and providing me with feedback.

Tatjana and Taghi, our conversations contributed clarity and focus to my academic investigation and of course the Ph.D. wine tasting. My *'brocademics'*, Emre and Fouad, thanks for the encouragement and for all your advice. I am thankful for having shared my office with Emre, Saeedeh, Renée and Nazanin who brightened up the long days. Rick and Kevin, I am happy that you also joined ABS and that we developed the Digital Transformation courses. I would also like to thank my colleagues at Erasmus University who made my Ph.D. a pleasant journey. Stefan, Somendra, Lisanne, Jitse, Joe, Thijs, Michael, Hendra, Omar, Ila, Radina, thanks for the positivity and the nice memories. I am grateful to Mark van der Veen for the smooth transition to Amsterdam and Iris, Josh, Emma, Martha, Elisabeth and Tina for welcoming me.

I would also like to thank my research assistants Mariah, Rafael and Victoria. Thanks for all your time and effort in gathering data and the many fun conservations. Finally, Mark and Roger, thanks for trusting me to set up ABS Case Society. I am also indebted to Jannah, Alex, Markus, Roger, Jules, Suzan and Marije for their support.

Lance J. Cosaert

Rotterdam
April, 2023

Dedicated to my family.

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Chapter 1

Introduction

This dissertation comprises three studies about knowledge absorption, institutional contingencies, and entrepreneurial engagement. In this chapter, I provide insight into how my research fits within the broader research context. Next, I will present the theoretical underpinnings of my research, introduce the research questions, methodology, and a short preview of my findings.

INTRODUCTION TO ABSORPTIVE CAPACITY, INSTITUTIONAL CONTINGENCIES AND ENTREPRENEURIAL ENGAGEMENT

Strategy research seeks to disclose how firms achieve competitive advantage. Today, firms do so under different circumstances as the business environment has changed in many ways. Digitalization, shorter innovation cycles, the emergence of the knowledge economy, unclear boundaries of industries, and the prominent role of technology and research, to name a few, characterize today's business arena. These changes result in various challenges and organizational learning has become even more central to firm survival; firms must continuously innovate and stay ahead of the competition. Organizations can do so by investing in their absorptive capacity and engaging in entrepreneurial activity. Appropriating value from these efforts in terms of innovation and financial performance is also important and I post that it depends on the institutional context. Absorptive capacity, entrepreneurial engagement, and institutional factors are the three central themes in this dissertation. The first two focus on identifying and capturing opportunities to achieve superior performance, while the latter highlights the importance of the external environment in which firms operate.

There are many ways to achieve competitive advantage and scholarly inquiry has shifted its focus over time. Scholars in the field of industrial organizations focused on firms' positioning and the effect of the external environment of innovation (e.g. Porter, 1996). Building on the resource-based view (Barney, 1991), scholars also focus on the internal resource base through which firms can innovate and sustain competitive advantage (e.g., Mahoney & Pandian, 1992; Peteraf, 1993; Wernerfelt, 1994). As the environment became increasingly dynamic, scholarly attention increasingly focused on the development of dynamic capabilities, describing ways in which firms can continuously reconfigure themselves to achieve competitive advantage (Teece et al., 1997; e.g., Eisenhardt & Martin, 2000; Helfat et al., 2007; Peteraf et al., 2013).

One of these dynamic capabilities is absorptive capacity (hereafter "AC"; Zahra & George, 2002) – the first construct of this dissertation. Cohen & Levinthal (1990: 128) formally defined absorptive capacity as "a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends" and suggest that AC constitutes a critical component of innovative capabilities. In the last three decades, AC (Cohen & Levinthal, 1989; 1990; 1994) gained traction across disciplines varying from organizational learning (Kim, 1998; Lane et al., 2002) to co-evolutionary theories (Van den Bosch et al., 1999; Koza & Lewin, 1999), innovation management (Cockburn and Henderson, 1998), international business (Lewin & Volberda, 1999; Zahra & Hayton, 2008; Ho & Wang, 2015; Yao et al., 2020), and knowledge management (Garud & Nayyar, 1994).

Keen to understand how firms develop the ability to reap benefits from novel information, scholars have sought to determine how a wide variety of antecedents may affect AC in different ways. Synthesizing past work, I contribute to research regarding the antecedents and their effectiveness on AC development. I categorize past work on the determinants of AC based on the implicit or explicit assumption that either path dependency or managerial agency determines AC. I will discover if the development of AC is indeed a path-dependent construct. If so, what active role is left for managers in fostering AC? Can managers exercise significant agency to develop AC and overcome path-dependencies? Do antecedences equally contribute to AC at different type of organizations? Building on co-evolutionary theory (McKelvey, 1997) and using Coleman's (1990) bathtub framework, I will reconcile these (conflicting) views and set the agenda for future research.

After unraveling how firms effectively develop AC in the first study, I will research the conditions under which firms benefit most from this learning capabilities in the following study. Scholars identified that individual- (e.g. Tortoriello, 2015), firm- (e.g. Wales et al., 2013) and industry-level (e.g. Lichtenthaler, 2009) factors influence the AC-firm performance relationship. More recently, scholars suggested that the national context may play a role in appropriating value of AC (Maldonado, Salaiz, Very & Keller, 2018; Barasa et al., 2017; Kotabe, Jiang & Murray, 2017; Yao et al., 2020). In this dissertation, I will study institutional contingencies that influence the AC- firm performance relationship across countries. Specifically, I will research the intricacies of IPR, and show how its underlying elements influence the focal relationship in different ways.

AC is not the only way in which firms can achieve superior performance. Firms may also engage in entrepreneurial engagement – the central construct of the third study. Entrepreneurial engagement defined as "the cognitive, affective, behavioral, and organizational activities of involvement in the process of exploiting a potential opportunity" (Shepherd et al., 2018: 14), contributes to achieving superior firm performance (Jacobides & Winter, 2007; Marvel et al., 2019). Entrepreneurial engagement encompasses a broader range of activities than AC, including entrepreneurial decision-making and forms of innovating and learning. These activities help firms to capture value from opportunities. In this study, I seek to understand its boundary conditions. Entrepreneurial firms are affected by the institutional environment (Baumol, 1990), and I will, therefore, study how the coherence across socio-economic institutions (Dilli et al., 2018) influence value appropriation of firms' entrepreneurial engagement.

While AC and entrepreneurial engagement focus on firms' activities, organizations are also dependent on the external context. The three studies that comprise this dissertation build on institutional analysis in one way or another. Institutions are defined as constituting 'the rules of the game' and institutional analysis focuses on understanding how and why they behave in specific ways and its consequences (Greenwood, Oliver, Suddaby & Shalin, 2008). Theoretical approaches towards researching institutions are diverse and draw on fields such as political science (Hall & Soskice, 2001; Thelen, 1999), sociology (Powell & DiMaggio, 1991), and economics (North, 1990). Study I reflects a central, institutional debate on structure versus agency (cf. Hirsch & Lounsbury, 1997). Study II focuses on how institutional factors, here intellectual property rights, offer support for value appropriation, influencing the AC- firm performance relationship. In the third study, I adopt a broader view of institutions and examine how coherence in governance principles across institutional domains influences value appropriation from entrepreneurial engagement.

THEORETICAL BACKGROUND

This dissertation builds on two core constructs, i.e. absorptive capacity and entrepreneurial engagement, and relies on institutional theory. In this section, I briefly discuss the key constructs and the underlying theory.

ABSORPTIVE CAPACITY

While the value of using and managing external knowledge has been recognized (e.g. Allen et al., 1979; Tushman & Scanlan, 1981) long before Cohen and Levinthal's seminal publications (1989; 1990), the relationship between external information and obtaining competitive advantage was still ambiguous and not yet explored. When writing their seminal paper, Cohen and Levinthal (1990) sought to understand why firms invest in R&D instead of purchasing the results. They theorized that firms produce a by-product, which they coined absorptive capacity. Internal R&D teams increase the absorptive capacity of a company; the more a firm invests in research and development activities, the more it will be able to appreciate the value of new external information fully.

Cohen and Levinthal build on memory development literature (Ellis, 1965). Like individuals, whose memory is linked to associative learning: the more you know on one topic, the easier it is to learn because events are linked to pre-existing concepts (Bower & Hilgard, 1981). There is a progressive improvement in learning, which explains the notion of cumulativeness (Ellis, 1965). Cohen and Levinthal (1989; 1990) demonstrated that firms conducting R&D instead of outsourcing it, develop a by-product called AC. AC helps organizations determine which type of information is relevant through industry foresight (Cohen & Levinthal, 1994) and how to interpret that information, also increasing aspiration levels that allow organizations to commercialize novel information. Defined as "a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen and Levinthal, 1990: 128), AC culminates in the commercialization of external knowledge, bringing innovations to the market. Originally conceptualized as the organizational ability to leverage external knowledge, AC has received ample research attention from a broad audience of scholars across disciplines over the years (Volberda, Foss & Lyles, 2010). This not only lead to a multitude of re-conceptualizations (Lane, Koka & Pathak, 2006; e.g. Lewin & Massino, 2004; Todorova & Durisin, 2007; Zahra & George, 2002; Song et al., 2018), and cross-fertilized other, often loosely related, research fields, but also crystalized AC as constituting its research field within management studies.

Extant studies, having extensively examined the concept of AC, commonly link and find strong support for a positive relationship between AC and organizational outcomes (Zou et al., 2018). For instance, higher levels of AC have been found to enhance

organizational pro-activity in exploiting opportunities (Cohen & Levinthal, 1990), encourage knowledge acquisition from foreign parents (Lyles & Salk, 1996), improve their ability to process and transfer knowledge (Gupta & Govindarajan, 2000), help firms introduce new products and technologies (Bierly, Damanpour & Santoro 2009) and lead to competitive advantage, making organizations more flexible and spurring innovation (Zahra & George, 2002). Furthermore, AC allows firms to enhance the efficiency of their business operations, lower costs, and ultimately increase profits (Cohen & Levinthal, 1990). On the other hand, lack of AC inhibits knowledge transfer (Minbaeva, Pedersen, Bjorkman, Fey & Park, 2003; Szulanski, 1996) and stifles innovation (Fosfuri & Tribó, 2008). Overall, these studies conclude that firms differ in their AC and generally benefit from this ability.

ENTREPRENEURIAL ENGAGEMENT

Entrepreneurship as an intellectual field has had a long history (Aldrich & Ruef, 2006; Gartner et al., 1992) and was launched academically around the 1970's (Landström & Benner, 2010). While the importance of entrepreneurship has long been recognized, definitions of entrepreneurship vary over time (Shepherd et al., 2018; Chowdhury, Terjesen, Audretsch, 2015). Dating as far as the 17th century, Cantillon (1755) describes entrepreneurs as those engaged in market exchanges who may profit in the face of uncertainty. Frank Knight (1916) adds that entrepreneurs face three types of uncertainty: risk, uncertainty and true uncertainty. Schumpeter (1949) suggests that entrepreneurs are gap-fillers who combine resources and, more recently, Shane and Venkataraman (2000: 218), broadly define entrepreneurship as "why, when, and how opportunities for the creation of goods and services come into existence; why, when, and how some people, and not others, discover and exploit these opportunities, and why, when, and how different modes of action are used to exploit entrepreneurial opportunities."[1]

While there are different views concerning what entrepreneurship entails, we recognize its importance for the economy of nations and society at large. Entrepreneurship is known as a driving force underlying economic development and growth (Acs & Varga, 2005; Galindo & Méndez, 2014), innovation (Acs & Audretsch, 2005; Baomol, 2010),

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[1] See Landström and Benner's (2010) work on the historical foundation of entrepreneurship research.

and job creation (Decker et al., 2014; Malchow-Møller et al., 2011; Wong et al., 2005). Entrepreneurship research has mainly focused on explaining the initiation, engagement, and performance of entrepreneurial endeavors (Shepherd et al., 2018). Entrepreneurial engagement can be defined as 'the cognitive, affective, behavioral, and organizational activities of involvement in the process of exploiting a potential opportunity' (Shepherd et al., 2018: 14). Each of these forms of entrepreneurial engagement has been shown to contribute to the performance of a new venture, whether that is firms' growth (David & Shaver, 2012), sales (Delmar & Wiklund, 2008) or financial performance (Florin, 2005; Jacobides & Winter, 2007).

INSTITUTIONAL FACTORS AND SYSTEMS

At the advent of globalization, scholars emphasized the importance of considering the institutional environment instead of studying organizations in isolation from its broader environment (Chacar et al., 2010; Peng et al., 2009). In fact, innovation and entrepreneurship need institutions to thrive (Acemogly, Johson & Robinson, 2005; Acs, Desai & Hessels, 2008; Boettke & Coyne, 2009; Bruton, Ahlstrom & Li, 2010; Nelson & Nelson, 2002; Peng et al., 2009; Yao et al., 2020). A central premise in institutional theory literature is that organizational practices, strategies, and outcomes are conditioned by country-level institutional factors (North, 1990). It is these higher-level collective institutions that constrain and shape firm behavior (Kostova & Roth, 2002; North, 1990), by "setting the rules of the game" and defining the norm for acceptable firm behavior and actions (Friedland & Alford, 1991).

As North (1990: 6) explained, 'The major role of institutions in a society is to reduce uncertainty by establishing a stable (but not necessarily efficient) structure conducive to human interaction. The overall stability of an institutional framework makes complex exchange possible across both time and space.' They do so by exerting institutional pressures on social actors that fall within their institutional realm, thereby creating a sense of country-level homogeneity regarding acceptable and appropriate firm behavior (DiMaggio & Powell, 1983). Governments need to provide institutions that allow for innovation and entrepreneurship to thrive. National-level institutional factors thus influence firm behavior.

These institutional factors can be split into formal and informal institutions (North, 2001; 2013; Yao et al., 2020). In this dissertation, I focus on the former, referred to as the codified (or written) rules and constraints, including regulations, contracts, restrictions, laws, property rights and other formal agreements. Intellectual property rights are essential institutional factors that influence organizational learning and its outcomes (Deng et al., 2019; Sweet & Maggio, 2015; Shu et al., 2015; see Candelin-Palmqvist et al., 2012 for a review).

Institutions also matter to entrepreneurship (Aguilera & Grøgaard, 2019; Shepherd et al., 2018; Zahra, 2007; Welter, 2001; Welter et al., 2019); when entrepreneurship is explained, institutions appear to be at the heart of this phenomenon (Baumol, 1990). A long intellectual tradition is built on economic systems, focusing on countries that share institutional characteristics (Koopmans & Montias, 1971). The Varieties of Capitalism (VoC) literature postulates that, within capitalism as an economic system, developed countries can be grouped based on two types, based on the extent to which the institutions are market driven. Institutional configurations consider multiple institutions to understand institutional differences across nations (Jackson & Deeg, 2008). The literature on Varieties of Capitalism (Hall & Soskice, 2001) provides a parsimonious framework to studying socio-economic institutions (Dilli et al., 2018) that may influence what firms produce and how they do so.

RESEARCH GAPS AND QUESTIONS

Considering the importance of organizational learning, entrepreneurial engagement and institutions, I seek to understand the emergence of AC and unravel the relationship between these constructs. To adequately fulfill this aim, I focus on the three research questions formulated in this section.

Over the last three decades, studies have repeatedly examined different antecedents in different empirical settings to elucidate why specific organizations possess more AC than others. We recognize two strands of research on AC antecedents. Scholars who examine AC development as a path-dependent phenomenon and those who focus on the role of managerial agency. These two strands have different underlying assumptions: the former focuses on the path-dependent AC determinants at the level

of the firm or its network (e.g. Lane & Lubatkin, 1998), the latter focuses on managerial agency at the micro-level (e.g. Yao & Chang, 2017). Individual studies advance the understanding of the effect of various antecedents on AC; however, there has been little attempt to synthesize the effect size of these antecedents and statistically accumulate these findings. Also, the extent to which antecedents contribute to AC relative to each other remains unquestioned: are antecedents associated with path-dependency or those of managerial agency more important in developing AC? Moreover, it is crucial to understand whether the effect sizes are contingent on firm characteristics, here, firm size. Finally, I am interested in understanding which underlying theory best reflects AC development and how these can be reconciled.

Research Question 1:

How do firms effectively develop their absorptive capacity?

While AC is considered to be beneficial to organizations, its effectiveness on firm performance differs (Zou et al., 2018). Scholars identified that factors related to the individuals (e.g. Tortoriello, 2015), firm (e.g., Wales et al., 2013) and industry (e.g. Lichtenthaler, 2009) influence the AC-firm performance relationship. Surprisingly, despite the strong emphasis on boundary conditions within the literature, little attention has been given to the effects of institutional factors. In the second study, I will study institutional contingencies that influence the AC-firm performance relationship across countries.

Scholars have previously already hinted at the importance of institutional contexts for absorbing external knowledge and its effect on organizational outcomes (Maldonado, Salaiz, Very & Keller, 2018; Barasa et al., 2017; Kotabe, Jiang & Murray, 2017; Zahra & George, 2002). One of these institutional factors that we expect to be especially important to AC is intellectual property rights. We intend to study the multifaceted, complex nature of IPR (Helfer, 2009; Schliessler, 2015; Van Pottelsberghe de la Potterie, 2011) and study how its system and enforcement influence the AC-firm performance relationship differently.

Research Question 2:

How do different regimes of intellectual property right influence how firms appropriate value, i.e., innovation output and financial performance, from their absorptive capacity?

While AC is important, entrepreneurial firms may also create and appropriate value through entrepreneurial engagement. Entrepreneurial engagement encompasses a wider range of activities than AC, including entrepreneurial decision-making, resource acquisition and allocation, entrepreneurial organizing and entrepreneurial commitment, sense-making, and forms of innovating and learning (Shepherd et al., 2018). Institutions have often been studied as a boundary condition for entrepreneurship (e.g. Acs et al., 2008). While institutions are deemed essential for entrepreneurship, there is growing skepticism concerning the effectiveness of these institutions (Coad et al., 2014; Ge et al., 2017), partly because they seem to lack an economic rationale (cf. Acs et al., 2016; Pathak et al., 2013). Previously, eclectic analyses of institutional influences have been studied, often in isolation from the broader institutional environment in the country. Such a *thin* approach de-contextualizes IB research and typically neglects interactions between institutions (Jackson & Deeg, 2019). We address this lacuna by further contextualizing entrepreneurship research (Shepherd et al., 2018) and by considering a set of institutions simultaneously in the wider macro-environment (e.g. Aguilera & Grøgaard, 2019), allowing the study of configurational effects. Drawing on the Varieties of Capitalism (Hall & Soskice, 2001), we investigate how the broader institutional environment influences the relationship between entrepreneurial engagement and firm performance within this parsimonious framework of socio-economic institutions.

Research Question 3:

How do institutional configurations influence the extent to which entrepreneurial organizations appropriate value from their activities?

As outlined in the research questions above, I focus in this dissertation on variables that influence AC and the appropriation of both AC and entrepreneurial engagement. These variables operate at different levels of analysis. Adopting meta-analytic techniques, I use study-level data and this data relies on data of multiple level of analysis. Integrating

theories at different levels through meta-analytic techniques advance management research (Bergh et al., 2014). In the first study, I study the development of AC and combine research related to its micro-level and firm-level antecedents, reflected by discussing the role of managerial agency and path dependency, respectively. The variables in the study operate at the individual, unit and firm level.

In the following study, I seek to understand the boundary conditions of the absorptive capacity – firm performance relationship. To understand how beneficial this learning ability is across different institutional settings, I theorize and empirically test the moderating effect of formal institutions, namely national intellectual property rights (IPR) regimes system strength and enforcement. IPR institutions are measured at the country level. The focal relationship, i.e., data of the underlying is sample, is measured on firm-level.

The focal relationship of the third study, entrepreneurial engagement – firm performance is studied on firm level. The boundary condition, however, is not an institutional factor, but an institutional configuration. The institutional configurational view considers multiple institutions and focuses on the coherence among institutional domains instead of directly affecting the focal relationship, and therefore is placed at a higher level of abstraction than the institution (IPR) in study II. Altogether, I focus on multiple levels of analysis in this dissertation. I visualize these levels of analysis and the simplified conceptual models corresponding to the three research questions in Figure 1.

RESEARCH METHODOLOGY

The dissertation includes three studies, each of which contributes to the theory in its way. The common denominator is the research methodology: a meta-analysis. Meta-analysis is defined as "the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings" (Glass, 1976: 3). Over time, empirical output grows and primary studies may produce conflicting results. To reach consensus and advance future research, meta-analysis reconciles (conflicting) results. More specifically, this methodology allows the quantitative summary of extant literature by consolidating quantitative findings. Meta-analyses focus on studies with similar dependent or independent variables and statistically aggregate empirical results,

considering both the effect size and sampling error around that estimate (Cumming, 2012, 2014; Hunter & Schmidt, 2004; Lipsey & Wilson, 2001). Researchers in medicine, psychology and biology increasingly adopt meta-analysis in their research repertoire to examine empirical findings. Meta-analytical techniques have gained traction in management research in the last two decades (Dalton & Dalton, 2005; Aguinis et al., 2009)

Figure 1 Overview Three Dissertation Studies

Unit of analysis
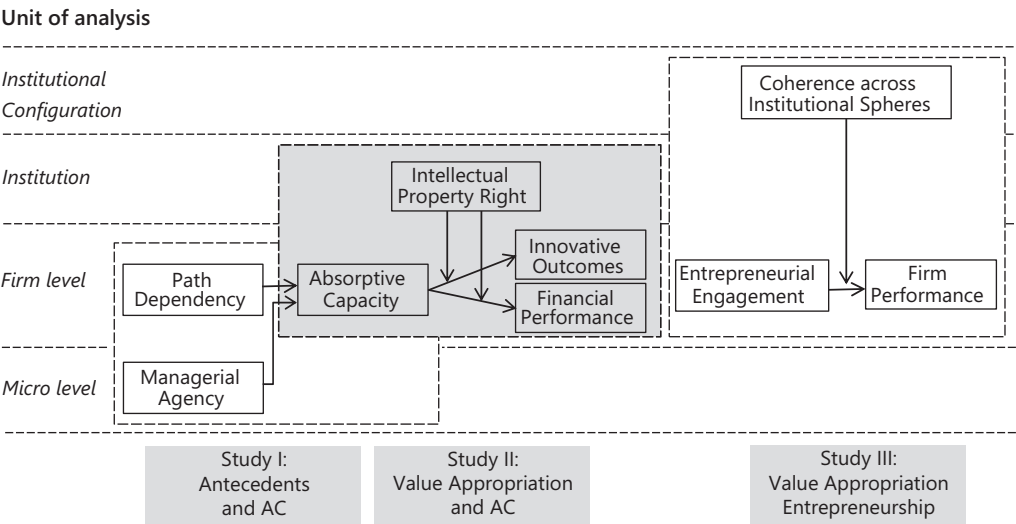
Different meta-analytic methods can be applied to the research questions mentioned in the previous section. I will elaborately discuss the meta-analytic procedures, including the estimation approach, transformation, and weighting of effect sizes, in the following chapters. In this section, I will briefly introduce three meta-analytic techniques to test the hypotheses in this dissertation: Hedges-Olkin's meta-analysis (HOMA), meta-analytic structural equation modeling (MASEM), and meta-analytic regression analysis (MARA).

HOMA is considered a traditional meta-analysis. As input, one may use the Pearson product-moment correlation or partial correction as effect size. HOMA is especially suitable when one wants to uncover the average effect size between two

variables. Understanding the effect size is especially relevant when the literature offers contradictory findings about the direction and the effect size of the focal relationships. Consider research question 1 on the relative influence of antecedents on AC; one can use HOMA to determine which antecedent most strongly influences AC and whether this effect is contingent on a moderating variable.

Recent meta-analysis developments allow us to model different theories and conduct a horse race across these theories (Bergh et al., 2016). I apply MASEM in Chapter 2 to compare the model fit of theories describing a path-dependent development of AC versus the managerial agency perspective. MASEM allows us to test previously untested mediation hypotheses and bridge the two streams of studies that have been conducted in silos (Berg et al., 2016). We used a two-step procedure, involving estimating a meta-analytic correlation matrix between variables and consequently using structural equation modeling to pit the mediation hypotheses against one another.

Another recent development within meta-analysis that has become an integral part of business and management research is MARA – a design that lends itself to examining (institutional) moderators (Gonzalez-Mulé & Aguinis, 2018; Oh, 2020). MARA is applied in chapters 3 and 4, and the partial correlation is used as the effect size as it holds other factors constant (Djankov & Murrel, 2002; Stanley & Doucouliagos, 2012). MARA estimates are conceptually identical to multiple regression analysis and specifically designed to assess the relationship between effect sizes and moderators (Lipsey & Wilson, 2001). By combining multiple single-country studies into one multiple-country study, one may study different institutional contexts.

DISSERTATION OUTLOOK

To study these research questions, I examine these questions independently in the following three chapters.

Study I: Antecedents of Absorptive Capacity

The first study deals with the factors determining the level of AC. Studies on the antecedents of absorptive capacity (AC) can be divided into two categories: those focusing primarily on the path-dependent processes and factors that determine AC,

and those focusing primarily on how managerial agency affects AC. While the path dependency studies examine in particular what effects a firm's past experiential learning, investments and network embeddedness have on AC, the managerial agency studies look at how AC is affected by managers' individual capabilities and practices. Our meta-analysis of 144 studies examines the effect sizes of both path-dependent and managerial agency variables, and whether these variables' effects are contingent on organizational size. We also study how these variables influence AC when combined. We find that managerial agency tends to be associated more strongly with AC, especially in small and medium-sized firms. In addition, we find support for a partial mediation model, in which path-dependent variables influence AC through their effect on managerial agency. At the end of Chapter 2 and 5, I discuss the contribution and implications of the study and indicate how the findings guide future research.

Study II: Institutions-Based View of Absorptive Capacity

In the second study, we seek to understand why AC seems to benefit some firms more than others. Scholars have explored individual-, firm- and industry-level boundary conditions, focusing on endogenous AC appropriation mechanisms. Introducing an institutions-based view of AC appropriation, we theorize and empirically test how IPR regime and IPR enforcement serve as exogenous constraints, moderating the absorptive capacity- firm performance relationship. Our meta-analytical assessment supports this argument. We show that the strength of a country's IPR regime positively moderates AC's effect on innovation, but negatively influences financial performance. We find the opposite moderating effect of IPR enforcement. This chapter contributes to the literature on organizational learning, international business and intellectual property right in innovation and commercialization.

Study III: Varieties Of Capitalism And Entrepreneurial Engagement

The third study draws on the Varieties of Capitalism (VoC) literature (Hall & Soskice, 2001) and examines how institutional arrangements in countries affect the relationship between entrepreneurial engagement and firm performance. As firms gravitate towards the mode of coordination for which there is institutional support, firms coordinate their activities differently dependent on the institutional context. In Coordinated Market Economies (CMEs), firms primarily depend on non-market relationships, whereas firms

in Liberal Market Economies (LMEs) coordinate their endeavors via hierarchies and competitive market arrangements.

We theorize that value appropriation from entrepreneurial engagement is influenced by the level of coherence across institutions in a given country, i.e., the degree to which they consistently adhere to the underlying CME or LME governance principles. As such, we suggest that this performance impact holds at different institutional configurations, i.e., across the LME/CME spectrum along which countries can be arrayed. We conduct a meta-analysis on our focal relationship in 13 OECD countries, finding that firms appropriate less value from entrepreneurial engagement in institutional configurations that lack coherence. Our study shows that institutional configurations at the national level are important for entrepreneurial engagement, particularly in terms of the coherence between the various institutions. We contribute to a parsimonious approach to studying institutional configurations in international business, the importance of institutional coherence relevance for entrepreneurial ventures, and, finally, to institutional equifinality.

An overview and summary of the studies can be found in Table 1 on page 17. The dissertation is visualized in Figure 1.

DECLARATION OF CONTRIBUTION

In this section, I declare my contribution and that of others for each study.

Chapter 1. This chapter was written by the author of the dissertation. The promotor, Henk Volberda provided the author with feedback on this chapter.

Chapter 2. This chapter builds on my master degree thesis and the final framework is the result of several discussions with my promoters Henk Volberda and Jatinder Sidhu. Mariah, my research assistant, contributed to the data collection. I carried out the analyses myself. My promoters provided me with feedback on the manuscripts, helped to crystallize the ideas, and contributed to writing the dissertation. I discussed many versions with my promoters.

Chapter 3. I developed the framework and conducted the data collection and analyses. Tatjana Schneidmüller helped to rewrite parts of the manuscript, so did my promoters.

Chapter 4. I generated the idea and wrote the chapter. I received assistance with data collection from Victoria and Raphael. My promoters provided me with feedback and support. I gained additional insights from the feedback I received from Andrea Herrmann.

Chapter 5. The author wrote this chapter of the dissertation. The promotor, Henk Volberda provided the author with feedback on this chapter.

I would also like to declare the insights I gained from various individuals from conferences and research seminars. This chapter served as the introductory chapter of this dissertation and provides a brief overview of the research questions and topics. The following three chapters present three different studies, as outlined in the previous section. After the studies, I conclude with a more extensive discussion of these studies in this dissertation.

1

Table 1 Overview Dissertation Chapters

Dissertation structure	Key concepts	Theoretical lens	Data and Methods	Main Gaps	Main findings
Chapter One:		Introduction			
Chapter Two: Study 1	Absorptive Capacity and antecedents	Perspectives related to path-dependency and managerial agency	Hedges-Olkins meta-analysis and meta-analytic structural equation modeling, 134 primary studies	Examination of the relative influence of different antecedents. Test the extent to which different theoretical models are reflected in meta-data.	Managerial agency influence AC more strongly than path dependencies, and both are moderated by firm size. The relationship between path dependency and absorptive capacity is partially mediated through managerial agency. Our findings suggest a co-evolutionary model of AC development.
Chapter Three: Study 2	Absorptive Capacity and value appropriation	Institutions-based view, intellectual property rights in specific	Meta-analytic Regression, 121 primary studies, 26 countries	Concerned with the boundary conditions of AC, scholars have identified individual-, firm- and industry-level constraints to firms' learning ability, and already explored endogenous appropriation mechanisms of AC at the firm- and inter-firm levels. Surprisingly, however, the role of country-level factors, including such prominent instruments as formal and informal institutions, have been largely overlooked in this regard.	We make two main contributions. First, we extend the current understanding of the boundary conditions of AC; introducing institutional contingencies to the AC-firm performance relationship. IPR influences the focal relationship both positive and negative. Second, we contribute to theory on intellectual property by dissecting it into its system and enforcement. We show that these IPR dimensions differently influence the focal relationship.
Chapter Four: Study 3	Entrepreneurial engagement and firm performance	Comparative Capitalism, Varieties of Capitalism	Meta-analytic Regression, 43 primary studies, 13 OECD countries	The benefits of institutions related to entrepreneurship policy have been often debated. This study addresses one of the key questions at the intersection of entrepreneurship and institutions, namely how do the different institutional systems affect entrepreneurial activity? We investigate the relationship between entrepreneurial engagement and firm performance, drawing on the VoC literature to examine how this relationship is influenced by consistency between the institutional spheres. There is, however, little consideration of the larger institutional configuration	Our meta-analysis of the relationship revealed that consistency across institutional spheres matters, perhaps even more than individual institutions themselves. The effectiveness of separate institutional spheres on the relationship between entrepreneurial engagement and performance is little. Only when considering the consistency to which institutions adopt a liberal market, or coordinated market approach, the effectiveness of institutions become clear.
Chapter Five:		Discussion			

Chapter 2

Path -Dependency or Managerial Agency: A Meta-Analysis on the Antecedents of Absorptive Capacity

ABSTRACT

We divide studies on the antecedents of absorptive capacity (AC) into two categories: those focusing primarily on the path-dependent processes and factors that determine AC, and those focusing primarily on how managerial agency affects AC. While the path dependency studies examine in particular what effects a firm's past experiential learning, investments and network embeddedness have on AC, the managerial agency studies look at how AC is affected by managers' individual capabilities and practices. Our meta-analysis of 144 studies examines the effect sizes of both path-dependent and managerial agency variables, and whether the effects of these variables are contingent on organizational size. We also study how these variables influence AC when combined. We find that managerial agency tends to be associated more strongly with AC. Also, we find support for a model of partial mediation, in which path-dependent variables influence AC partially through their effect on the managerial agency. Using a coevolutionary narrative, this paper concludes with an integrative framework, as well as a discussion of theoretical insights, managerial implications, and avenues for future research.

INTRODUCTION

Defined as "a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990: 130), absorptive capacity (AC) has emerged as a pivotal construct in management research. Being at the intersection of learning, knowledge and innovation, AC has been subject to extensive scholarly research and is widely applied in many different theoretical domains. Keen to know how firms develop the ability to reap benefits from novel information, scholars have sought to determine how a wide variety of antecedents may affect AC in different ways.

Although research on antecedents is burgeoning, few studies have explored the relative strengths of these various antecedents from different, sometimes competing, theoretical lenses in terms of their effect on AC. This omission in the literature is particularly striking, given (i) the need for comparison of the strength of relationships that are reflected by competing theories (Bergh et al., 2016; Volberda, Foss & Lyles, 2010), and (ii) the overarching issue of how resources can be allocated most effectively. In this study, we therefore examine the literature on AC antecedents and analyze 144 independent studies, which enables us to identify the emergence of two distinct research streams. To investigate the extent to which antecedents differ in their effect on AC, we adopt a meta-analytic approach – a design that lends itself to testing the relative strength of antecedents and their boundary conditions, and allows us to test empirically whether the antecedents are interconnected.

We categorize past work on the AC determinants based on the implicit or explicit assumption that AC is determined by either path dependency or managerial agency. Path dependency here reflects the idea that history matters, and that AC is to a large extent pre-determined by firms' past. Scholars who examine AC as a path-dependent phenomenon build on the notion that AC is accumulated by firms and look particularly at three antecedents: firms' experiential learning, network embeddedness, and investment history.

Given that path dependency can lead firms to experience inertia, other scholars have focused on the role of managerial agency, arguing that purposeful and goal-oriented individuals and practices can help firms to break free of their path dependency and to shape AC actively. Often located at a lower level of analysis within the firm, this stream mirrors the growing interest in micro-foundations of management research (Felin

et al., 2015). We categorize studies that adopt this approach into two groups: those concerned with managerial abilities, and those that focus on managerial practices. Using this categorization, we theoretically contrast and empirically test the effects of these antecedents on AC development. Our results indicate that the meta-analytic effect size of managerial agency is more strongly associated with AC.

In addition to unraveling the relative effects of the determinants of AC, we examine organizational size as a boundary condition. The role and importance of firm size have been debated extensively in the AC literature (Zou, Ertug & George, 2018). Strikingly, we find that the aggregated effect sizes are contingent upon the organizational size, with the magnitude of the effect sizes being even higher for small and medium-sized firms. Given our desire to understand the complexity of AC development, we consider theorizing exclusively from either one of these streams to be inadequate. Therefore, we juxtapose research from both streams, to empirically explore the interconnectedness of the antecedents. Our findings indicate that managerial agency partially mediates the relationship between path dependency and AC. We suggest that microcoevolutionairy theory is particularly suitable to understand these findings and present numerous avenues for future research.

We make three main contributions to the field of AC. First, we identify and distinguish between two perspectives that have underpinned research on the determinants of firms' AC, highlighting the differences between them and examining the underlying mechanisms by which past studies theorized AC development. While most of the studies focused on path dependencies, we find that antecedents related to managerial agency have a more substantial effect on AC. This finding highlights the role of antecedents at a lower level within the firm, which runs parallel to the recent surge in interest in the micro-foundations of AC. Second, our study draws attention to the importance of firm size not as an antecedent or control but as a moderator in AC development. While we find little support for the idea that the relative effectiveness of all antecedents is contingent upon firm size, we do observe significant differences in effect size, especially for network embeddedness.

Third, our empirical analysis is among the first attempts to present and test a parsimonious model of AC antecedents, highlighting how AC is shaped by the coevolution of managerial agency and path dependency. Our model breaks down the silos in which past studies have researched AC development (i.e., either path dependency

or managerial agency), signifying the interrelatedness of these antecedents. Ultimately, firms should not only focus on the antecedents with the largest effect size, but should, instead, adopt a mix of antecedents to shape firm AC and recognize the continuing interaction between these antecedents.

In the following section, we present the two streams of research on AC development. Next, we build theory on the expected relationships, discuss how organizational size functions as a boundary condition, and conceptualize a number of mediation models. We then discuss the methodological choices made, and the findings of our meta-analyses. After that, we discuss the conceptual and theoretical implications, and finally we highlight opportunities for future research.

THEORETICAL BACKGROUND

Throughout the last three decades, AC has attained a central position in management research on how firms reap benefits from novel information. Cohen and Levinthal (1989; 1990) suggest that, despite risks associated with in-house R&D activities, such as knowledge spillover, organizations develop, as a by-product, a set of related abilities associated with the valuation, assimilation and utilization of external information, referred to as AC. This by-product in turn enables firms to recognize, through industry foresight, what technologies offer promise allowing companies to keep abreast of technological developments (Cohen & Levinthal, 1994).

AC has caught the attention of scholars from different theoretical domains (Volberda et al., 2011), and existing research on its antecedents has been conducted at various levels: the individual (Lowik et al., 2017), unit (Jansen et al., 2005), dyad (Lane & Lubatkin, 1998) and, more traditionally, the organization (Wales et al., 2013). Many scholars have also recognized the multifaceted nature of AC and its different underlying dimensions (Volberda et al., 2011), leading to a multiplicity of reconceptualizations (e.g., Zahra & George, 2002; Song et al., 2018) and to the reification of AC (Lane et al., 2006). Although the definition and dimensions of AC have been subject to much debate (Lane et al., 2006), scholars are generally in agreement about its importance and there is strong support for there being a positive relationship between AC and organizational outcomes (Zou et al., 2018).

Path Dependency and Absorptive Capacity

We identify antecedents, symbolized by different organizational path dependencies, and determinants, characterized by managerial agency, as two strands of research that have underpinned the extensive research on AC development. Scholars have defined path dependency as "a rigidified, potentially inefficient action pattern built up by the unintended consequences of former decisions and positive feedback processes" (Sydow, Schreyögg & Koch, 2009: 696), which is essentially arguing that firms' history matters. Due to self-reinforcing mechanisms, organizations become locked into certain paths, or ways of behaving, and are unable to shake themselves free (David, 2001). Path dependencies are difficult to alter or reverse (Arthur, 1994) and the costs of reversal tend to be high (Levi, 1997). In some cases, external events are required before firms can break free of their path dependencies (Vergne & Durand, 2010).

The notion of cumulativeness and expectation formation, two core premises of AC, highlight its path-dependent nature (Cohen & Levinthal, 1990). The cumulative nature of AC refers to the idea that the learning process is more efficient when the object of learning relates to what is already known (Ellis, 1965); prior knowledge helps the absorption of new knowledge. The level of AC that firms have acquired also affects how firms evaluate new information; in some cases, opportunities may not be recognized, as they may be too distant for firms to see them as offering important scope for development in a particular area (i.e. influencing firms' expectation formation). Given these two premises, it comes as no surprise that research has implicitly or explicitly attributed AC development to organizational path dependencies in one way or another. AC scholars have studied three antecedents that reflect a firm's past choices and decisions and are rooted in organizational path dependencies. The first is *experiential learning*, referring to the firm's accumulated knowledge, performance history and age. The second is *network embeddedness* – as reflected in the firm's structural position, cognitive closeness to its partners, and relationship history – which enables the firm to tap into external resources. The final antecedent is *investment history*, as indicated by the firm's organizational structures, ICT and R&D, through which knowledge sharing is facilitated.

Experiential Learning

Cohen and Levinthal (1989) argue that the ability to absorb external knowledge at time T is a crucial antecedent of AC at T_{+1}. In other words, firms that accumulate AC at one point in time will also accumulate it more readily at some future point. Experiential learning thus reflects firms' past choices and decisions about developing AC, and thus continues to have an effect as firms develop further and specialize in particular technological domains. We distinguish between three elements that may reflect a firm's experiential learning: accumulated knowledge, age, and performance history.

A firm's AC derives from its accumulated stocks of knowledge (Cohen & Levinthal, 1990). The ability to absorb external information presupposes that organizations have some form of prior knowledge. The richness of the existing organizational knowledge is essential to the assimilation of new knowledge because it increases the firm's ability to recall and use knowledge (Cohen & Levinthal, 1990). A larger stock of knowledge increases the overlap between new knowledge and what is already known within the firm, facilitating the assimilation of new information. A lack of prior related knowledge, on the other hand, makes it harder to recognize potential opportunities and may dissuade firms from building AC in a particular domain (Cohen & Levinthal, 1990). A large and diverse stock of knowledge can also elicit learning since bringing together different pieces of knowledge can allow novel linkages to be made. Thus, having related areas of expertise within the organization allows knowledge to be better understood, helps firms to evaluate the importance of technological advances, and allows them to use their knowledge more effectively.

Given the history-dependent nature of AC (Cohen & Levinthal, 1990), it is also affected by firm age. AC is primarily pre-determined by the firm's history, as reflected in its past investments and choices. Moreover, since AC evolves out of learning from repeated trials (Zahra & George, 2002), older organizations will have learned more about cause and effect relationships and how to achieve greater AC. As organizations age, they tend to rely on more sophisticated routines that underlie AC (Wang, Wang, & Horng, 2010). Notably, from a routines perspective, history affects the form and variety of the AC routines developed by organizations, through clear reflection and adaptation (Lewin et al., 2011). Past decisions can lead firms to become embedded in path dependencies (Sydow et al., 2009), but older firms often find it easier to acquire and exploit information (Autio, Sapienza & Almeida, 2000).

Prior performance affects AC through either positive or negative feedback loops. Positive feedback loops build strong path dependence (David, 2001; Sydow et al., 2009), spurring organizations to delve further into technological domains, so that they become more specialized and enhance their AC. Organizations that have absorbed knowledge very well in the past are likely to keep up with advances in the industry because of their understanding of the relevant search space and their aspiration levels (e.g., Gavetti & Levinthal, 2000). Negative feedback loops, on the other hand, may lead to (premature) termination of information search in a technological domain, and to AC efforts being discontinued (Cohen & Levinthal, 1994). When combined, the three elements of experiential learning are expected to enhance the identification, assimilation and utilization of novel information.

> **Hypothesis 1a:**
> A firm's experiential learning – as indicated by its accumulated knowledge, age and performance history – will positively affect its absorptive capacity.

Network Embeddedness

Cohen and Levinthal (1990) stressed the importance of external linkages in enabling a firm to tap into new knowledge sources and recombine heterogeneous resources in novel ways. AC has, therefore, been considered to be a construct at learning dyad or learning network level, rather than at the firm level, and is dependent on the social capital of a firm's network (Lane & Lubatkin, 1998; Burt, 1992; Yli-Renko, Autio & Sapienza, 2001). Organizational networks are subject to path dependencies, highlighting the importance of an organization's history and the factors that embed it in complex networks (e.g. Gulati, Nohria & Zaheer, 2000; Kim et al., 2006). Nahapiet and Ghoshal (1998: 257) state that "like other forms of capital, social capital constitutes a form of accumulated history – here reflecting investments in social relations and social organization through time." Firms need to build social capital to collaborate with other firms effectively, and the relationships develop through a history of interactions and prior relationships (Ahuja et al., 2009). Time must pass for external relationships to be cemented and collaboration to be strengthened (Krackhardt, 1992; Jensen & Roy, 2008) and, once established, firms become locked in the social context of their external relationships, influenced by firm's past and current network (Burger & Sydow, 2014; Soda et al., 2004; Zaheer & Soda,

2009), and subject to historical imprinting (Marquis & Tilsin, 2013) and inertia (Kim et al., 2006). There are three elements that are significant in relation to firms' network embeddedness: structural position, cognitive closeness and relationship history (Nahapiet & Ghoshal, 1998).

First, a firm's structural position in a network provides some indications as to the nature of its collaborations with other firms, and enables us to evaluate the patterns in those relationships between firms, how they are configured, and the linkages between them (Inkpen & Tsang, 2005). The firm's ability to access and absorb new knowledge increases as it gathers knowledge from multiple external sources (Miliken & Martins, 1996). More frequent collaboration increases the firm's experience of knowledge search and simplifies the process of identifying and assimilating knowledge (Katila & Ahuja, 2002). Also, firms that occupy a central position in a network are connected to a broader external community, exposing them to a more extensive range of novel information (Cockburn & Henderson, 1998; Lim, 2009). Being in a brokerage position enables firms to locate information that is relevant to them (Burt, 1992). Exposure to different types of knowledge allows firms to link knowledge to rewarding opportunities (McEvily & Zaheer, 1999). Gupta and Govindarajan (2000) found that geographic proximity increases the opportunity to interact with partners, which strengthens ties, ultimately enhancing AC. Altogether, the structural dimension of the network context influences the extent to which firms can absorb knowledge from partners.

Second, cognitive closeness to partners refers to resources within the social context that provide a shared system of meaning, narrative and interpretation (Cicourel, 1973; Nahapiet & Ghoshal, 1998). Studies have shown that this can be achieved through cognitive mechanisms such as shared (technical) language or shared vision and interpretation systems (Weick, 1979, 1995). These factors enhance the bonding between firms, allowing them to integrate knowledge, and thus increase the efficiency with which knowledge is absorbed (Lane & Lubatkin, 1998). Notably, many scholars have examined the role of knowledge overlap between firms and concluded that AC enhances the transfer and understanding of novel knowledge (Lane & Lubatkin, 1998). The dominant logic of firms changes slowly (Prahalad & Bettis, 1986); it is therefore vital that the logic of a given firm should overlap, at least partly, with that of other firms. Moreover, a fit in vision and culture between collaborating firms helps to promote mutual understanding of shared goals and behaviors, which decreases the cognitive distance and facilitates

knowledge exchange (Lyles & Salk, 1996). Also, shared skills enhance firms' ability to learn from their alliance partners, allowing them to cooperate with one another more effectively. (Tanriverdi & Venkatraman, 2005). Together, these cognitive factors influence a firm's ability to acquire, assimilate, transform and exploit external knowledge.

Social motives, trust, norms and prestige are a reflection of the firm's history of relationships and inter-firm collaboration (Granovetter, 1992; Fang & Zou, 2011). Trust and cultural compatibility facilitate the development of social ties, which increase the willingness of the firm to exchange knowledge (Hurmelinna-Laukkanen & Blomqvist, 2007). When partners are more willing to share information, it becomes easier to acquire external information (Lee, 2007). Strong relational ties lead to greater informality and more conversation. Such ties also help the recipient firm to assimilate and transfer knowledge because the counterpart may be willing to help, facilitating learning and joint problem solving (McEvily & Marcus, 2005). Finally, stable social relationships help to clarify and emphasize the mutual obligations, facilitating collaboration between organizations (Misztal, 1996).

Hypothesis 1b:
A firm's network embeddedness – as reflected by its structural position in its network, its cognitive closeness to its partners, and its relationship history with them – will positively affect its absorptive capacity.

Investment History

Cohen and Levinthal note that (1990: 131) "AC does not simply depend on the organization's direct interface with the external environment. It also depends on transfers of knowledge across and within subunits," implying that the ability to utilize novel information is also dependent on internal investments to improve knowledge flows, helping organizations to consider how prior knowledge is stored and retrieved (Nonake & von Krogh, 2009) and how information is shared and interpreted. These investments build on earlier investments, are subject to past investment decisions (Manning & Sydow, 2011; Marquis & Tilcsik, 2013) and have a bearing on AC. We distinguish between three types of investment, linked to (i) information and communication technology (ICT), (ii) R&D, and (iii) organizational resources.

Prior research, particularly in the area of information systems (see Roberts et al., 2012, for a review), informs us on how IT plays a role in driving AC. Knowledge management systems facilitate the distribution and storage of knowledge (Daft, 1987), enabling employees to access and leverage newly acquired and existing information (Shin, 2004). ICT is also needed to apply and retrieve external information efficiently (Mahnke et al., 2005), and to ensure access to data across organizational units, as has been demonstrated by the use of ERP systems (e.g., Park et al., 2007; Wang et al., 2007) and integrated technologies for the provision of market information (Setia & Patel, 2013). If firms have no understanding of where they might find particular types of knowledge, they may abandon any attempt to search for it. ICT is thus important for the process of searching (Cohen & Levinthal, 1994) and keeping knowledge stocks up to date. Here, ICT plays a particularly important role, making information more readily applicable to different parts of the organization. Moreover, because ICT plays a role in the retrieval and sharing of knowledge, it also facilitates understanding of how new information fits into the firm's current knowledge base.

How organizations organize their R&D efforts also matters. Referred to as R&D co-practices (e.g., Frost & Zhou, 2005), joint technical efforts by different units enhance knowledge distribution and shared understanding. In addition, even when R&D co-practices cease to exist, they will leave behind a reservoir of knowledge that units can draw upon. Functioning as internal gatekeepers, R&D laboratories may gather information efficiently and assess its value before disseminating it to the rest of the organization. An autonomous R&D climate encourages creativity (Huang et al., 2015) and innovative behavior (Cabrera, Collins & Salgado, 2006). Continuous R&D efforts increase the likelihood that firms will be able to relate externally acquired information to their existing knowledge and better understand what information is of particular relevance to them.

Investments in organizational resources lead to unique higher-order firm structures related to integrative firm-wide planning and control. It includes structural firm characteristics that develop over time, such as reporting relationships, hierarchy and centralization. The extent to which organizations structurally free up resources is also key to AC development. It allows exploring new applications of existing knowledge needed for innovation (e.g., Bourgeois, 1981; Cyert & March, 1963), for instance, by cross-fertilizing different types of knowledge from heterogeneous sources (Greve,

2003). In addition, through processes of co-evolution, organizational structures such as centralization affect firms' ability to absorb new knowledge more readily (van den Bosch et al., 1999) and to integrate different underlying AC routines to achieve complementarities (Lewin et al., 2011), so that they can develop AC effectively.

Hypothesis 1c:
A firm's investment history – as reflected in organizational structures, R&D, and ICT investments that facilitate knowledge sharing – will positively affect its absorptive capacity.

Managerial Agency and Absorptive Capacity

Whereas path dependencies are understood to result from historical trajectories that are difficult (Arthur, 1994) and costly (Levi, 1997) to alter or reverse, and exogenous events are required to break free of them (Vergne & Durand, 2010), research on managerial agency places more emphasis on the critical role of the individual. Here, firms' administrators are seen as autonomous and self-directing actors who actively shape the development of AC and can break free from organizational path dependencies (Jones, 2006). Whereas the importance of managerial agents in AC research was stressed in the seminal article by Cohen and Levinthal (1990), little work was done on related antecedents during those early stages of AC research.

Research following this tradition focuses primarily on what happens at the individual level, thus mirroring to some extent, the growing interest in the microfoundations of organizational capabilities (e.g., Felin et al., 2015). AC is to a large extent malleable; agents and their actions are seen as being the central force behind the development of AC. Managers vary greatly in ability and activities are governed by individuals, and scholars writing in this tradition attribute the variation in organizational AC to managerial agency. These managerial capabilities shape decisions, which in turn determine how the enterprise creates, shapes and deploys its capabilities (Dosi, Faillo & Marengo, 2008). Studies that adopt this perspective can be categorized into two streams. The first stream focuses on managerial abilities, as reflected in managers' efforts to enhance human and social capital and broaden cognitive mindsets, enabling external knowledge to be absorbed. The second stream focuses on whether or not managers facilitate knowledge sharing and learning within the organization by introducing knowledge sharing practices.

Managerial Abilities

AC can be changed through managerial action, which is driven by the capabilities of individual managers (Zahra & George, 2002; Floyd & Lane, 2000). We build on the notion of managerial capabilities, which are defined as "the capabilities with which managers build, integrate and reconfigure organizational resources and competencies" (Adner & Helfat, 2003: pp. 1012; Helfat & Peteraf, 2015). Differences in the human capital, social capital, and cognitive mindsets of the firm's administrators have a bearing on how AC is developed.

Managerial human capital here refers to "the knowledge, information, ideas, skills, and health of individuals" (Becker, 2006: 292). Administrators' efforts to actively shape a strong organizational culture may encourage knowledge sharing and strong collaboration (Gumusluoglu & Ilsev, 2009). The extent to which administrators exercise leadership may also encourage cooperation within teams, which helps employees to share internal knowledge (Flatten et al., 2011). Differences in leadership, personality and values can affect decisions, potentially altering learning trajectories and efforts to develop AC.

Administrators also differ in their social capital, which refers to the sum of resources that individuals have as a result of their networking and personal relationships (Lin, 2002). This suggests that, if managers cultivate relationships that put them in particular positions in a social network, those positions (Burt, 2004) and relationships (Tortoriello, 2015) provide access to ideas (Gong et al., 2013) and knowledge that can increase AC by bringing new learning to the company. The important thing to note is that it is managers who affect AC, independent of the effects of path-dependent variables, by leveraging new relationships or introducing more informal styles of communication, for example (Darawong, 2015)

Managerial cognition is essential for sensing market opportunities (Gavetti, 2012) and transferring knowledge in diverse settings (Gary et al., 2012). Managers perceive their environment and external information through their own cognitive lens and develop their own dominant logic. Differences in dominant logic have a bearing on their view on where the firm stands in relation to its environment and what a firm is expected to do (Prahalad & Bettis, 1986), and can also direct the organization and learning efforts in particular ways. Managers' use of language also differs, affecting the construction (Renzl, 2007), modification and adoption of external knowledge (Nonaka, 1994; Cabrera,

2003), and can indicate differences in how they apply that knowledge to problems inside the organization (Cohen & Levinthal, 1990).

> **Hypothesis 2a:**
> **The managerial abilities of a firm's administrators – as reflected in efforts to enhance their human capital, increase their social capital, and broaden their cognitive mindsets – will positively affect the firm's absorptive capacity.**

Managerial Practices

Managers exercise managerial agency through their decisions on whether to introduce knowledge sharing practiecs into a team, unit or the wider organization or to introduce organizational activities such as task-based projects (Youndt et al., 1996). Since information held by one unit might be relevant to units elsewhere, AC rests partly on the degree of knowledge flow between individuals and business units (Cohen & Levinthal, 1990; Becker 2001). Empowering employees by delegating decision-making power to those lower down the organization stimulates motivation and commitment (Thomas & Velthouse, 1990), helps to foster new ideas (Konzcak et al., 2000); and supports the development of AC (Ebers & Maurer, 2014). The premise behind Six Sigma methodology, for example, is that it enables external knowledge to be acquired and stored more effectively and also encourages workers to share expertise (Chiles & Choi, 2000). Six Sigma also contributes to the development of a shared vision, which enhances AC (Gutiérrez, Bustinza & Molina, 2012). Job rotation directly enhances knowledge transfer across internal boundaries (Gupta & Govindarajan, 2000), increasing interaction and stimulating the application of new knowledge (McGrath, 2001).

> **Hypothesis 2b:**
> **Managerial practices – specifically practices designed to facilitate knowledge sharing – will positively affect absorptive capacity.**

Boundary Condition

In addition to unraveling the relative effect of the determinants of AC, we seek to examine whether size acts as a boundary condition that moderates the effect of antecedents on AC. The role of firm size has been discussed in the AC literature (Zou et

al., 2018). The importance of organizational size was also addressed in a systematic review of innovation, which showed that it differentiates innovative from non-innovative firms (Becheikh et al., 2006). Although we know that size has a direct effect on AC and learning, we know little about how the relative effect antecedents may influenced by the size of the firm.

Since firms accumulate resources when they grow, large firms are more likely to possess resources that facilitate the development of AC. These firms also tend to devote more resources to knowledge transfer (Gupta & Govindarajan, 2000). Given that larger firms may have more experience to draw upon, which may help them in identifying which information is of most relevance to them, we can expect that, for these firms, path dependency, in particular, will play a role in AC development.

Small firms, on the other hand, are endowed with fewer resources. Despite this, there are several examples where small firms nevertheless manage to successfully innovate (Audretsch, 2002). As smaller firms cannot build extensive stocks of knowledge, they might actively seek other ways of building their AC, particularly by drawing on the abilities of managers and choosing to introduce organizational practices for knowledge sharing. As small firms do not have long-established path dependencies and can change their practice more easily, we expect them to be better at building AC by exercising managerial agency. Given that managers in small firms are closer to the action, they should have more discretion to take action and will be more likely to do so; this allows them to adapt the organization and develop AC in pre-specified fields (Gavetti, 2005). The effects of managerial agency will thus be stronger.

Hypothesis 3:
The effect of antecedents on absorptive capacity is moderated by firm size: When organizations are small, path dependencies will have a weaker effect on absorptive capacity and managerial agency will have a stronger effect.

Figure 1   Conceptual Model
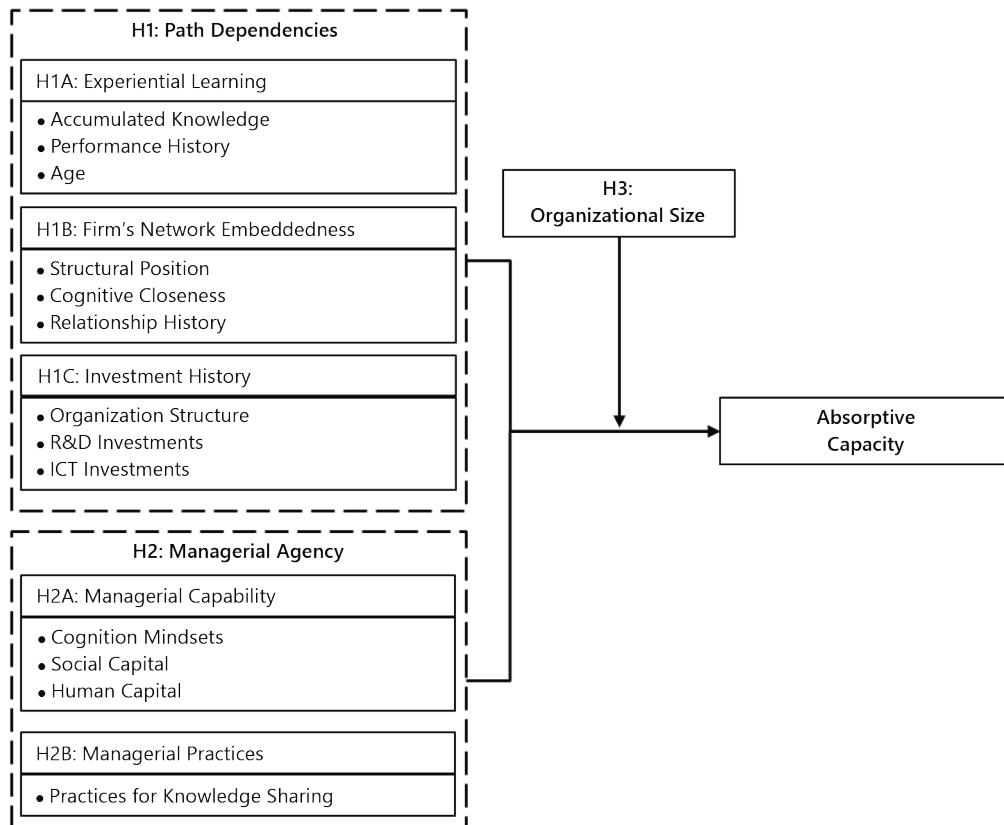
Interconnectedness of Antecedents

As noted earlier, research on AC has often been conducted in two separate streams, with the implication being that this capacity is developed either through path dependencies or through managerial agency. However, we argue that focusing solely on either of these is inadequate in terms of determining their relative strengths. At issue here is how far AC should be regarded as stemming from path dependencies as opposed to managerial agency. This divide lies at the heart of social ontology: Are behaviors and outcomes determined by social structures or by human agency? (e.g., Bourdieu, 1979; Giddens, 1984). The theoretical premise of a firm's natural trajectory (Nelson &

Winter, 1982) is that path-dependencies contribute to organizational learning. In this stream, antecedents are determined by macro-level antecedents and often entail an abrogation of individual autonomy. Here, individuals serve as conduits of information, but their actions are structured by organizational path dependencies. This assumption underlies the deterministic nature of AC, in which firms' AC is a product of accumulated experiences and investments.

This implies that path dependency determines agency, which is in turn antecedent to AC. Proponents of this view may focus solely on dyad- or network-level explanations of AC heterogeneity (Lane & Lubatkin, 1998; Henderson & Cockburn, 1994) or may even assume that individual are homogenous (Felin & Foss, 2005). The three indicators of path dependency reflect investments and organizational structures that are built over time. Firms cannot easily detach themselves from path-dependencies because the past has a bearing on the choices firms make and action they undertake due to inertia, affecting routines and capabilities, which in turn determine behavior by defining search consistent with prior learning (Nelson & Winter, 1982). This logic is also closely linked to population ecology theory, which suggests that accumulated knowledge and experiences become repositories of learning for a firm, enabling it to develop unique skills, which in turn leads to the development of homogeneous cognitive styles and heuristics (Hannan & Freeman, 1977). Here, managerial agency is determined by path dependencies, and the firm's administrators influence AC in a homogenous way, In other words, path dependencies may affect AC directly and indirectly through agents.

Hypothesis 4a:
The relationship between path dependency and absorptive capacity will be partially mediated by managerial agency.

Alternatively, the source of AC may also stem from intentions and choices of purposeful and goal-oriented agents. Here, managers in firms are seen as autonomous actors who actively shape the development of AC and can break free from organizational path dependencies (Jones, 2006). The emphasis is on adaptability and agents (e.g., Fiol & Lyles, 1985), and on how agents shape outcomes through their action and interaction (cf. Felin et al., 2012). The central premise, here, is that managerial agency not only directly influences AC, but also has bearing on path dependencies because managers

have authority and control through which they can make deliberate choices regarding structural and administrative arrangements.

More specifically, as Dodgson (1993) noted, the primary learning entity in firms is the agent, and managers can shape organizational forms, which then enable learning. For instance, managers who favor a classical management logic prefer functional organizational structures in which there is less emphasis on external information sources (Dijksterhuis et al., 1999). Extant research also demonstrated that managerial agency influences a firm's network embeddedness, for instance, through alliance partner selection (Malmendier & Tate, 2008) and the decision to acquire (Gamache et al., 2015). The introduction of managerial practices also causes changes in path-dependencies. Consider, for example, how the introduction of agile management methods broke down silos and influence organizational structures in the traditional banking industry (Birkinshaw, 2018). Overall, research seems to suggest that managerial agency affects AC both directly and indirectly through path dependency.

Hypothesis 4b:
The relationship between managerial agency and absorptive capacity will be partially mediated by path dependency.

METHOD

We use established meta-analytical techniques to test our hypotheses. A meta-analysis examines studies with similar relationships and statistically aggregates the empirical results (Cumming, 2014; Hunter & Schmidt, 2004). In other words, we summarize quantitatively the findings of previous studies that examined our focal relationship. This technique allows us not only to estimate the mean effect size of that relationship but also to test whether antecedents from different streams are interconnected.

Literature Search and Rules for Inclusion
We identified which academic studies to include using the following process. First, we took 1990 as our starting point and identified studies using the following databases: Business Source Complete, JSTOR and Google Scholar. Keywords included, but were not limited

to, "absorptive capacity," "knowledge acquisition," and "commercializing knowledge." We also examined the reference section of key conceptual and review papers (e.g., Zahra & George, 2002; Lane et al., 2006; Volberda et al., 2011) to complement our dataset of primary studies. Studies were selected for inclusion based on the following criteria: first, the central relationship in the articles needed to be between the antecedents and AC. Second, AC should be broadly consistent with the definition given by Cohen and Levinthal (1990) or that of subsequent reconceptualizations. Third, data on the sample size and correlations between AC needed to be available. The final prerequisite was that the unit of analysis should be the business unit or firm level. Our meta-analysis includes studies that were identified up to February 2015. The final sample consisted of 1991 bivariate correlations from 144 primary studies, and observations varied from 21 to 60,444 per study.

Coded Variables

After reading the articles, we identified path dependency and managerial agency as two streams and developed a coding protocol (Lipsey & Wilson, 2001). The coding procedure required one specific judgment: the coder had to decide which stream or sub-category the determinants were associated with. We hired and trained a graduate student to code a subsample of 50 randomly selected effect sizes. We then computed the inter-rater agreement and obtained a kappa value of 0.87, signifying a high degree of inter-rater reliability. When the two raters coded the data differently, they resolved these issues together and adjusted the coding scheme if necessary. Table 1 presents a more detailed overview of the variable measurements. Full details of the coding decisions are available from the first author upon request.

Meta-analytic Procedures

Hedges and Olkin-type meta-analysis (HOMA). We used the Pearson product-moment correlation (r) as effect size. The analyses were conducted using the "Metafor" package in R. We corrected the effect sizes using Fisher's r-to-z[2] transformed correlation coefficient (Fisher, 1921) to account for normality-assumption and potential skewness. We weighed the sample sizes using the inverse variance to compute mean correlations

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[2] Fisher's z-transformation: $z = \frac{1}{2} ln \frac{1+r}{1-r}$, where r stands for the correlation

and confidence intervals (Hunter & Schmidt, 2004)[3]. When studies included multiple measurements or dimensions of AC, we included them all, as this leads to increased estimation accuracy and parameter significance (Bijmolt & Pieters, 2001).

The main effect of antecedents described by Hypotheses 1 and 2 was tested by calculating the confidence interval for the aggregated effect size. This interval should exclude zero for the hypotheses to be confirmed. Hypothesis 3 was tested by calculating aggregated effect for sub-groups of studies at the level of the moderator (i.e., small and medium-sized firms versus large firms). If the confidence intervals did not overlap between the groups, this suggested that there was a moderating effect (Hunter & Schmidt, 2004).

Meta-analytic structural equation modeling (MASEM). MASEM allows us to test previously untested mediation hypotheses and bridge the two streams of studies that have been conducted in silos. We used a two-step procedure to conduct MASEM. First, we established the meta-analytical correlation matrix using separate HOMA for each bivariate relationship. Not all the hypothesized relationships needed to be included in each of the primary studies, because each cell represents a different set of primary studies (Viswesvaran & Ones, 1995). Second, we applied structural equation modeling to test "intermediate mechanisms in a chain of relationships," pit the mediation hypotheses (i.e. H4a and H4b) against one another, and examine which theoretical models is best represented in the meta-data (Bergh et al., 2016: 448). We estimate the effects using maximum-likelihood modeling (e.g. Kirca et al., 2011). The sample size was imputed by calculating a harmonic mean of 155, instead of the arithmetic mean of 499, resulting in a more conservative parameter estimate and allowing us to examine regular fit indices (Aguinis & Harden, 2009). We used the R package "Lavaan" for MASEM.

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[3] The inverse variance weight w of each effect size is calculated as follows: $\frac{1}{SE^2}$. SE stands for standard error of the effect size, which is calculated as $SE = \frac{1}{\sqrt{n-3}}$
The meta-analytic mean is calculated as follows: $\overline{ES} = \frac{\Sigma(w*s\,ES)}{\Sigma w}$. The standard error is $SE_{\overline{ES}} = \sqrt{\frac{1}{\Sigma w}}$, with the confidence intervals measured as $\mathrm{CI} = \overline{ES} \pm 1.96 * (SE_{\overline{ES}})$

Table 1 Descriptions or Definitions and Operationalization of Constructs

Construct	Description or Definition, and Operationalization
Path Dependency	
Experiential Learning	
Accumulated Knowledge	Description: The amount of knowledge that resides within the firm; Representative measurements: Patent stock, R&D stock, knowledge stock
Performance History	Description: Prior financial performance Representative measurements: Market- or accounting-based
Age	Description: Age of organization Representative measurements: (log) number of years active
Network Embeddedness	
Structural Position in Network	Definition: Overall properties of the network and social structure of relations, focused on impersonal linkages (Burt, 1992) Representative measurements: type of collaboration or frequency, network configurations, pattern of linkages (density, connectivity; hierarchy)
Relationship History	Definition: Personal relationships between actors that developed over time (Granovetter, 1992) Measurements: Respect, friendship, sociability, approval, prestige, trust, norms, obligations, identification, tie strength
Cognitive Closeness to Partners	Definition: Resources providing shared representation, interpretations and systems of meaning among parties (Cicourel, 1973). Representative measurements: Shared codes and language, shared narrative, technological overlap
Investment History	
Organizational Structures	Defined by characteristics of focal organization. Representative measurements: type of organizational structure, (time) pressure, resources, restructuring
ICT Investments	Defined by long-term arrangements focused on information and communication. Representative measurements: Integrated ICT systems, size of IT department, flexibility of ICT, IT usage or sophistication
R&D Investments	Defined by long-term arrangements focused on research and development. Representative measurements: Centralized R&D departments
Managerial Agency	
Managerial Capabilities	
Cognitive Mindsets	Definition: Managerial cognition consists of mental models and beliefs, processes and emotions (Helfat & Martin: 1285) Representative measurements: self-awareness, boundary spanning, language and participation
Managerial Social Capital	Managerial social capital consists of goodwill derived from relationships, both formal and informal, that managers have with others and can use to obtain resources and information (Helfat & Martin, 2015: 1286) Representative measurements: internal network characteristics and ties, work floor relationships, advantageous position of unit
Managerial Human Capital	Definition: "the core characteristics that human capital comprises . . . knowledge, education, experience, and skills" (Wright, Coff, & Moliterno, 2014: 361) Representative measurements: personal experiences, skills, knowledge or education
Organizational Practices	
Practices for Knowledge Sharing	Defined by a variety of managerial practices Representative measurements: just-in-time practices, job rotation, formalization, routinization, training, compensation practices
Absorptive Capacity	
Absorptive Capacity and Dimensions	Definition: "a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990: 132) Measurement: R&D investment (Cohen & Levinthal, 1990; Wales et al., 2013), scale-based measures (Jansen, Volberda & Van den Bosch, 2005)
Field Level Moderators (categorical)	
Firm size	Small and medium (i.e. <500 employees), large (>500 employees), unknown

RESULTS

Antecedents

Table 2 reports the findings of the traditional bivariate meta-analysis (HOMA), used to test Hypotheses 1 and 2. The magnitude of the relationship between path dependency and AC, based on 440 effect sizes and a total of 150,851 observations, is positive and significant (ρ = 0.189; i.e., the effect size excludes the 95% confidence interval). The antecedents underlying of path dependency, experiential learning (ρ = 0.064), network embeddedness (ρ = 0.200), as well as the firm's investment history (ρ = 0.321), are each positively associated with AC, confirming Hypothesis 1.

The effect of experiential learning on AC development is strikingly low (ρ = 0.064). To understand the relatively weak effect of experiential attributes, we took a closer look at the individual indicators. We found that accumulated knowledge (ρ = 0.231) and performance history (ρ = 0.067) are significantly associated with the ability to identify, value and exploit knowledge. Organizational age (ρ = -0.007), however, is not significantly associated with AC.

The firm's network embeddedness (ρ = 0.200), tested in relation to three indicators, encompasses the social contexts of inter-firm collaboration and positively influences AC. The results show that determinants relating to the firm's structural position (ρ = 0.220) and its cognitive closeness with partners (ρ = 0.208) are more strongly related to AC than those relating to its relationship history (ρ = 0.121).

Our findings underscore the importance of a firm's investment history (ρ = 0.321). Prior ICT investment (ρ = 0.334) and organizational structure (ρ = 0.332) are the two indicators most strongly associated with AC. Past R&D investments (ρ = 0.131) also influence the level of AC. Taken together, these findings confirm that the three antecedents that are path-dependent enhance AC significantly. However, further examination of the indicators underlying these antecedents showed that the effect sizes vary in magnitude, suggesting that there is also a relative influence of its indicators for each antecedent. The three confidence intervals of path dependency indicators exclude zero, confirming Hypotheses 1a, 1b and 1c.

The meta-analysis of the second stream of studies, focusing on the role of managerial agency, shows that the administrators' ability strongly and significantly affects AC (ρ = 0.251). Managerial cognition (ρ = 0.350) and individual social capital (ρ = 0.315),

in particular, enhance AC more than human capital (ρ = 0.218). Managerial practices (ρ = 0.198) deployed by administrators are also positively associated with organizational AC. The results of the traditional HOMA are reported in Table 2 and indicate that both managerial ability and managerial practices are significantly associated with AC. The confidence interval of the effect size of managerial abilities and practices excludes 0, which supports H2a and H2b.

Table 2   Results of HOMA Analysis: Antecedents and Absorptive Capacity[a]

| | | | | | Meta-analytic Mean Correlation (ρ) | | | | |
Predictor	k	n	Mean	SE	CI Lower Limit [b]	CI Upper Limit [b]	Q Test	I^2	T^2
Path Dependency	**440**	**150851**	**0.189**	**0.012**	**0.166**	**0.212**	**8449**	**94.9593**	**0.0559**
Experiential Learning	**113**	**31345**	**0.064**	**0.020**	**0.024**	**0.104**	**1823**	**91.7364**	**0.0409**
Prior Related Knowledge	25	6744	0.231	0.060	0.114	0.348	925	95.4582	0.0818
Prior Firm Performance	26	6472	0.067	0.019	0.030	0.104	52	49.6862	0.0041
Age	62	18129	-0.007	0.020	-0.046	0.033	363	85.0239	0.0201
Network Embeddedness	**241**	**88093**	**0.200**	**0.015**	**0.171**	**0.229**	**4206**	**94.4412**	**0.0475**
Structural Dimensions	161	65034	0.220	0.019	0.182	0.257	2984	95.3892	0.0526
Cognitive Dimensions	36	11181	0.208	0.038	0.134	0.282	541	92.5866	0.0446
Relational Dimensions	44	11878	0.121	0.027	0.068	0.174	463	86.2258	0.0253
Investment History	**86**	**31413**	**0.321**	**0.028**	**0.266**	**0.376**	**1878**	**95.3506**	**0.0615**
ICT Arrangements	45	11896	0.334	0.035	0.314	0.459	996	93.4853	0.0569
R&D Arrangements	16	6350	0.131	0.063	0.007	0.255	132	95.0697	0.0564
Organizational Characteristics	25	13167	0.322	0.047	0.229	0.414	584	94.0439	0.0498
Managerial Agency	**348**	**155526**	**0.235**	**0.014**	**0.208**	**0.261**	**7121**	**95.9274**	**0.0575**
Managerial Capabilities	**237**	**76154**	**0.251**	**0.015**	**0.221**	**0.281**	**4221**	**94.0703**	**0.0504**
Cognition	27	7211	0.350	0.057	0.238	0.462	645	95.4808	0.0822
Social Capital	45	13288	0.314	0.034	0.247	0.381	525	93.2060	0.0472
Human Capital	165	55655	0.218	0.017	0.184	0.252	2974	93.3670	0.0429
Managerial Practices	**111**	**79372**	**0.198**	**0.027**	**0.146**	**0.251**	**2260**	**97.3461**	**0.0723**
Managerial Practices	111	79372	0.198	0.027	0.146	0.251	2260	97.3461	0.0723

[a] k = number of effect sizes ; N = firm observations; SE = the standard error of the mean correlation; Q test = Hedges & Olkin (1985) chi-square test for homogeneity; I2 = scale-free index of heterogeneity

[b] Confidence interval around the meta-analytic mean is set at 95%.

We tested whether the strength of antecedents differs depending on firm size (see Table 3). We hypothesized that the effect of path dependency variables would be greater for large firms than for small- and medium-sized firms. Our findings suggest that all antecedents expect for managerial practices have a stronger positive effect for small and medium-sized firms than for large firms. The confidence intervals, however, do not exclude each other, suggesting that Hypothesis 3 should be rejected. When we

dive deeper in our results show, the data shows that for smaller firms[4], managerial abilities (ρ = 0.23), in particular, are important in developing AC. The firm's network embeddedness (ρ = 0.10) and its investment history (ρ = 0.10) are especially important for large firms but less so than for small and medium-sized firms, where the effect sizes for the antecedents are 0.20 and 0.23, respectively. Experiential learning is least associated with AC and becomes insignificant for large firms (see Table 3).

Table 3   HOMA Moderation Sub-group Analysis

Predictor	Subgroup	k	n	Mean	SE	CI Lower Limit [b]	CI Upper Limit [b]	Q Test	I^2	T^2
Antecedents										
Path Dependency	Large	92	20422	0.082	0.016	0.051	0.112	382	77.387	0.016
	SME	75	29637	0.149	0.024	0.101	0.197	935	93.517	0.038
Managerial Agency	Large	102	31107	0.176	0.023	0.131	0.221	1608	93.676	0.049
	SME	64	13962	0.203	0.026	0.153	0.254	489	88.410	0.036
Path Dependency										
Experiential Learning	Large	36	10308	0.020	0.025	-0.028	0.068	154	81.979	0.016
	SME	34	9203	0.069	0.029	0.012	0.125	170	83.665	0.021
Network Embeddedness	Large	40	5762	0.095	0.020	0.056	0.135	82	54.042	0.008
	SME	31	16245	0.203	0.037	0.131	0.275	349	94.756	0.037
Investment History	Large	40	5762	0.095	0.020	0.056	0.135	82	54.042	0.008
	SME	10	4189	0.233	0.087	0.063	0.403	259	95.257	0.067
Managerial Agency										
Managerial Capabilities	Large	67	20820	0.174	0.025	0.124	0.224	822	92.213	0.039
	SME	44	10671	0.230	0.032	0.166	0.293	374	90.284	0.039
Manageiral Practices	Large	35	10287	0.180	0.047	0.089	0.272	758	95.251	0.071
	SME	20	3291	0.143	0.039	0.066	0.220	86	79.178	0.024

[a] k = number of effect sizes ; N = firm observations; SE = the standard error of the mean correlation; Q test = Hedges & Olkin (1985) chi-square test for homogeneity; I2 = scale-free index of heterogeneity

[b] Confidence interval around the meta-analytic mean is set at 95%.

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[4] Some of the primary studies do not provide descriptive information about the firm size of their sample. Therefore, the total amount of effect sizes in Table 3 is not equal to that of the Table 2. Table includes the effect sizes of all samples and does not differentiate between the firm size.

Interconnectedness of Antecedents

Using the meta-analytic correlation matrix as input (see Table 4), we conducted MASEM and tested the hypothesized mediation models (i.e. H4a and H4b). First, we tested a direct effect model of antecedents. The findings, presented in Table 5, show that a firm's investment history (β = 0.242, ρ <0.001) and network embeddedness (β = 0.125, ρ <0.094) enhance AC, but that experiential learning does not (β = 0.02, ρ <0.787). Managerial abilities (β = 0.151, ρ <0.043) and practices (β = 0.131, ρ <0.079) both positively affect AC. This model, however, shows an inadequate fit (CFI = 0.741; GFI = 0.969; NFI = 0.700; RMR = 0.082).

Table 4   Meta-analytic Correlation Matrix

Variables	1	2	3	4	5	6	7
Experiential Learning (1)		62 (19507)	8 (5025)	47 (13011)	89 (25315)	109 (33722)	113 (31345)
Firm Size (2)	0.197		24 (21641)	48 (62288)	82 (28738)	151 (58686)	122 (204983)
Systematic Investment History (3)	0.052	0.121		33 (11592)	38 (11485)	43 (74850)	85 (31413)
Managerial Practices (4)	0.059	0.075	0.144		84 (36011)	95 (33306)	110 (79372)
Managerial Capability (5)	0.084	0.077	0.254	0.139		164 (46508)	236 (76154)
Network Embeddedness (6)	0.091	0.098	0.160	0.084	0.153		241 (88093)
Absorptive Capacity (7)	0.064	0.062	0.321	0.198	0.251	0.200	

Cells below the diagonal contain mean effect sizes. Cells above the diagonal contain the number of effect sizes (k) and the total number observations from primary studies (N) between parentheses.

Table 5   Coefficients for Direct Effect Model (Figure 1)

		Coefficients	SE	95 % CI	ρ-value
Experiential Learning	--> Absorptive Capacity	0.020	0.074	-0.054:0.094	0.787
Systematic Investment History	--> Absorptive Capacity	0.242	0.075	0.167:0.317	0.001
Firm's Network Embeddedness	--> Absorptive Capacity	0.125	0.075	0.05:0.2	0.094
Managerial Capabilities	--> Absorptive Capacity	0.131	0.074	0.057:0.205	0.079
Managerial Practices	--> Absorptive Capacity	0.151	0.074	0.077:0.225	0.043

Model fit: $\chi2$ (6): 15.127; ρ <0.019; CFI = 0.741; GFI = 0.969; NFI = 0.700; RMR = 0.082

SE = standard error; 95 percent CI = confidence interval for coefficient; CFI = comparative fit index; GFI = goodness-of-fit statistic; NFI = normed fit index; RMR = root mean square residual

Next, we tested for partial mediation. Following Dulebohn and colleagues (2012), we did not treat experiential learning as a mediator due to its insignificant direct effect (see Table 5). The results for Hypothesis 4a, in which the relationship between path dependency and AC is partially mediated by managerial agency, show good fit and summarized in Table 6 (χ^2 (5): 2.903 ρ = 0.715; GFI = 0.995; NFI = 0.940 ; RMR = 0.272). The model fit of the alternative Hypothesis, as shown in Table 7, is acceptable (χ^2 (5): 5.238 ρ = 0.388; GFI = 0.990; NFI = 0.897; RMR = 0.037). When we consider the relative fit of the models

we tested (Bergh et al., 2016), the meta-data provides support for Hypothesis 4a. This means that the model in which the relationship between path dependency and AC is partially mediated through managerial agency, as reflected in Figure 2, comes out as winner.

Table 6   Coefficients for Partial Mediation through Path Dependency

		Coefficients	SE	95 % CI	p-value
Firm's Network Embeddedness	--> Managerial Capabilities	0.115	0.079	0.036:0.194	0.144
Systematic Investment History	--> Managerial Capabilities	0.236	0.079	0.157:0.315	0.003
Firm's Network Embeddedness	--> Managerial Practices	0.062	0.081	-0.019:0.143	0.442
Systematic Investment History	--> Managerial Practices	0.134	0.081	0.053:0.215	0.096
Firm's Network Embeddedness	--> Absorptive Capacity	0.125	0.075	0.05:0.2	0.093
Systematic Investment History	--> Absorptive Capacity	0.242	0.077	0.165:0.319	0.002
Managerial Capability	--> Absorptive Capacity	0.151	0.088	0.063:0.239	0.052
Managerial Practices	--> Absorptive Capacity	0.131	0.075	0.056:0.206	0.093
Experiential Learning	--> Absorptive Capacity	0.020	0.074	-0.054:0.094	0.786
Organizational Size	--> Absorptive Capacity	-0.006	0.075	-0.081:0.069	0.939

Model fit: $\chi2$ (5): 2.903; ρ = 0.715; GFI = 0.995 NFI = 0.940 ; RMR = 0.272

SE = standard error; 95 percent CI = confidence interval for coefficient; CFI = comparative fit index; GFI = goodness-of-fit statistic; NFI = normed fit index; RMR = root mean square residual

Table 7   Coefficients for Partial Mediation through Managerial Agency (Figure 2)

		Coefficients	SE	95 % CI	p-value
Managerial Capability	--> Firm's Network Embeddedness	0.144	0.071	0.073:0.215	0.074
Managerial Practices	--> Firm's Network Embeddedness	0.064	0.081	-0.017:0.145	0.429
Managerial Capability	--> Systematic Investment History	0.239	0.078	0.161:0.317	0.002
Managerial Practices	--> Systematic Investment History	0.111	0.078	0.033:0.189	0.156
Firm's Network Embeddedness	--> Absorptive Capacity	0.125	0.075	0.05:0.2	0.093
Systematic Investment History	--> Absorptive Capacity	0.242	0.077	0.165:0.319	0.002
Managerial Capability	--> Absorptive Capacity	0.151	0.088	0.063:0.239	0.052
Managerial Practices	--> Absorptive Capacity	0.131	0.075	0.056:0.206	0.093
Experiential Learning	--> Absorptive Capacity	0.02	0.074	-0.054:0.094	0.786
Organizational Size	--> Absorptive Capacity	-0.006	0.075	-0.081:0.069	0.939

Model fit: $\chi2$ (5): 5.238; ρ = 0.388; GFI = 0.990 NFI = 0.897 ; RMR = 0.037

SE = standard error; 95 percent CI = confidence interval for coefficient; CFI = comparative fit index; GFI = goodness-of-fit statistic; NFI = normed fit index; RMR = root mean square residual

Robustness Test

We made a detailed comparison of the full mediation models used to test Hypotheses 4a and 4b, which allowed us to test potential endogenous relationships. The first full mediation model posits that path dependency affects AC through managerial agency; the fit indices are, however, inadequate (χ^2 (7) = 16.479, p = 0.019; CFI = 0.719; NFI = 0.657). The model with a reverse-managerial agency logic, in which managerial agency influences AC through path dependency, also shows a poor fit (χ^2 (7): 12.760;

p < 0.061; CFI = 03966; NFI = 0.748). We present an overview of the different fit indices in Table 8, which indicates that partial mediation is supported, rather than full mediation, as these fit indices comply with most cut-off points (Lomax & Schumacker, 2004). Our results provide evidence that the relationship between path dependency and AC is partially mediated by managerial agency. We present an overview of the hypotheses and results in Table 9.

Figure 2   Best-fitting Partial Mediation Model
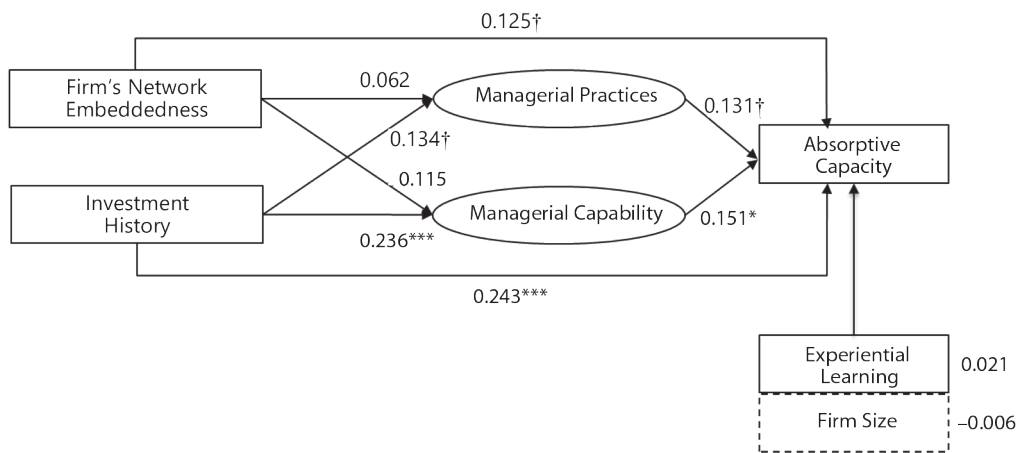
Table 8   Comparison of Fit Indices of Mediation Models

Fit indices competing models	χ2	df	CFI	GFI	TLI	NFI	RMSEA	SRMR	RMR	AIC	BIC	PNFI	p-Value	Δχ2
Managerial Agency --> Path Dependency --> AC*	12.76	7	0.839	0.977	0.654	0.748	0.073	0.054	0.748	0.073	3097.8	0.349	0.078	
Path Dependency --> Managerial Agency --> AC*	16.479	7	0.713	0.971	0.386	0.657	0.093	0.059	0.657	0.093	3101.5	0.307	0.021	
Managerial Agency --> Path Dependency --> AC	5.238	5	0.993	0.99	0.98	0.897	0.017	0.037	0.897	0.017	3100.4	0.299	0.388	
Path Dependency --> Managerial Agency --> AC	2.903	5	1	0.995	1.19	0.94	0	0.027	0.94	0	3098	0.313	0.715	2.335

* *Full mediation models*
χ2 = Chi-square; df = degrees of freedom; CFI = comparative fit index; GFI = goodness-of-fit statistic; TLI = Tucker Lewin index; NFI = normed fit index;
RSMEA: root mean square error of approximation; SRMR: standardized root mean square residual; AIC: Akaike information criterion; BIC: Bayesian information criterion;
PNFI: parsimony normed fit index; RMR = root mean square residual

DISCUSSION

What are the factors that explain why firms differ in their ability to absorb knowledge? The answer to this question differs depending on whether path dependency or managerial agency is assumed to be the antecedent of AC. Using meta-analytic techniques, we examine various indicators of these antecedents to assess their relative influence, explore organizational size as a moderator, and test the interdependence of antecedents. This enables us to offer insights into a number of central issues relating to AC. First, we identify path dependency and managerial agency as two complementary perspectives on AC development and show that, of the two, managerial agency has a more substantial effect on AC. Second, our study draws attention to the importance of firm size as a hypothesized moderator in AC development. Third, in this section, using a coevolutionary narrative, we provide an initial integration of these two strands of research and highlight the multidirectional nature of antecedents. We finish the manuscript with a discussion of the theoretical insights, managerial implications, limitations, as well as opportunities for future research.

Our results indicate that the history of investment is central to AC development. The variance across different indicators of investment, however, is intriguing. ICT arrangements are strongly linked to AC; this is in line with the extensive research on information systems (Roberts et al., 2012). Our study also highlights the importance of organizational structures for AC. In contrast, the meta-analytic effect size of R&D arrangements is small, less than half of that of organizational structure and ICT, which challenges the idea that AC is a by-product of R&D investments. Perhaps this static view of AC, as a by-product of R&D, is inadequate, and a process view would better explain the emergence of AC (cf. Lane et al., 2006).

In line with the view of relative AC (Lane & Lubatkin, 1998), our findings support the notion that a firms' AC is influenced by dyadic or network characteristics that focus on the similarity between firms. While the magnitude of effect size is relatively small, our results suggest that the relational elements are of significance to AC, an element that was initially not part of relative AC (Lane & Lubatkin, 1998). Our findings thus suggest that a broader range of elements, i.e., beyond knowledge-based components, should be considered.

Table 9 Summary Hypotheses

Hypotheses	Method	Descriptives [a]	Results [b]	Interpretation
Hypothesis 1a: A firm's experiential learning – as indicated by its accumulated knowledge, age and performance history – will positively affect its absorptive capacity.	Hedges-Olkin Meta-analysis (HOMA)	k = 113; n = 31,345	ρ = 0.046; CI = 0.024-0.104	Hypothesis 1a supported
Hypothesis 1b: A firm's network embeddedness –as reflected by its structural position in its network, its cognitive closeness to its partners, and its relationship history with them – will positively affect its absorptive capacity.	Hedges-Olkin Meta-analysis (HOMA)	k = 241; n = 88,093	ρ = 0.200; CI = 0.171-0.229	Hypothesis 1b supported
Hypothesis 1c: A firm's investment history –as reflected in organizational structures, R&D, and ICT investments that facilitate knowledge sharing – will positively affect its absorptive capacity.	Hedges-Olkin Meta-analysis (HOMA)	k = 86; n = 31,413	ρ = 0.321; CI = 0.266-0.376	Hypothesis 1c supported
Hypothesis 2a: The managerial abilities of a firm's administrators – as reflected in efforts to enhance their human capital, increase their social capital, and broaden their cognitive mindsets – will positively affect the firm's absorptive capacity.	Hedges-Olkin Meta-analysis (HOMA)	k = 237; n = 76,154	ρ = 0.251; CI = 0.221-0.281	Hypothesis 2a supported
Hypothesis 2b: Managerial practices – specifically practices designed to facilitate knowledge sharing – will positively affect absorptive capacity.	Hedges-Olkin Meta-analysis (HOMA)	k = 111; n = 79,372	ρ = 0.198; CI = 0.146-0.251	Hypothesis 2b supported
Hypothesis 3: The effect of antecedents on absorptive capacity is moderated by firm size: When organizations are small, path dependencies will have a weaker effect on absorptive capacity and managerial agency will have a stronger effect.	HOMA: Path Dependecy at large firms HOMA: Path Dependency at SMEs HOMA: Manageiral agency at large firms HOMA: Manageiral agency at SMEs	k = 92; n = 20,422 k = 75; n = 29,639 k = 102; n = 31,107 k = 64; n = 13,962	ρ = 0.082; CI = 0.051-0.111 ρ = 0.149; CI = 0.101-0.196 ρ = 0.198; CI = 0.131-0.221 ρ = 0.198; CI = 0.153-0.254	Hypothesis 3 rejected
Hypothesis 4a: The relationship between path dependency and absorptive capacity will be partially mediated by managerial agency.	Meta-analytic Structural Equation Modeling (MASEM)	Harmonic mean = 155	$\chi2(5)$ = 2,903; GFI = 0.995; NFI = 0.940; RMR = 0.272	Hypothesis 4a supported
Hypothesis 4b: The relationship between managerial agency and absorptive capacity will be partially mediated by path dependency.	Meta-analytic Structural Equation Modeling (MASEM)	Harmonic mean = 155	$\chi2(5)$= 5,238; GFI = 0.990; NFI = 0.897; RMR = 0.037	Hypothesis 4b rejected

[a] k = effect sizes; n = accumulated observations; ρ =meta-analytic bivariate effect size; CI = Confidence interval
[b] $\chi2$ = Chi-square; GFI = goodness-of-fit statistic; NFI = normed fit index; RMR = root mean square residual

Managerial Agency

While path dependencies do, of course, matter, the downside is that organizations may "become fixed to the constellations in which they proved to be successful" (Schreyögg & Kliesch-Eberl, 2007). During the initial period of AC research, there was little empirical

focus on the role of the individual or managerial practices because AC was seen as a firm-level argument, and individuals were given little empirical consideration (Volberda et al., 2011). A major source of recent contributions to AC consists of managerial agency variables that drive AC from a lower level of analysis. This shift did not take place in isolation, but alongside the micro-foundations movement, a paradigmatic shift in organization theory in which the central impetus is to understand how individual-level factors influence organizational-level outcomes (Felin et al., 2015).

Heeding to calls for more micro-foundations research (Lewin et al., 2011; Volberda et al., 2011), we distinguish between managerial agency studies based on whether AC is affected by managers' capabilities or their practices. For managerial capabilities, our findings suggest that managerial cognition and their social capital have the most substantial influence AC, while fewest studies have been conducted in this domain. However, recent scholarly contributions (e.g., Helfat & Peteraf, 2015; Lowik et al., 2017; Yao & Chang, 2017) suggest that research in this sphere is catching up. We find that indicators of managerial human capital, on the contrary, exhibit a small effect on AC while much research has been done in this regard. Our meta-analysis also confirmed the importance of managerial practices, for which the effect size is slightly weaker than that of managerial human capital.

So far, scholars have focused on these two forms of managerial agency (i.e., managerial practices and managerial capabilities). However, much remains unexplored. In terms of managerial capabilities, managerial intentionality, for example, referring to a managers' ability and intention to influence the evolutionary path of the firm (Hutzschenreuter et al., 2007), may also be of importance. Scholars may also explore the extent to which using different types of leadership behavior (Burke et al., 2006) or transitioning between different roles (e.g., Tempelaar & Rosenkranz, 2019) allows individuals to enhance AC, and may even alter path dependencies. Moreover, the introduction of agile – a managerial practice – leads to creating a new (temporary) organization structure in which employees work in squads (Birkenshaw, 2018), helping the firm overcome structural path dependencies. Managerial practices may be designed to facilitate knowledge sharing and overcome structural path dependencies.

Boundary Condition of the Effect of Antecedents

In contrast to Hypothesis 3, we find no support for the idea that the relative effectiveness of all antecedents is contingent upon firm size. However, we find intriguing results when analyzing the moderating effect of firm size on indicators separately. We find that the differences in the effect size are especially pronounced for the firm's network embeddedness, with the effect size for SMEs being double that of large firms. This finding emphasizes that, especially for large firms, tapping into external knowledge sources is critical to obtain complimentary resources (Hite & Hesterly, 2001) and stimulate innovation (Schott & Jensen, 2016). Our findings also showed that, for large firms, management practices more strongly influence AC than for small firms. These practices are particularly useful in overcoming inertia in large, traditional firms (e.g. Birkenshaw, 2018). We show that the effects of some variables are contingent on organizational size. Doing so, we draw attention to firm size as a moderator instead of an antecedent (e.g., Zou et al., 2018) or control variable (e.g., Jansen et al., 2005).

Relative influence of AC Antecedents

To understand how resources can be allocated most effectively and in response to calls on the relative effect of antecedent (e.g., Volberda et al., 2011), we compare the effect sizes in this section. We observe that the effect size of antecedents relating to managerial agency is significantly larger than those relating to path dependencies. The finding is counter-intuitive because a central premise is the cumulative nature of AC that is assumed to be at the firm level. Whether it is managerial abilities or the introduction of knowledge-sharing practices, these mechanisms underlying managerial agency may be particularly relevant to the study AC because of the high magnitude in effect size.

Considering the relative influence of path-dependencies, we notice that organizational structures and ICT, in particular, influence AC. Organizational structures enable individuals and business units to share information within the firm. ICT arrangements are also strongly linked to AC; this is in line with the extensive research on information systems (Roberts et al., 2012) and recent studies on how ICT drives the usage of data and innovation, for instance, through the application of big data (Lam et al., 2017; Niebel et al., 2018). Strikingly, we find that experiential learning has a relatively low effect on AC. High levels of prior knowledge, for instance, may limit creativity and the application of novel knowledge as firms become increasingly cognitively bound by widely acknowledged

information (Distel, 2019; Prandelli et al., 2016). More generally, prior success and extant knowledge may lead to learning myopia, as Levinthal and March (1993) argued.

The small effect size of R&D on AC could be interpreted in light of its explanatory power. Given that AC was conceptualized as a by-product of R&D (Cohen & Levinthal, 1990), scholars have been pre-occupied with R&D and R&D intensity (Lane et al., 2006) as proxies for AC. However, the meta-analytic results show that this is not the case for R&D, which supports the idea that R&D has a relatively low explanatory value in explaining AC, corroborating earlier criticism (Lichtenthaler, 2009; Lane et al., 2006). Therefore, future research should not rely solely on R&D as a proxy for AC; instead, it should use scale-based measures (e.g., Jansen et al., 2005).

In support of the micro-foundations stream of research (e.g., Felin et al., 2015), we found that managerial agency more strongly influences AC than path dependency. Highlighting the cognitive underpinnings of micro-foundations research (Eggers & Kaplan, 2013; Helfat & Peteraf, 2015), we find that managerial cognition, in particular, exhibits the largest effect size. Although our discussion on the relative influence of antecedents indicated that managerial agency more strongly influences AC than path dependency, it would be too short-sighted to conclude that managerial agency matters more. We find more support for the idea that managerial agency is partially affected by path dependency; however, this does not exclude the theoretical alternative.

Towards an Integrative Framework of AC Development

One key direction for future AC research is a comprehensive understanding of AC ante-cedents (e.g., Volberda et al., 2011) and the need to compare the strength of relationships reflected by competing theories (Bergh et al., 2016). We examine whether, and, if so, how the two streams of literature should be integrated. First, we ran a direct effect model (see Table 5). Here, we did not specify a relationship between antecedents but only from antecedents directly to AC. The corresponding fit indices were poor, which suggests that theorizing exclusively from either stream is inadequate because it does not fully capture the complexity of AC development. We continued with the examination of the competing full mediation hypotheses (i.e., Model 1 and 2 Table 8). While fit increased relative to the direct effect model, the fit indices were still inadequate.

A further examination of the results shows that both partial mediation models (i.e. H4a and H4b) further improved fit and were adequate. We found most support for the

model in which the relationship between path dependency and absorptive capacity is partially mediated by managerial agency (i.e., H4a). The differences in fit indices were small, suggesting clear interdependencies among antecedents, and reverse causality is plausible; the development of AC goes through path dependency and vice-versa through managerial agency.

We recognize both causal paths and respond to calls relating to an integrative framework of AC antecedents (e.g., Volberda et al., 2011). We complement prior work suggesting that understanding AC is inherently incomplete without considering antecedents that support the logic of managerial agency and path-dependency, reflecting different theories. Future research on AC development should be more parsimonious and combine multiple antecedents. There is a direct effect of path dependencies on AC, and this is also partially mediated by managerial agency. Future research may focus on how firms should invest in antecedents associated with path-dependencies in such a way that it also enables managerial agency to improve AC. In addition, given adequate fit indices for H4a and H4b, future research should explore the conditions under which a causal path works.

A coevolutionary narrative allows us to capture the complexity of AC development without theorizing exclusively from either stream and without assuming that path dependency precedes mangerial agency, or vice-versa. The central premise of the coevolutionary is that variables are interconnected. Recognizing this interplay between variables within the firm fits the microcoevolution (McKelvey, 1997; Lewin & Volberda, 1999; Volberda & Lewin, 2003) particularly well and helps to shed light on how antecedents coevolve, and, together, influence AC. Moreover, the interconnectedness also speaks well to the notion of AC cumulativeness (cf. Van den Bosch et al., 1999). We, therefore, posit that AC is shaped by the joint effect of managerial agency and path dependency. From this vantage point, we would conjecture that antecedents complement one another and advocate for research strategies that consider the joint outcomes of path dependency and managerial agency.

Demonstrating the joint impact of antecedents from different levels of analyses, together, on AC, our meta-analysis also responds to calls for more multilevel AC research, bridging micro, and macro research of AC (Volberda et al., 2011; Felin et al., 2015; e.g., Distel, 2019). While some scholars (e.g., Alexiou et al., 2019; Martinkenaite & Breunig, 2016) have begun to study micro and macro antecedents in one study, further research

is required. These studies, however, fall short as they do not specify both micro-macro and macro-micro relationships. The Coleman (1990) bathtub model offers a conceptual basis for handling the joint effect of managerial agency and path dependency. We adapt this model and briefly describe how the managerial agency, at the lower level of analysis, interacts with path-dependencies at the collective level of analysis. Besides influencing firm AC directly, path-dependencies may influence individuals' development and how they can freely use their managerial capabilities. The managers' experiences may serve as a filter to which certain managerial practices are chosen. Finally, going from micro to macro, and as theorized in Hypothesis 2b, managerial practices directly influence the collective AC, e.g., by sharing knowledge through job rotation (Jansen et al., 2005). Given the complexity of AC development, we suggest that future multi-level research should further validate the adaptation of Coleman's bathtub model. Figure 3, below, displays how our adaptation of Coleman's (1990) bathtub model.

Figure 3   **Adaption of Coleman's (1990) Bathtub Model**
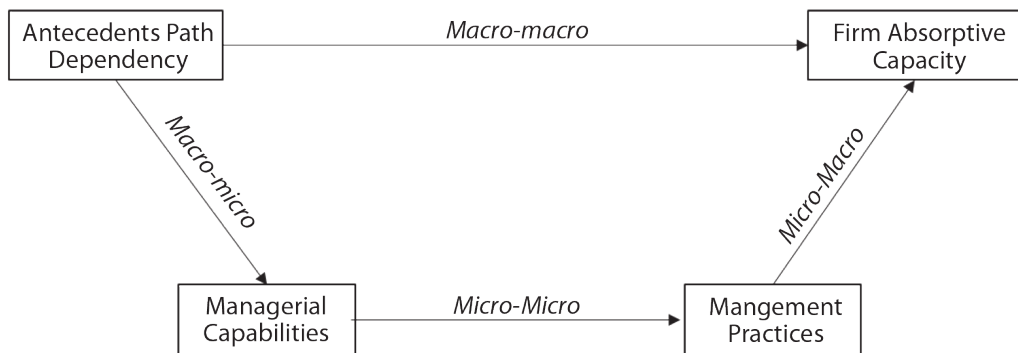
Limitations and additional Future Research

Although this paper provides some valuable insights, it also has some limitations that should be borne in mind when interpreting the findings. Meta-analyses are inherently vulnerable when it comes to validity tests since the primary research in the studies included has been conducted by others and may be susceptible to endogeneity. It is hard to make conclusive causal inferences because all the input data would need to be based on experimental designs, which is very unlikely in strategic management

(Bergh et al., 2016). Any meta-analysis also involves a variety of judgment calls that may influence the study's outcomes. One such call is which studies are relevant to include. Another task that involved a judgment call in our study was how the primary studies were coded. We mitigated the first bias by conducting an exhaustive search for potential studies. We minimized subjectivity in coding by having a second coder and calculating the inter-reliability rate.

Concerning AC construct validity, we do not control for different dimensions or measurements of AC, but that can be seen as a strength as AC encompasses much more than, for instance, R&D investments and knowledge stocks (Lane et al., 2006). While we find more support for the idea that managerial agency is partially affected by path dependency, this does not exclude the theoretical alternative. Finally, our study was affected by the fact that many of the primary studies either did not mention firm size when describing their sample or had samples that covered all sizes of firms, which inhibited us from capturing heterogeneity across studies fully.

In this study, we have concentrated only on the total amount of AC within any one firm, without looking at the precise nature of that AC. Future studies could focus on whether antecedents influence the breadth and depth of AC differently (Van den Bosch et al., 2003). The breadth of AC extends the scope of knowledge to other knowledge domains and may be obstructed by prior specialization. The depth of AC stands for the absorption of additional knowledge in a knowledge domain where the firm is active and involves specialization and efficiency, and we may expect path dependencies to be particularly important here due to prior investments. Future research may also examine whether antecedents equally influence internal and external AC capabilities (Lewin et al., 2011).

In light of alternative moderators on the antecedents – AC relationships, future studies are encouraged to study the effect of environmental conditions on our frame-work. National (Lewin et al., 1999) and industry context (Djelic & Ainamo, 1999; Sahaym, Steensma & Schilling, 2007) have an impact on organizational forms. Past research showed that organizational forms, on its turn, influence firm AC (Jansen et al., 2005). High levels of AC may also influence the knowledge environment by bringing in new knowledge (Van den Bosch et al., 1999) and introducing new standards or organizational forms. Under weak institutional regimes, the effect of R&D on AC may be smaller as firms are forced to redirect their resources towards network embeddedness and rely

more, for instance, on political capabilities (Kotabe et al., 2017). In addition, future studies may also study the contingency of industry. Do antecedents of AC look different, for example, in pharma and chemical versus computer software? Theoretically, such exploration would contribute to the nested hierarchy (Baum & Singh, 1994) of AC, i.e., how AC microcoevolution is embedded within higher coevolution levels.

This paper also contributes to managerial practice. From a manager's standpoint, understanding the relative influence of the determinants of AC is of significance, given the economic stakes associated with AC outcomes such as innovation and performance (Zou et al., 2018), and the related allocation of resources needed to develop AC. Also, the importance of the role played by managers is emphasized by the fact that the direct relationship between managerial agency and AC is stronger than that of path dependency and AC. With this study, we provide a managerially actionable framework that is parsimonious and gives insight into a wide variety of variables associated with AC development.

CONCLUSION

Given that AC has been considered highly relevant, both theoretically and managerially, scholars have conducted a considerable amount of research on its antecedents for the past three decades. In this study, we identify two strands of research focused on five sets of antecedents. We aggregate and consolidate the findings of prior research and examine what they reveal about how AC emerges. Our results indicate that these antecedents vary in terms of the strength of their effect and that organizational size acts here as a boundary condition for the effect of network embeddedness. The importance of the role played by managers is emphasized by the fact that the direct relationship between managerial agency and AC is stronger than that of path dependency and AC. We show the relationship between path dependencies and AC is partially mediated by managerial agency, highlighting the complex nature of AC. Finally, we contribute an integrative framework in which AC is shaped by the coevolution of managerial agency and path dependency, unifying the two streams of literature

Chapter 3

Absorptive Capacity Appropriation and Intellectual Property Rights: A Cross-country Analysis
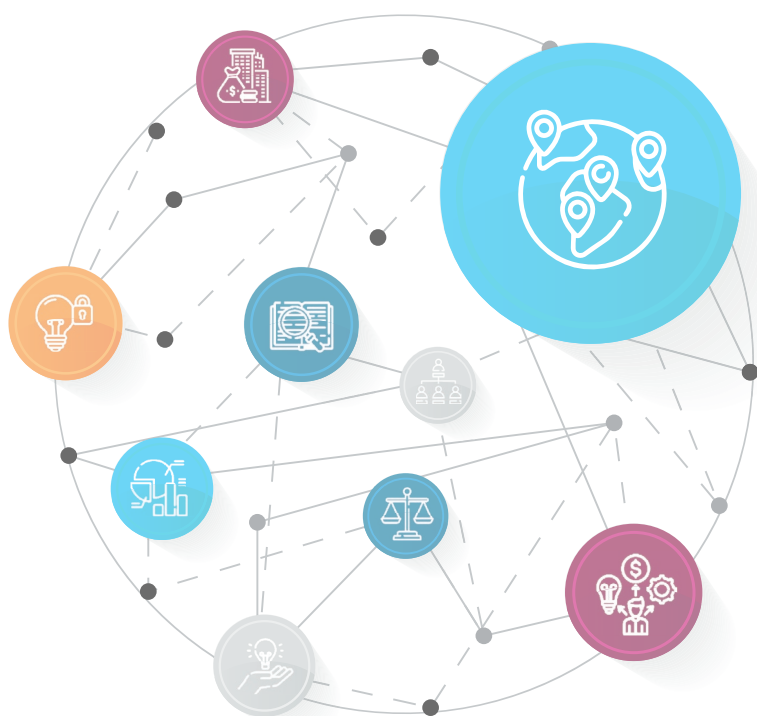
ABSTRACT

In this paper, we explore the effect of IPR regimes on the absorptive capacity (AC)—firm performance relationship to further explain heterogeneity in AC appropriability across countries. We build on the notion that intellectual property rights (IPR) are central to knowledge and knowledge appropriation, and thus, affect organizational learning and the extent to which such learning can be leveraged to commercial and innovative means. We distinguish between IPR system strength and IPR enforcement to theorize and empirically test the moderating effect. With our meta-analytical assessment we find support for our hypotheses, emphasizing the importance of dismantling IPR into its two components. Specifically, we show that the strength of a country's IPR regime positively moderates the effect of AC on innovation performance, but negatively influences financial performance. We find the opposite for IPR enforcement. With our findings, we contribute to the organizational learning, and intellectual property rights literatures.

INTRODUCTION

Burgeoning scholarly interest in absorptive capacity (AC) – the organizational ability to leverage external knowledge for superior organizational performance (Cohen & Levinthal, 1990) – over the last three decades highlights heterogeneity in AC appropriation (Kotabe et al., 2017; Moon et al., 2019; Yao et al., 2020). While the overall effect of AC on organizational outcomes, most importantly innovation and financial performance, appears to be positive (Zou et al., 2018), some scholars caution that AC may not always result in enhanced performance (e.g., Huang & Rice, 2009; Kotabe et al., 2017; Moon et al., 2019). In turn, advances have been made to explore the boundary conditions of AC appropriation (on firm and inter-firm levels) (e.g. Tortoriello, 2015; Wales et al., 2013) and firm appropriation strategies (e.g., Zahra & George, 2002), including secrecy and lead-time (e.g. Cohen, Nelson & Walsh, 2000; Ritala & Hurmelinna-Laukkanen, 2013).

What is currently lacking in AC research and our understanding of AC appropriation is the consideration of the role of the (national) context (Yao et al., 2020), and intellectual property rights (*IPR*), specifically. This is a crucial omission in literature, not only considering the vast heterogeneity in AC appropriation documented across studies (with often varying geographic and national contexts), but also because benefitting from investments in knowledge and innovation through IPR is key to innovation and technology policy (Leiponen & Bymma, 2009). National IPR regimes influence important knowledge-based learning and innovation activities, including R&D collaboration and knowledge transfer (Li, 2013), as well as firms' appropriation strategies, such as product (to market) timing (Paik & Zhu, 2016) and institutional arbitrage (Zhao, 2006). Additionally, IPR allows examining under what conditions investing in AC pays off, whereas extant studies often overlook AC-associated costs (Volberda et al., 2011; Yao et al., 2020). Furthermore, scholars have previously already hinted at the importance of the national context for knowledge appropriation (Teece, 1986), external knowledge absorption (Van den Bosch et al., 1999; Zhai et al., 2018), and its effect on organizational outcomes (Barasa et al., 2017; Kotabe et al., 2017; Zahra & George, 2002; Yao et al., 2020). It is, thus, puzzling that little attention, except for Yao and colleagues (2020), has been dedicated to studying contextual constraints that could shed further light on heterogeneity in AC appropriation.

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In this study, we investigate how national structures (here: IPR regimes) moderate how firms can capture value from their AC. Focusing on patenting, we distinguish between IPR system strength and IPR enforcement and theorize how these impact firms' capacity to extract value from their learning ability across countries. Such considerations are particularly pressing for firms that operate in multiple varying, and/or plan to expand to differing national settings. To investigate to what extent IPR regimes serve as enablers/barriers to AC appropriation, we adopt a meta-analytic approach – a design that lends itself to the examination of country-level moderators. Synthesizing observations from 126 primary studies across 24 countries, we find intriguing results, highlighting the convoluted impact of IPR regimes on AC appropriation.

We make two main contributions. First, we contribute to the field of organizational learning (Cohen & Levinthal, 1990) by extending our current understanding of the boundary conditions of AC appropriation (e.g., Yao et al., 2020). Specifically, we shed light on how country-level arrangements affect the AC – performance relationship and explore whether some are more conducive to firm success than others. In fact, we demonstrate that some country-level contingencies related to the national environment enable firms to successfully appropriate value from their learning ability, while others may inhibit such behavior.

Secondly, we contribute to literature on IPR (Chung, Lorenz & Somaya, 2019; James, Leiblein & Lu, 2013; Savage, Li, Turner, Hatfield & Cardinal, 2020; Somaya, 2012; Somaya et al., 2011; Ziedonis, 2008) by showing that IPR system strength and enforcement have differing effects on different organizational outcomes. We thus present a more nuanced view of the effect of IPR and its influence on firm performance and advocate more attention to the intricacies of IPR in scholarly work.

THEORETICAL BACKGROUND

Defined as "a firm's ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990: 128), AC culminates in the commercialization of external knowledge, bringing innovations to the market. Conceptualized as the organizational ability to leverage external knowledge (cf. Song et al., 2018), AC has received ample research attention from a broad audience of scholars

across disciplines over the years (Volberda, Foss & Lyles, 2010). This not only led to a multitude of reconceptualizations (Lane, Koka & Pathak, 2006), and cross-fertilization of other, often loosely related, research fields, but also established AC as a research field within organizational studies in its own right.

Despite considerable heterogeneity, scholars overall agree on a positive relationship between AC and organizational outcomes (Zou et al., 2018; Maldano et al., 2018). For instance, higher levels of AC have been found to enhance organizational pro-activeness in exploiting opportunities (Cohen & Levinthal, 1990), encourage knowledge acquisition from foreign parents (Lyles & Salk, 1996), improve firms' ability to process and transfer knowledge (Gupta & Govindarajan, 2000), help firms introduce new products and technologies (Bierly, Damanpour & Santoro 2009), and lead to competitive advantage, making organizations more flexible and spurring innovation (Zahra & George, 2002). Furthermore, AC enables firms to enhance their operational efficiency, lower costs, and ultimately increase profits (Cohen & Levinthal, 1990). On the other hand, lack of AC inhibits knowledge transfer (Minbaeva, Pedersen, Bjorkman, Fey & Park, 2003; Szulanski, 1996) and stifle innovation (Fosfuri & Tribó, 2008).

Importantly, research also indicates that firms vary in the degree to which they can appropriate value from their organizational learning ability (e.g., Kotabe et al., 2017; Moon et al., 2019). Cimoli, Dosi, and Stiglitz (2008: 8) define appropriability "as the ability of the originators/owners of the process and product technologies to keep to themselves the relevant underlying knowledge and/or the ensuing claims to the economic benefits coming from the exploitation of such knowledge." Previous studies have identified a multitude of mechanisms, at the firm- (e.g., Cohen et al., 2000; Hurmelinna-Laukkanen & Puumalainen, 2007; Leiponen & Byma, 2009), and the inter-firm levels (Ritala & Hurmelinna-Laukkanen, 2013) at firms' disposal to appropriate value from their AC and to protect innovations from imitation. Examples include, but are not limited to secrecy, speed to market, human resource management practices and lead time. Intrigued by firm heterogeneity in AC appropriation, scholars have explored how factors at the individual (Tortoriello, 2015), firm (Wales, Parida & Patel, 2013), industry (Lichtenthaler, 2009), and wider environment (Zhai et al., 2018) levels moderate AC appropriation. Yet, little, is known about the role of the national environment, and national structures and arrangements, such as intellectual property rights.

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AC appropriability, however, is at least partly, determined by the environment. At its core, the construct of AC calls for external knowledge and thus depends on knowledge contingencies (Song et al., 2018), such as intellectual property rights protection, which in turn is a characteristic of the national environment. Additionally, firms are embedded in their operational environment, meaning their operations and strategies are conditioned by the higher-level external structures and arrangements (North, 1990). Appropriability, too, then is affected by larger, country-level factors. In fact, early research on AC already hinted at the importance of the environment (Zahra & George, 2002). Thus, the extent to which firms can obtain organizational value from their AC depends on both, micro, firm-level (Cohen et al., 2000) and macro, higher, environment-level (Teece, 1986) factors.

Yet, with the exception of Yao et al. (2020), to date, it remains mostly untested whether the value of AC can be equally appropriated across different macro-level settings. Examples from emerging markets, in particular, emphasize the difficulties firms can face appropriating value from their learning efforts in different contexts (Kotabe et al., 2017; Peng & Luo, 2000). For instance, Zhao's (2006) study of 1,567 MNEs suggests that firms are forced to adjust their internal appropriability regimes if formal institutions are lacking. Consequently, to advance our understanding and to complement prior work on firm-external boundaries to AC appropriation – (e.g., Hurmelinna-Laukkanen & Puumalainen, 2007; Ritala & Hurmelinna-Laukkanen, 2013; Hamel, 1991), we draw attention to higher-level, macro regimes of appropriability at the country-level. Our approach is in line with recent calls across disciplines that highlight the importance of studying focal relationships in the national context, rather than in isolation (Eden, 2010; Li & Qian, 2013; Peng et al., 2009).

Knowledge and the environment

The knowledge-based view (Grant, 1996) asserts that knowledge is the main determinant of superior performance and firms' most important resource. Hence, knowledge creation/acquisition, diffusion and protection are key to organizational processes and capabilities (Foss, 2007). These, in turn, are subject to environmental contingencies (Peng et al., 2009; North, 1990). By "setting the rules of the game", environmental structures define the norm of acceptable behavior (Friedland & Alford, 1991), exerting pressures on social actors that fall within their realm. In so doing, they shape and constrain firm actions (Kostova & Roth, 2002; North, 1990). The result is a sense of country-level homogeneity regarding firm behavior (DiMaggio & Powell, 1983).

The range of acceptable firm behavior within an environment was poignantly coined by Simon (1945) as the "zone of conformity." Organizations generally gravitate towards and actively pursue to operate within these bounds, as they seek to secure support and acceptance from their operating environment (Friedland & Alford, 1991). While prominent examples of how environmental pressures translate into firm strategic behavior concern the adoption of practices (Vasudeva, Alexander & Jones, 2014) and strategic response (Oliver, 1991; Meyer, et al., 2009;), they also affect boundary-spanning activities (Gittelman, 2006), hence also organizational learning (Cohen & Levinthal, 1990) and its appropriation.

Intellectual property rights as characteristics of the national environment

Formal IPR, and in our case, patents, are key to innovation and technology policy (Leiponen & Byma, 2009). Patent systems represent legal constraints that governments introduced to reduce uncertainty in economic exchange and stabilize expectations by structuring interactions among firms (North, 1990). Furthermore, by conferring IPRs to inventors (e.g., patents) and guaranteeing protection for their creative efforts through enforcement, governments aim to incentivize inventors and encourage them to commercialize their creative endeavors (Mazzoleni & Nelson, 1988). Consequently, scholars have extensively studied whether society and patentees benefit from patent systems (Chirico & Salvato, 2016; Nordhaus, 1969; Trajtenberg & Jaffe, 2002; Greenhalgh &Rogers, 2007). Findings confirm that such systems vary in many ways (van Pottelsberghe de la Potterie, 2011). We thus postulate that the variation in the strength and quality of these macro-level factors may help explain heterogeneity in AC appropriation across countries.

Following conventions in IPR research (e.g., Dai, Zeng, Qualls & Li, 2018), we distinguish between IPR system strength and IPR enforcement quality. IPR system, in our context, thus refers to the strength of the patent filing system, whereas IPR enforcement concerns the possibility of using or threaten to use litigations to exercise firms' rights to either discourage infringers from using patented innovations or to pay royalties (Somaya, 2012). Other examples of formal IPR include copyrights, and trademarks, among others.

IPR system strength and AC appropriation

The strength of IPR regimes influences the degree to which organizations can focus on value appropriation from their learning ability. A well-functioning IPR system is known to increase R&D collaboration (Li, 2013) and facilitate knowledge transfer in alliances

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(Zhang & Zhou, 2013), allowing firms to better identify and utilize external knowledge (Li & Qian, 2013). On the one hand, absence of a clear IPR system has generally been found to obstruct firms' ability to benefit from their unique resources (Acemoglu, Johnson & Robinson, 2005). Bjørnskov and Foss (2013; 2016) suggest that IPR systems promote innovative behavior and firm risk-taking. Without, or with weak, formal IPR systems in place, organizational investments are at risk (Aidis et al., 2008) as firms cannot protect their proprietary knowledge, requiring organizations to direct their attention, time, and efforts towards developing and deploying internal protection mechanisms. Consequently, in countries with weak IPR regimes, firms may need to complement their AC with a political network capability to overcome institutional voids (Kotabe et al., 2017). Additionally, Teece (2006) advocates leveraging firm complementary assets to appropriate value of innovation in these settings.

In countries with strong IPR systems, firms benefit from the knowledge generated by other firms. To patent, firms must detail their inventions' sophistication (Guellec & Potterie, 2000; Makri, Lane, & Gomez-Mejia, 2006). When firms can protect their proprietary knowledge, they are safeguarded against potential infringements and are thus encouraged to share their knowledge and collaborate. Access to larger knowledge pools, in turn, enables firms to easier identify and internally use valuable external knowledge, as well as develop industry foresight (Cohen & Levinthal, 1994). Van Dijk (2000) confirms that organizations are more likely to reap the benefits and appropriate value from external knowledge when firms' knowledge assets are protected. Conversely, weak IPR systems may lead to unfair competition and technology imitation, inhibiting innovation and companies' willingness to collaborate (Zhao, 2006; Allred & Park, 2007).

On the flip side, IPR systems are becoming increasingly more complex. The complexity stems from patent thickets, fuzzy boundaries, and the probabilistic nature of IPR systems (Bessen & Meurer, 2007; Lemley & Shapiro, 2005), among other factors. Patent thickets present a particularly curious case. As dense webs of overlapping patent rights (Shapiro 2001, Hall & Ziedonis, 2001), individual patents cover little innovative progress, yet jointly create an overwhelming sense of information abundance. The associated looming threat of litigation due to involuntary patent infringement in strong IPR systems may significantly delay innovation and product introduction (Hall 2004; von Graevenitz et al. 2011, 2013). Overall, patent thickets increase search and coordination costs. Additionally, firms cannot always use patented IP. Firms can block competition

by enforcing exclusive rights, increasing lead time and stifling innovation. Nevertheless, with strong IPR systems in place, inventors are reassured that their sophisticated knowledge will be protected and are thus more willing to contribute to and tap into shared knowledge pools for their own innovation pursuits.

Hypothesis (H1a):
The relationship between absorptive capacity and innovation performance, will be positively moderated by the strength of the intellectual property right system within a given country.

At the same time, with strong IPR systems in place, firms incur higher costs for protecting their own inventions, but also for using external knowledge sources. While IP protection through patents has been found to have several benefits, including larger knowledge pools, it is also a costly (Ganglmair et al., 2012; Landes & Posner 2003) and time-consuming process, involving valuable managerial resources (Agarwal et al., 2009). In fact, the estimated costs of patents may well exceed its benefits (Bessen & Meurer, 2008b; Collins, 2009). Furthermore, research on patenting strategy shows that firms can exclude competitors from or charge high fees for using patents (Somaya, 2012).

Accordingly, strong IPR systems allow for strategic plays and gaming of the IPR system. Originally, patents and patent rights have been designed to spur innovation and create order by preventing competitors from imitating, constraining patenting efforts, allowing firms to earn licensing income from their invention, legitimizing firms in the eyes of investors and peers, as well as, enabling them to gain strong negotiation positions (Cohen, Nelson & Walsh, 2000). However, today, many patents are not directly used for creating value and supporting innovation (Shapiro, 2001). Instead, they are used to block others. Furthermore, patents nowadays no longer protect tangible assets, such as production machines, but intangible assets, including ideas that often overlap. Particularly troubling are the actions of non-practicing entities (i.e., patent trolls), whose entire existence is dependent upon filing (and settling/winning) IPR lawsuits (Bessen et al., 2011). Hence, firms operating in countries with strong IPR systems must be careful and avoid stepping on "patent landmines" (Chung et al., 2019). As such, firms may need to apply defence IP strategies to avoid IP landmines (Chung et al., 2019). Similarly, strategic disclosure can mislead and may delay competitors (Somaya, 2012). Another

stalling technique is to prolong royalty negotiations. Shapiro (2010) shows that for weak patents, it is the opportunity costs of delay rather than the actual royalties that matter. Together, such practices further raise coordination and hold-up costs in strong IPR systems.

> **Hypothesis (H1b):**
> **The relationship between absorptive capacity and financial performance will be negatively moderated by the strength of intellectual property right regimes within a given country.**

IPR Enforcement and AC Appropriation

IPR enforcement refers to the use or threat of litigation to protect patented knowledge. As such, formal enforcement can incentivize firms to behave honestly and predictably, stimulating productive behaviour (Bjørnskov & Foss, 2013) and decreasing transaction costs (Barzel, 1997). Aggressive litigation can be used as a protection mechanism, and a powerful signal for competitors, aiming to decrease the extent to which firms steal away IP through hiring rivals' employees (Agarwal et al., 2009). Acemoglu and Johnson (2005) add that risk of knowledge misappropriation by competitors is highest when enforcement quality is low. Moreover, a lack of enforcement may discourage firms from entering markets, and thereby deter R&D investments (Stiglitz, 1999). This may not only decrease the number of new entrants, but also reduce knowledge spillovers, and constrain firms in seizing the full potential of their AC. Overall, IPR enforcement allows firms to devote more time and attention to AC appropriation in form of innovation, rather than strategic behaviour to navigate institutional voids (Gao et al., 2017).

At the same time, national environments with high quality IPR enforcement can be less conducive to innovative pursuits. For one, litigation, ensuing from IPR enforcement, might result in an expensive "multistage game" (Allison, Lemley & Walker, 2009; Somaya, 2003; 2012: 1089), diverting funds from innovation to costly and time-consuming litigation (Bessen & Meurer, 2008; Bessen & Maskin, 2006; Jaffe & Lerner, 2004). Another concern is the use of mutual blocking, the purposeful exclusion of competitors from the use of patents (Noel & Schankerman, 2013). Relatedly, strategic patenting has been linked to high patent litigation costs, as well as, potential ex-post hold-ups (Noel & Schankerman, 2006). Patent sharks are known to thrive on litigation and settlements,

extracting rents from putative patent infringements (Reitzig et al., 2010; 2007), rather than leveraging their AC. Notably, with patent thickets abound (Von Graevenitz et al., 2013), the threat of being accused an persecuted for patent infringement is higher in institutional environments with high quality IPR enforcement (Lemley, 2013; Teece, 1986). Hence, IPR enforcement may discourage firms from using the latest knowhow as firms can be blocked and may incur high costs before ever commercializing their inventions (Autio & Acs, 2010). Only when firms have established a patent portfolio, can they use cross-licensing to obtain the right to use patents (Grindley & Teece, 1997; Hamel, 2006). Additionally, being able to protect one's IP through enforcement, firms also forego the opportunity of benefitting from knowledge leakage and free access to knowledge generated by other firms. Therefore, with high quality IPR enforcement in place, firms are restricted in their ability to leverage external knowledge to bring out new/better products (i.e., be more innovative).

Hypothesis (H2a):
The relationship between absorptive capacity and innovative output will be negatively moderated by the quality of intellectual property right enforcement within a given country.

Being able to enforce patent protection, firms will be able to appropriate more of their proprietary know-how to commercial ends (materially embodied in their products). With high quality IPR enforcement, the consumption of illicit products and misappropriation of knowledge are known to decrease (Acemoglu & Johnson, 2005; Zhang et al., 2012). Hence, firm are likely to secure a higher market share or revenue, than otherwise. For instance, IPR enforcement can generate revenues from licensing (Pitkethly, 2001). Moreover, strong IPR enforcement decreases indirect costs, including managerial time and other resource-intensive drains on capital and human resources (Landes & Posner 2003). Also, prior experience with litigation has been found to decrease the likelihood of competitors stealing away IP by hiring each other's employees (Agarwal et al., 2009). Consequently, in high-quality IPR enforcement environments, the threat of costly and time-consuming litigation incentivizes firms to squeeze financial rents from their own IP.

Hypothesis (H2b):

The relationship between absorptive capacity and financial performance will be positively moderated by the quality of intellectual property right enforcement within a given country.

As visualized below (Figure 1), we hypothesize that IPR system strength improves value appropriation in terms of innovation (H1a), yet not in view of financial performance (H1b). Regarding IPR enforcement, we expect that the quality of enforcement enhances financial performance (H2b), however, not innovation performance (H2a).

Figure 1   Conceptual Model
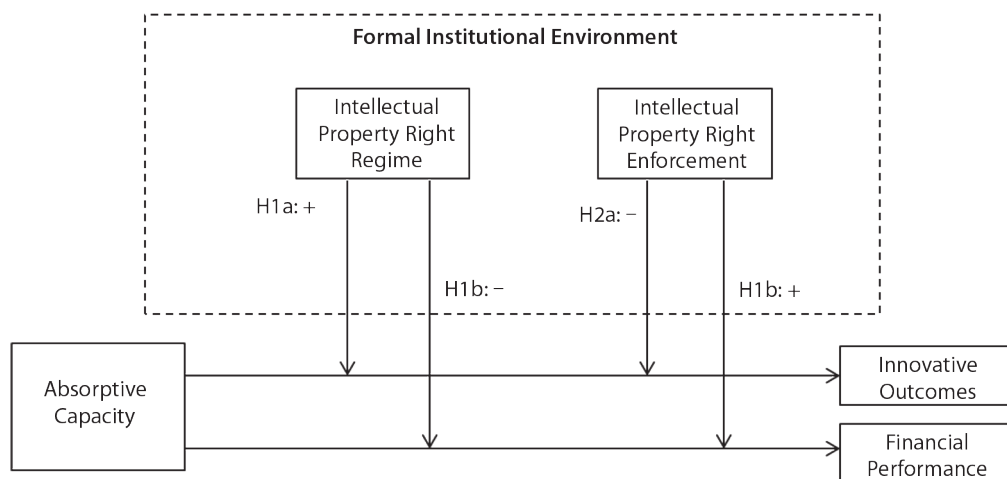
METHOD

We rely on established meta-analytic techniques to test our hypotheses. A meta-analysis examines studies with similar relationships and statistically aggregates empirical results (Lipsey & Wilson, 2001; Hunter & Schmidt, 2004). In other words, we quantitatively summarize findings of extant literature that study our focal relationship. Our data spans a wide diversity of different national contexts by combining multiple single-country

studies into one multiple-country analysis. Ultimately, this methodological technique enables us to estimate the average effect size of our focal relationship and allows us to test for country-level moderation (e.g. Aguilera et al., 2021).

Literature Search and Filtering

We identify and filter academic studies through the following process. In line with Cohen and Levinthal's (1990) seminal work on AC, we set 1990 as the starting point and identify studies using the following databases: Google Scholar, Business Source Complete, and the Web of Science. Search keywords include terms such as "absorptive capacity," "knowledge acquisition," "commercializing knowledge," and "research and development." We also examine the reference section of conceptual and review papers to identify additional relevant studies (i.e., Zahra & George, 2002; Volberda et al., 2011; Song et al., 2018).

Next, we narrow down the studies based on the following criteria. First, primary studies should examine the AC – organizational performance relationship. Second, the independent variable AC should be broadly consistent with the definition of Cohen and Levinthal (1990). Third, the study should report the minimum required information for meta-analysis. These search and filtering efforts result in a final sample of 128 primary articles, covering data from 24 countries with different institutional contexts that reflect differences in IPR regimes. The list of studies included in our meta-analysis is available upon request.

Coding and Operationalization

Coding Scheme. Following Lipsey and Wilson (2001), we designed a coding protocol to extract relevant information from the primary studies. Using this protocol, the first author coded the calculation-based information (e.g., effect size). For the non-calculation-based information (e.g., construct measurement), which required subjective judgment, the first two authors developed a coding strategy by having the second author code the non-calculation-based information of a random subsample of 15 studies. Interrater agreement was 97%. Discrepancies were resolved via discussion.

Based on characteristics of the primary studies related to the country and median year of data collection, the IPR data was matched to complement the dataset. When the median year of the primary studies could not be determined, we used the year of

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publication or closest country-level data point available. If the same study design was carried out in independent subgroups, e.g., independent samples in different countries, these results were entered as independent samples (Hunter & Schmidt, 1990; e.g., Zhao et al., 2010). The full details of the coding decisions are available from the first author upon request.

Absorptive Capacity. There is a great variety of AC measures, including static measures such as R&D investment (Cohen & Levinthal, 1990; Wales et al., 2013) and scale-based measures (e.g. Jansen et al., 2005). R&D spending is the most popular measurement of AC (Cohen & Levinthal, 1990; Zahra & Hayton, 2007) as it represents the foundation of knowledge creation and exploitation. Following Yao and colleagues (2020), we account for differences in scale-based versus static measures of AC.

Firm performance. We include various performance indicators related to both *innovation* (e.g. George et al., 2001) and *financial performance*. We account for three types of innovation outcomes: product innovation, knowledge creation, and innovation performance. Product innovation is often measured using surveys (e.g., Ritala & Hurmelinna-Laukkanen, 2013) or the number of new products on the market (George, Zahra, Wheatley& Khan, 2001). On the other hand, knowledge creation is typically measured using the number of patents. Innovation performance captures the number of new products developed (Ritala & Hurmelinna-Laukkanen, 2013), task innovation (Deng, Doll & Cao, 2008) or increase in the speed of a process (Liao, Fei and Chen, 2007). Financial performance entails market-based (e.g. stock-returns) or account-based measures (e.g. return-on-equity).

IPR. We collect data from additional sources and employ them in conjunction with those obtained from the primary studies to introduce variables related to the national environment (Doucouliagos & Ulubaşoğlu, 2008). *IPR system strength* is captured using Intellectual Property Right Protection scores obtained from The Global Competitiveness Index developed by The World Economic Forum. *IPR enforcement*, on the other hand, is proxied using the Rule of Law (e.g. van Essen et al., 2012). The Rule of Law is one of the five World Governance Indicators (Kaufmann et al., 2009). This index captures the

extent to which organizations and citizens abide by the rules, echoing the effectiveness of regulation and enforcement of law.

Control variables. The AC-firm performance relationship has been said to be affected by industry-level factors (e.g., Lichtenthaler, 2009) and the effectiveness of patents varies across industries (Cohen et al., 2000). To control for meso-level exogenous factors that may affect value appropriation from AC, we control for the *industry*, as this may influence dynamism and growth rates (Zahra, 1993). Additionally, we created a separate dummy variable to control for the *manufacturing industry* (1 = manufacturing, and 0 otherwise) due to its historical importance in IP protection (Moser, 2012). Similarly, we accounted for data being collected from *private vs public firms* (1 = private, and 0 otherwise).

On study-level, we control for the effect of measurement artifacts, specifically differences between *survey-based measurement* (e.g. Jansen et al., 2005) and *static measures of AC* (e.g., R&D intensity; Cohen & Levinthal, 1990), *firm size*, and whether the effect sizes were harvested from a study using a *panel design* (value of 0) or a cross-sectional design (value of 1). Table 1 presents an overview of all variables, measurements, and data sources.

Robustness and control checks. To test the robustness of our results against the influence of variable operationalization, model specification, and study artifacts, we control for several variables. We controlled for country-level variation across studies. GDP affects value creation through higher purchasing power and affects the diffusion and commercialization of technology (Comin & Hobijn, 2004; Caselli & Coleman, 2001). We, thus, used country GDP to control for differences between countries in overall economic development. Data for country-level differences (i.e., GDP) was obtained from the World Bank database. The characteristics of the primary study (i.e., country code and the middle year of data collection for each publication) are then matched with the values in the database.

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Table 1 Definitions of Study Constructs and Measurements

Construct	Operationalization and source
Formal Institutional Moderators	
Intellectual Property Right System Strength	Intellectual property right protection. Source: World Economic Forum
Intellectual Property Right Enforcement	Rule of Law. Source: Worldwide Governance Indicators
Country Level Control Variables	
GDP_General	Natural logarithm of GDP Source: World Bank
FDI_Country	Natural logarithm of Foreigh Direct Investment Source: World Bank
Study Control Variables	
Absorptive capacityMeasurement	Dummy variable: objective vs. subjective measurement of absorptive capacity
Industry	Dummy variable: Manufacturing, High-Tech, Service, others
Firm Performance	Dummy varibale: innovation versus financial performance
Study Design	Dummy variable: Cross Sectional or Longitudinal
Datasource	Categorical variable: Database, Survey, Mix
Firm size	Categorical variable: Small or medium (i.e. <500 employees), or large, unknown

Meta-Analytic Procedures

Hedges and Olkin-type meta-analysis (HOMA). For the first meta-analysis, HOMA, we use the partial correlation coefficient ($r_{xy.z}$) as effect size (i.e. input). By using ($r_{xy.z}$), we capture the relationship between AC (X) and firm performance (Y), given a set of n control variables (Z). Since a normal distribution is one of the assumptions of HOMA, we need to account for skewness. Hence, we correct the effect sizes using Fisher's r-to-z[5] transformed correlation coefficient (Fisher, 1921). Secondly, using Hunter and Schmidt's (2004: 205-207) formula, we weigh the respective sample sizes using the inverse variance[6] to compute meta-analytic mean correlations and confidence intervals[7]. We use

[5] Fisher's z-transformation: $z = \frac{1}{2} ln \frac{1+r}{1-r}$, where r stands for the effect size

[6] The inverse variance weight w of each effect size is calculated as follows: $w_i = \frac{1}{se_i^2 + \hat{v}_\theta}$ SE stands for standard error of the effect size, which is calculated as $(z_r) = \frac{1}{\sqrt{n-3}}$. $\hat{v}.$ is the random variance component, calculated as: $\hat{v} = \frac{Q_T - k - 1}{\sum w - \frac{\sum w^2}{\sum w}}$

[7] The meta-analytic mean is calculated as follows: $\overline{ES} = \frac{\sum(w * s ES)}{\sum w}$. The standard error is $SE_{\overline{ES}} = \sqrt{\frac{1}{\sum W}}$,

a random effects model because it accounts for heterogeneity in effect sizes (Kisamore & Brannick, 2008; Raudenbush & Bryk, 2002) and calculate the Q and I^2 statistics to assess the homogeneity of the effect size. Furthermore, we conduct sub-group analyses to test whether effect sizes differ across countries.

Meta-Analytical Regression Analysis (MARA). To test the moderating effects of local institutions, we apply meta-analytical regression analysis (MARA). Here, we also use partial correlation, because this effect size allow us to control for different endogeneity problems, such as omitted variable bias (Stanley & Jarrel, 2005), as well as to compare the effect sizes across multiple studies, as the effect size has no unit of measurements. Another advantage of partial correlation is that it measures the effect while holding other factors constant and thus provides a measure of association, ceteris paribus (Stanley & Doucouliagos; 2012). When primary studies use multiple measurements, we include multiple effect sizes because it improves estimation accuracy and parameter significance (Bijmolt & Pieters, 2001).

The estimates of MARA are conceptually identical to multiple regression analysis and specifically designed to assess the relationship between effect sizes and moderators (Lipsey & Wilson, 2001). We estimate the parameters using mixed effect modeling because this specification is more conservative (Geyskens et al., 2009), attributing effect size variability to systematic between-study differences, firm-level sampling error, and unmeasured random components (Lipsey & Wilson, 2001). We conducted HOMA and MARA using the "Metafor" package in R (Viechtbauer, 2018).

RESULTS

The following details the meta-analytic results of HOMA and MARA. The partial correlation-based HOMA ($r_{xy.z}$) of the focal relationship is shown in Table 2. In line with findings of other meta-analyses (Zou et al., 2018; Maldonado et al., 2018), our examination reveals that the AC-organizational outcomes relationship is positive ($r_{xy.z}$ = 0.158; *confidence interval* 0.139–0.176). Notably, the heterogeneity in effect size is considerable (*r* distribution: Q = 2,141 , I^2 = 0.95), suggesting that the accumulated

with the confidence intervals measured as $\mathrm{CI} = \overline{ES} \pm 1.96 * (SE_{\overline{ES}})$

effect size should be interpreted as an average instead of a true correlation value (Hedges & Olkin, 1985; Higgins, Thompson, Deeks & Altman, 2003). This observation hints at the presence of alternative explanations for systematic differences in our focal relationship.

Consequently, in order to further explore these differences, we also conducted HOMA sub-group analyses. We start off with country-level sub-group analyses, based on the assumption that countries may capture and reflect differences in the strength of national arrangements, such as IPR. In fact, we observe differences in effect sizes across geographical sub-groups, and the heterogeneity tests indicate that the between-study difference is systematic. The focal relationship is particularly strong and positive in Canada ($r_{xy.z}$ = 0.227; *confidence interval* 0.067–0.387; *n* = 6) and *South-Korea* ($r_{xy.z}$ = 0.271; *confidence interval* 0.045–0.183). Notably, we find negative effects of AC on firm outcomes in Australia and Belgium; however, these findings are based only on one study, which does not allow us to conclude anything about the accumulated effect size.

To further tease out the differences in effect sizes, we conduct MARA – an analysis specifically designed to assess effect sizes and moderators (Lipsey & Wilson, 2001). The MARA meta-analytic results are based on the partial correlation ($r_{xy.z}$) and are presented in Table 3. As hypothesized, we distinguish between AC's influence on innovation, i.e., Model 1 and 2, and financial performance, i.e., Model 3 and 4.

Controlling for study artifacts, Model 1 indicates that AC's effect on innovation is positive and significant (β = 0.0684, $p < 0.001$). Following Yao and colleagues (2020), we controlled for the type of AC measurement. Studies that measure AC using subjective scales (e.g. Jansen et al., 2005) exhibit considerably higher effect sizes (β = 0.1266, $p < 0.001$) than those studies that measure AC through objective scale (e.g., R&D intensity). Other control variables, including firm size (β = -0.0570, p = 0.035) and whether firms are active in manufacturing (β = 0.0592, p = 0.035), also influence the focal relationship. Notably, public firms (β = 0.1351, p = 0.001) appropriate more innovation value from their AC. The control variables in Model 1 capture a reasonable amount of heterogeneity (R^2 = 38.21%). Model 2 adds the influence of IPR system strength (H1a) and IPR enforcement (H2a) on the model. Our findings indicate that the former positively influence the focal relationship while the latter decreases the effect, confirming both Hypotheses 1a and 2a. Adding these variables increases the heterogeneity captured (ΔR^2 = 1.90%).

Table 2 **Partial Correlation-based HOMA Results Absorptive Capacity – Firm Performance**

Country	k	n	Mean	s.d.	CI Lower Limit (B)	CI Upper Limit (B)	Q Test	I^2
Absorptive Capacity to Organizational Outcomes								
Total incl. Mix	242	331855	0,161	0,009	0,143	0,180	2313	96%
Total excl. Mix	228	329468	0,158	0,009	0,139	0,176	2141	95.11%
Australia	1	292	-0,207	0,059	-0,323	-0,091	0	0
Belgium	1	428	-0,115	0,049	-0,210	-0,020	0	0
Canada	6	1759	0,227	0,082	0,067	0,387	90	3,37%
Switzerland	2	12722	0,024	0,009	0,007	0,042	0	0
China	28	191911	0,140	0,022	0,097	0,182	95	0,96%
Germany	13	3868	0,217	0,033	0,153	0,281	70	0,89%
Ecuador	1	199	0,203	0,072	0,062	0,344	0	0
Spain	29	44735	0,178	0,036	0,106	0,249	98	3,45%
Finland	5	1255	0,119	0,034	0,053	0,185	26	0,15%
France	2	4502	0,064	0,015	0,035	0,093	0	0
United Kinsgdo	20	7842	0,093	0,017	0,059	0,128	56	0,34%
Hong Kong	1	200,00	0,128	0,072	-0,013	0,269	0	0
India	1	329	0,177	0,056	0,068	0,286	0	0
Italia	4	781	0,228	0,036	0,157	0,299	0	0
South-Korea	13	2056	0,271	0,045	0,183	0,359	74	1,91%
mix	14	2387	0,196	0,070	0,058	0,334	91	4,27%
Norway	2	1377	0,110	0,083	-0,054	0,274	85	1,19%
Poland	1	41000	0,016	0,005	0,006	0,025	0	0
Portugal	3	741	0,188	0,109	-0,025	0,402	87	3,05%
Russia	2	334	0,077	0,056	-0,032	0,186	0	0
Slovenia	2	800	0,046	0,036	-0,024	0,116	0	0
Sweden	4	1247	0,166	0,030	0,107	0,226	7	0,03%
Thailand	6	644	0,271	0,045	0,183	0,359	14	0,17%
Taiwan	28	10446	0,188	0,028	0,133	0,244	87	1,90%
USA	53	27611	0,1	0,0	0,1	0,175	87	1,35%

(A) k = number of effect sizes ; N = firm observations; SE = the standard error of the mean correlation;Q test = Hedges & Olkin (1985) chi-square test for homogeneity; I2 = scale-free index of heterogeneity

(B): Confidence interval around the meta-analytic mean is set at 95%.

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Table 3 Partial Correlation-based MARA Results Absorptive Capacity – Innovation and Financial Performance

Variables	Model 1 (Innovation)		Model 2 (Innovation)		Model 3	(Financial)	Model 4	(Financial)
	B (SE)	*p* b	*B* (SE)	*p*	*B* (SE)	*p*	*B* (SE)	*p*
Constant	0.0684 (0.0111)	<.0001	-0.003 (0.0322)	0.925	0.0276 (0.0107)	0.010	0.1857 (0.0704)	0.008
Moderators and Control variables								
Type of absorptive capacity measurement	0.1266 (0.0199)	<.0001	0.1337 (0.0201)	<.0001	0.1207 (0.0224)	<.0001	0.1048 (0.0234)	<.0001
Firm size	-0.057 (0.027)	0.035	-0.0614 (0.0268)	0.022	0.0258 (0.0289)	0.372	0.0426 (0.0298)	0.154
Manufacturing Industry	0.0592 (0.0281)	0.035	0.051 (0.0282)	0.070	0.125 (0.0245)	<.0001	0.1171 (0.0258)	<.0001
Public Firm	0.1351 (0.0423)	0.001	0.1341 (0.0422)	0.002	0.0492 (0.0416)	0.238	0.0486 (0.0423)	0.250
Cross-sectional design	0.048 (0.0196)	0.015	0.0573 (0.0198)	0.004	0.0195 (0.022)	0.376	0.015 (0.0238)	0.529
Country GDP	0.0088 (0.0079)	0.266	0.0055 (0.0081)	0.499	-0.008 (0.009)	0.372	-0.0003 (0.0099)	0.975
Formal Institutions								
H1a & H1b : IPR System Strength			0.0196 (0.0071)	0.006			-0.0387 (0.017)	0.023
H2a & H2b: IPR Enforcement			-0.0247 (0.0127)	0.053			0.0475 (0.0234)	0.042
R2	38.21%		40.11%		82.72%		84.50%	
k	151		147		49		49	
Qmodel (p)	100 (6)		104 (8)		102 (6)		110 (8)	
Qresidual (p)	910 (140)		874 (138)		92 (42)		87 (40)	

a Unstandardized regression coefficients; *k* is the total number of effect sizes; Q is the homogeneity statistic; standard errors are presented between parentheses; v is random-effect variance component

b Exact values of *p* are reported

Regarding financial performance, Model 3 and 4 confirm an overall positive relationship between AC and financial performance. Here, we also observe that this effect size is more prominent in manufacturing (*β* = 0.1250, *p* < 0.001) and when AC is measured as a subjective scale (*β* = 0.1048, *p* < 0.001). In Model 4, we find that IPR system strength (*β* = -0.0387, *p* = 0.023) negatively influences the AC-financial performance relationship,

Table 4 Partial Correlation-based MARA Results Absorptive Capacity and Performance

Variables	Model 1		Model 2	
	B (SE)	p b	B (SE)	p
Constant	0.0652 (0.008)	**<.0001**	0.0168 (0.0242)	**<.0001**
Moderators and Control variables				
Type of absorptive capacity measurement	0.1203 (0.0138)	**<.0001**	0.1252 (0.0139)	**<.0001**
Innovation outcome	-0.0263 (0.0135)	**0.052**	-0.0341 (0.0137)	**0.013**
Firm size	-0.0279 (0.0184)	**0.128**	-0.0339 (0.0184)	**0.066**
Manufacturing Industry		**<.0001**		**<.0001**
Public Firm	0.0821 (0.0273)	**0.003**	0.0806 (0.0271)	**0.003**
Cross-sectional design	0.0351 (0.0139)	**0.011**	0.0416 (0.014)	**0.003**
Country GDP	0.0074 (0.0056)	0.190	0.0049 (0.0057)	0.391
Formal Institutions				
IPR System Strength			0.0142 (0.0056)	**0.0111**
IPR Enforcement			-0.0207 (0.0094)	**0.0275**
R2	47.70%		49.44%	
k	200		196	
Qmodel (p)	180 (7)		184 (9)	
Qresidual (p)	1041 (192)		2003 (186)	

a Unstandardized regression coefficients; k is the total number of effect sizes; Q is the homogeneity statistic; standard errors are presented between parentheses; v is random-effect variance component

b Exact values of p are reported

whereas IPR enforcement ($β$ = 0.0475, p = 0.042) *positively moderates* this relationship, confirming Hypotheses 1b and 2b. Finally, adding these variables increases heterogeneity in effect size captured ($ΔR^2$ = 1.78%).

Robustness. We also ran the same model on an aggregated dataset in which the dependent variable combines innovation and financial performance, see Table 4.

Here, we find that IPR system strength increases the focal relationship ($β$ = -0.0142, p = 0.011) and IPR enforcement ($β$ = -0.0207, p = 0.0275) decreases it. This suggests that a model focusing on firm performance as a whole, compared to dissecting it into innovation and financial performance, does not fully grasp the nuances of the moderating effect of IPR on AC appropriation, culminating in potentially misleading results and interpretations.

DISCUSSION

Absorptive capacity – the ability to leverage external knowledge, has been widely recognized as crucial for attaining various organizational outcomes. Firms with greater absorptive capacity have been shown to outperform others (Zou et al., 2018), address changing and challenging business environments better (Cohen & Levinthal, 1994), and introduce innovation faster to secure economic rents from their learning (Maldano et al., 2018). Concerned with boundary conditions, scholars have identified individual- (Tortoriello, 2015), firm- (Wales, Parida & Patel, 2013) and industry-level (Lichtenthaler, 2009) constraints to AC appropriation. However, with the exception of Yao and colleagues (2020), the role of higher-level environmental conditions has been largely neglected. To complement extant research and to further advance our understanding, in this paper, we theorize and empirically demonstrate that characteristics of the national environment, here IPR system strength and enforcement, regulate the extent to which organizations benefit from their AC.

IPR and absorptive capacity appropriation
Our work, presents a comprehensive synthesis of the absorptive capacity literature, extending four prior meta-analyses on this topic (Maldano et al., 2018; Song et al., 2018;

Yao et al., 2020; Zou et al., 2018;). We compliment these by addressing the question of why some firms appropriate more value from their AC than others, rather than exploring study artifacts, antecedents, and a reconceptualization, respectively. Based on our HOMA analyses and the Q and I^2 heterogeneity statistics, we show that while AC generally enhances organizational outcomes, the strength of the effect size varies considerably across countries. Our meta-analysis helps to reconcile previous inconclusive findings and highlights that AC may be more beneficial for organizations in some national contexts, and less in others. In addition, we demonstrate that the environmental context may have varying implications for different types of firm performance. Specifically, we make two contributions.

First, we contribute to organizational learning literature by introducing contextual factors (Peng et al., 2009; e.g. Carney et al., 2011;) as key contingencies that influence the extent to which organizations can secure economic rents from their learning ability (Zahra & George, 2002). Our approach is complimentary to research that explores firm-internal appropriation strategies (e.g., Cohen, Nelson & Walsh, 2000; Ritala & Hurmelinna-Laukkanen, 2013). Specifically, we develop insights on how organizations may benefit from their organizational learning ability depending on their national IPR regimes (Peng & Khoury, 2008; Peng et al., 2009). We advocate that firms may look beyond internal appropriation strategies and consider the national context when planning and engaging in organizational learning. Based on our findings, firms wishing to spur innovation may locate their R&D centers in countries with strong IPR systems and weak enforcement yet exploit contexts with weak systems and strong IPR enforcement to extract commercial rents from the same organizational learning done elsewhere. Similarly, governments wishing to attract certain types of foreign investment may and, in fact, some, including many developed Asian countries, are already taking proactive measures to make their countries more attractive for high-tech and R&D investments (Smith, 2021).

Issues related to IPR become particularly pressing when firms operate in multiple or expand to different institutional settings, where the strength and enforcement of formal institutions may significantly vary (Peng et al., 2017). Our results support this prediction by showing that both moderate the relationship between AC and different organizational performance indicators. We further observe that the effect of IPR system strength is lower than that of enforcement. The relatively small effect size of IPR system strength could be due to its often lamented drawbacks (e.g., patent tickets and fuzzy

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boundaries). This is in line with Dosi and colleagues (2006), who show that IPR systems have at best no effect on innovation. On the other hand, the use or threat of costly and time-consuming litigation in high-quality IPR enforcement environments may present a powerful regulating market mechanism discouraging imitation and enabling organizations to ensure economic rents from their AC. Hence, we advocate that firms operating or planning to expand to differing countries closely consider the national environment when setting company performance goals; meaning some countries are better suited for innovative pursuits, while others can generate better financial performance.

Secondly, we contribute to literature on IPR (Chung et al., 2019; James et al., 2013; Savage et al., 2020; Somaya, 2012; Somaya et al., 2011) by dismantling IPR into its sub-dimensions and empirically demonstrating that they have different effects on the extent to which firms benefit from their AC. Prior empirical studies on the role of IPR in organizational outcomes offer mixed findings (reference). Intriguingly, we also find mixed moderating results; yet ours stem from treating IPR system strength and enforcement separately. This may explain the lack of consensus in prior studies. Highlighting that IPR system strength is more conducive to leveraging AC for innovation output (e.g. Zhao, 2006), whereas IPR enforcement benefits more from the commercialization of AC in terms of financial performance, we advance a contingency perspective of IPR in view of the AC – company performance relationship.

Traditionally, management scholars have examined IPR as one construct – IPR regime (e.g., Somaya et al., 2011; Savage et al., 2020). However, legal and political scholars highlight the multifaceted, complex nature of IPR (Helfer, 2009; Schliessler, 2015; Van Pottelsberghe de la Potterie, 2011). Additionally, since patent enforcement has been found to be conceptually (Ganco et al., 2015) different from patent acquisition (Schliesser, 2015) in management theory, applying a more fine-grained conceptualization may offer an opportunity for further theory development (Suddaby, 2010). More specifically, understanding the heterogenous national environment and empirically testing the influence of IPR components may help better understand firm behavior and performance.

For instance, managers may be strategically taking advantage of institutional arbitrage. Firms may avoid patent wars in settings with strong enforcement by conducting business in countries with weak IPR protection (Zhao, 2006). Paik and Zhu (2016) also indicate that the IPR environment influences firms' product launch strategies; firms may

use product launch strategically to counter competitors' aggressive patent enforcement strategies. Overall, we call for more attention to the intricacies of IPR and its effects on firm behavior and outcomes.

Limitations and Future Research Directions

Like any study, our paper has some limitations. First, meta-analyses are inherently vulnerable to construct validity tests because the primary studies are based on the research of others that can be good, bad, or indifferent (e.g., the primary design can be vulnerable to endogeneity) (Eysenck, 1987). At the same time, a meta-analysis offers multiple advantages over single-country studies, not last as it aims to synthesize the findings in a research field to advance the overall understanding of the subject matter, discounting and controlling for study idiosyncrasies.

Second, any meta-analysis is subject to a variety of judgment calls that may influence the study's outcomes (Aguinis et al., 2011). One critical judgment call involves the selection of relevant studies. We tried to minimize this bias by conducting an exhaustive search for potential studies ex-ante.

Third, an implicit assumption to our study is that country-level settings/scores adequately represent the entire country, including regions, states, districts, etc. However, this might not always be the case. For instance, there is considerable variation in marketization and IPR regime strength across provinces in China (Wang et al., 2012). The US presents a similar scenario with variance across states. Additionally, enforcement and sanctions of infringements are often biased and discriminatory (La Porta et al., 1997). Therefore, institutional context may require a finer grained lens in the context of large economies. It would be interesting to see if our findings can be replicated in future research, accounting for these institutional subtleties.

Relatedly, international business and strategy scholars strive to make cross-country generalizations, even though their primary observations are drawn from a limited number of countries (Franke & Richey, 2010). This all-too-common tendency, however, might be misleading. In light of the vast heterogeneity observed in AC appropriation studies, the field may benefit from comparative studies, further exploring the role of the institutional context on organizational learning.

We have only explored IPR as an one environmental factor. Future studies could consider other characteristics of the national environment, such as financial markets.

Additionally, historically, most studies have exclusively examined formal structures and arrangements, largely neglecting the unwritten, informal agreements and conventions as social constraints (Pejovich, 1999; Sartor & Beamish, 2014; Sauerwald & Peng, 2013). However, formal structures can only paint part of the picture (North, 1990), particularly in (still) emerging countries (Khanna & Palepu, 1997). Future research could specifically elucidate how informal arrangements influence international business, for instance, draw on the construct of political ideology (Jost et al., 2009; e.g. Aguilera et al., 2020), and its economic and social sub-dimensions (Crawford et al., 2017). On the continuum from liberal to conservative, the two dimensions of political ideology may affect AC appropriation differently. Future studies could, thus, examine the intersection between home and host country ideologies. Specifically, given that expatriates often take on the role of boundary-spanners and trusted employees within MNEs (e.g., Fang et al. 2010; Oddou et al., 2009), do differences in ideology between home and host-country matter? Another interesting avenue could explore whether ideologies can potentially overcome weak formal structures. And if so, how?

Summing up, we hope to have inspired scholarly work on the appropriation of organizational learning that highlights the national context; that is, studies that explore how the context inhibits or facilitates firms from ensuing economic rents from organizational learning, firm-specific advantages, or (dynamic) capabilities. Such work is much needed, as, at present, we know relatively little about how firms can thrive and innovate when operating under differing environmental conditions, considering both formal and informal structures (e.g., Yao et al., 2020).

CONCLUSION

While ample research on AC has been conducted over the years, scholars have largely neglected the role of country-level constraints; specifically, IPR. Our study complements studies exploring firm-internal appropriation strategies, underscoring that AC appropriation is, at least partly, also external to the firm, shaped by the national environment and its characteristics. Specifically, we argue that intellectual property rights protection system strength and enforcement, affect the degree to which firms can appropriate value from their learning ability towards organizational outcomes. Thus,

we posit that the national context – how the environment is interpreted and ordered (Peng et al., 2009), ultimately translates in the way organizations can leverage external knowledge to generate and secure commercial ends. Our meta-analytical assessment supports this argument.

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Chapter 4

Entrepreneurial Engagement and Firm Performance: A Meta-study on the Contingent Effect of Institutional Configurations

ABSTRACT

Drawing on the varieties of capitalism literature, we examine how institutional arrangements in countries affect the relationship between entrepreneurial engagement and firm performance. We theorize that value appropriation is influenced by the level of coherence within institutions (i.e., the degree to which they adhere to the same governance principles) and that this performance impact holds at different institutional configurations ("equifinality"). We conduct a meta-analysis on our focal relationship in 13 Western OECD countries, finding that firms appropriate less value from entrepreneurial engagement in institutional configurations that lack coherence. Our study shows that institutional configurations at the national level are essential for entrepreneurial engagement, particularly in terms of the coherence between the various institutions. We contribute to (i) a parsimonious approach towards studying institutional configurations in international business, (ii) the importance of institutional coherence relevance for entrepreneurial ventures, and, finally, (iii) institutional equifinality.

INTRODUCTION

Given the importance of small and medium-sized firms (SMEs) to the economies of many nations (Audretsch, 2002; Thurik, 1996), entrepreneurship has been widely celebrated as a catalyst for economic growth, alleviation of poverty (Bruton, Ahlstrom, & Obloj 2008), and job creation (Haltiwanger, Jarmin, & Miranda, 2013). However, many countries struggle to build an entrepreneurial culture (Audretsch, Grilo, & Thurik, 2007) and reap the benefits of engaging in entrepreneurial endeavors, i.e., activities involving exploiting a potential opportunity (Shepherd et al., 2019). Concerns expressed by academics, business leaders, and politicians (Samans, 2017) about the declining entrepreneurial activity (Decker et al., 2016; Porter, 2019) and future economic growth have prompted policymakers to take action to create and shape institutions in an attempt to spur entrepreneurship and related outcomes.

However, there is growing skepticism and ambivalence concerning the effectiveness of these institutions (cf. Ge, Stanley, Eddfleston, & Kellermanns, 2017; Coad et al., 2014), partly because they seem to lack an economic rationale (cf. Acs et al., 2016) or in some cases fail to achieve their goals (Pathak, Xavier-Oliveira, & Laplume, 2013). Previously, eclectic analyses of institutional influences, often in isolation from the broader institutional environment in the country, have been performed. As outlined below, such a *thin* approach de-contextualizes IB research and typically neglects interactions among institutions (Jackson & Deeg, 2019). We address this lacuna by further contextualizing entrepreneurship research (Shepherd et al., 2018) and considering a set of institutions simultaneously in the wider macro-environment (e.g. Aguilera & Grøgaard, 2019).

Institutions influence countries differently, depending on other institutional attributes (Kogut and Ragin, 2006; Rueda and Pontusson, 2000). To understand how the broader institutional context matters, we take a configurational approach (Meyer, Tsui, and Hinings, 1993) and study the joint effect of institutional spheres. The literature on Varieties of Capitalism (VoC) (Hall & Soskice, 2001) provides the most parsimonious framework to studying socio-economic institutions that are part of different institutional spheres (Dilli et al., 2018). VoC focuses on five distinct institutional spheres, such as the sphere of labor market regulation, and presents two ideal ways of organizing economic activity: liberal market economies (LMEs) and coordinated market economies (CMEs). These represent extremes on a continuum ranging from market to non-market forms

of organizing activities, respectively (see, for example, Amable, 2003). Firms must develop relationships with different actors (e.g., individuals, firms, governments) in each institutional sphere to develop, produce, and distribute goods and services (Hall & Soskice, 2001).

Considering the institutional configuration of a country, we introduce the role of coherence across different institutional spheres. Institutional coherence refers to the degree to which institutions adhere to the same governance principles. As such, we posit that in the presence of institutional coherence, different states (i.e., institutional configurations arrayed across the LME/CME spectrum) contribute to achieving a particular outcome. The outcome, here, refers to entrepreneurial ventures to appropriate financial value from entrepreneurial engagement. As we expect that the performance impact of these configurations is the same ("equifinality"), we contribute to institutional equifinality research (Carney et al., 2019; Cirillo et al., 2019; Fiss, 2007; Judge et al., 2014).

We investigate institutional coherence using meta-analytic techniques – an approach that lends itself to examining country-level moderators. We heed to calls for more evidence-based entrepreneurship research (Frese et al., 2012, 2014; Sanderson, 2002). We synthesize observations from 43 primary studies undertaken in 13 Western OECD countries. We take national economies as the unit of analysis and show that, if studied in isolation, the individual institutional spheres appear to have an insignificant, or at best marginal, influence on the relationship between entrepreneurial engagement and firm performance. This finding is in line with recent work (e.g., Ge et al., 2017; Coad et al., 2014). When we consider coherence across all institutions, the effect of individual institutions crystallizes. Additionally, we find that a lack of coherence across institutional spheres weakens the focal relationship. Thus, we can crystallize the effect of different institutional configurations by taking institutional coherence into account.

We make three main contributions with this study. First, while there is largely agreement within the entrepreneurship literature that institutions matter, this study shows *how* they matter. Since we consider the configuration of institutions rather than single institutions, we depart from a *thin* use of institutions (Jackson & Deeg, 2019) and move from an eclectic view of institutions toward a parsimonious model. We find that the extent to which institutions are coherent in terms of their organizing principles is important for entrepreneurial activity. These findings deepen our understanding of the influence of domestic institutions and flag the importance of examining the effect of all institutions in combination, for which the VoC framework is especially suitable.

Second, while the idea that institutional configurations impact national economies (Bruton et al., 2015) and facilitate incumbent performance is well-established in the VoC literature, it has not been tested to date for entrepreneurial ventures (cf Herrmann, 2019). We depart from the complementarity argument and highlight how coherence across all national institutions affects how much value can be created from entrepreneurial engagement. This also helps to understand why prior studies found, sometimes conflicting findings in terms of entrepreneurship policy. Third, our study shows that institutional coherence, irrespective of where institutions fall on the LME/CME spectrum, can lead to similar outcomes in terms of firm performance. This equifinal finding contributes to debates on institutional equifinality (e.g., Carney et al., 2019; Judge et al., 2014).

We present the VoC literature and formulate our hypothesis in the following sections. We then discuss the methodological choices made and the findings of our meta-analyses. After that, we discuss the conceptual and theoretical implications, and finally, we highlight opportunities for future research.

THEORETICAL BACKGROUND

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Entrepreneurship research has mainly focused on explaining entrepreneurial endeavors' initiation, engagement, and performance (Shepherd et al., 2018). In this study, we are particularly interested in the role of the wider institutional context in explaining variance in the relationship between entrepreneurial engagement and firm performance. The engagement of entrepreneurial endeavors can be defined as "the cognitive, affective, behavioral, and organizational activities of involvement in the process of exploiting a potential opportunity" (Shepherd et al., 2018: 14). Entrepreneurial engagement[8] involves a wide variety of activities, including entrepreneurial decision-making, resource acquisition and allocation, entrepreneurial organizing and entrepreneurial commitment, sense-making, and forms of innovating and learning.

Each of these forms of entrepreneurial engagement has been shown to help contribute to the performance of a new venture**.** Previous studies have examined the

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[8] Note that this process differs from different entrepreneurial engagement levels on the entrepreneurial ladder (Van der Zwan et al., 2016).

effect of entrepreneurial engagement on firm growth in terms of employees (David & Shaver, 2012), sales (Delmar & Wiklund, 2008), or assets (Thapa, 2015), as well as its effect on financial performance (Jacobides & Winter, 2007) and returns from investment (Florin, 2005). Scholars have also studied how entrepreneurial engagement influences the speed of innovation (Marvel, Sullivan, & Wolfe, 2019). They have also looked at its effect on the novelty of innovation (Park & Tzabbar, 2016). This study looks deeper into the relationship between entrepreneurial engagement and firm performance.

The following section explores the intersection of entrepreneurship and institutions. First, using an institutional configuration approach (Amable, 2016; Meyer et al., 1993), we highlight the importance of analyzing institutions jointly. Building on VoC (Hall & Soskice, 2001), we scope our efforts to five socio-economic institutional spheres and their underlying governance principles. We depart from the complementarity argument (Höpner, 2005) and hypothesize that the coherence across the underlying governance principles across institutional spheres contrbutes to value appropriation from entrepreneurial engagement.

Entrepreneurship and Institutional Configurations

When entrepreneurship is explained, institutions seem to be at the heart of this phenomenon, particularly those institutions that determine how entrepreneurial activity is allocated. (Baumol, 1990). As North (1990, p. 6) explained, '*The major role of institutions in a society is to reduce uncertainty by establishing a stable (but not necessarily efficient) structure to human interaction.*' Past research has recognized that differences between countries exist across institutional spheres (Witt & Redding, 2013). This diversity has led scholars to cluster countries into distinct groups of typologies or so-called institutional configurations or, more broadly, into comparative institutional systems (Jackson & Deeg, 2008).

The institutional configurations approach (e.g., Jackson & Deeg, 2008; Kogut & Ragin, 2006) highlights the importance of examining the combined effect of different institutions to understand institutional differences across nations. VoC literature emerged as a response to debates that considered institutions to be politics against the free market (Esping-Andersen, 1985; Korpi, 1978). Stemming from political science, the VoC literature presents a parsimonious framework for understanding how firms are affected by the different socio-economic institutions of a national institutional configuration (Hall & Soskice, 2001).

Institutions within these institutional spheres contribute to interaction among firms and help firms solve coordination problems. Firms must develop relationships with actors in each institutional sphere to develop, produce, and distribute goods and services (Hall & Soskice, 2001). Hall and Soskice (2001) distinguish between five institutional spheres: (i) industrial relations, (ii) vocational training and education, (iii) corporate governance, (iv) inter-firm collaboration, and (v) employees relations. Institutions within industrial relations, vocational training and education, and employees help organizations obtain the necessary human capital. Corporate governance helps firms obtain financial capital. In the inter-firm collaboration sphere, institutions help firms get the necessary intellectual capital, such as access to technology and knowledge.

Institutions that are part of a specific institutional spheres provide firms the input for essential resources for the market's supply side. They enable firms to access skilled labor and give them different ways of collaborating with other parties. Firms may encounter coordination problems, and their ability to coordinate effectively with actors, such as inter-firm relationships or employee unions, substantially influences their success – the reasons for which they need to coordinate concern human, financial and intellectual capital. A firm's success thus depends to a large extent on its capability to coordinate effectively with a wide range of actors or institutions within the institutional spheres (Hall & Soskice, 2001).

Following Hall and Soskice (2001), Liberal Market Economies (LMEs) and Coordinated Market Economies (CMEs) constitute two ideal types at which the core distinction can be made in terms of organizing economic activity. CMEs and LMEs represent two extremes on a continuum ranging from market to non-market forms of organizing activities, respectively (see, for example, Amable, 2003). Each of the five institutional spheres can be arrayed along the LME/CME spectrum and the corresponding governance principles that have institutional support. Firms "*will gravitate towards the mode of coordination for which there is institutional support*" (Hall & Soskice, 2001: 9), and the national context influences the type of relationships firms develop and thus how firms resolve coordination problems.

When the "functional contribution of an institution A is conditioned by the presence of another institutions B and vice versa" (Höpner, 2005), we speak of institutional complementarity. The combined effect of institutions in the five spheres in these ideal types creates specific benefits that would not exist if the configuration of the institutional

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environment were to be different (Aoki, 2005; Streeck, 2010). Hall and Soskice (2001) suggest pure LME and CME configurations achieve comparative advantage in the form of radical and incremental innovation. Others (e.g., Campbell & Pedersen, 2007; Molina & Rhodes, 2007) suggest that hybrid configurations (i.e., combining LME and CME institutions) exist and they also create benefits. The following three paragraphs illustrate complementary across institutional configuration (i.e., at LME, CME and hybrid), and afterwards we discuss how complementarity differs from coherence – our 7 – and its importance.

Firms that operate in LMEs (e.g., US and UK) organize activities mainly through competitive market arrangements and hierarchies. These market arrangements are characterized by arm's-length exchange of goods and services. The exchanges typically place in the context of formal contracting, and competition and actions are based on marginal calculation, as stressed in neoclassical economics (Hall & Soskice, 2001). Here, supply and demand determine firms' behavior, providing a highly effective means of coordinating the endeavors of economic actors. Complementarity at LMEs, lies in a high degree of flexibility, enabled by a 'hire and fire' system and short-term finance, ultimately fostering radical innovation.

CMEs are typically welfare states and have high degrees of unionization, such as Japan and the Netherlands. Firms that operate in CMEs rely more heavily on non-market modes of coordination and may use more extensive relational collaboration or incomplete contracting. Non-market modes of coordination may entail more extensive relational or incomplete contracting. Networking monitoring here is based on non-public rather than public information exchange. Firms develop their competencies and achieve their goals through collaboration and reliance on relational contracting instead of competitive arms-length agreements with competitors. Here, complementarity arises from firm-specific skills, facilitated by coordinated wage setting to avoid employee poaching and patient capital (Hall & Soskice, 2001) and team-oriented lifetime employment (e.g., in Japan; Aoki, 1994), allowing incremental innovation to emerge.

While Hall and Soskice suggest that complementarity is realized at the two ideal types, i.e. at the extremes of the LME/CME continuum, complementarities may also exist in institutional configurations that combine characteristics of both LMEs and CMEs. Various hybrid institutional configurations (Campbell & Pedersen, 2007) have been identified, such as mixed market economies (e.g., Molina & Rhodes, 2007) or dependent market

economies (e.g., Nölke & Vliegenthart, 2009), and the complementary across institutional spheres create different comparative advantages (Amable, 2003; Molina & Rhodes, 2007). The *Varieties of Institutional Systems* (Fainshmidt et al., 2014) typology suggests that seven national institutional configurations exist that each has complementary features and lead to other national outcomes. The typologies highlight that different comparative advantage can be achieved through institutional complementarity. For example, Witt and Jackson (2016) show that radical innovation can be spurred in an institutional configuration characterized by low degrees of coordination in all spheres except employment relations; here, the sphere of the inter-firm relations may be either LME or CME-like to achieve radical innovation.

Institutional Coherence

To disentangle the effect of institutional configurations on the performance of entrepreneurial firms, we need to understand the unique mechanisms driving their argument (Aguilera & Grøgaard, 2019). While much is known about the complementary of distinct sets of institutions and performance implications, we know little about institutional coherence and whether it exhibits equifinality, i.e., leads to similar outcomes in terms of value appropriation. Coherence and complementarity are two distinctive institutional features and may exist with and without each other (see Höpner, 2005). Complementarity is achieved when institutions with different governance principles (i.e., LME vs. CME) reap benefits for its differences (e.g., Witt & Jackson, 2016). Coherence, refers to structural features across institutional spheres and how institutions adhere to similar governance principles, e.g., market (LME), non-market (CME) governance principles, or anywhere along the LME/CME spectrum. Different institutions can be structured coherently, i.e., adhere to similar governance principles, and coherence thus refers to the level of cohesion around solving coordination problem, see Figure 1.

The coherence will be rooted in a core set of values that are used consistently, enabling individuals to reach an agreement about coordination issues and allowing the organization's activities to be aligned and integrated consistently. When conflicting governance principles are used across different institutions within a particular country, and there is a combination of CME- and LME-style institutions, we refer to this as institutional *incoherence*. When institutions impose different, conflicting modes of resolving coordination problems, the institutional configuration lacks coherence but

may still be complementary and result in comparative advantage (e.g., radical innovation; Witt & Jackson, 2016).

Figure 1   **Visualization Institutional Coherence**
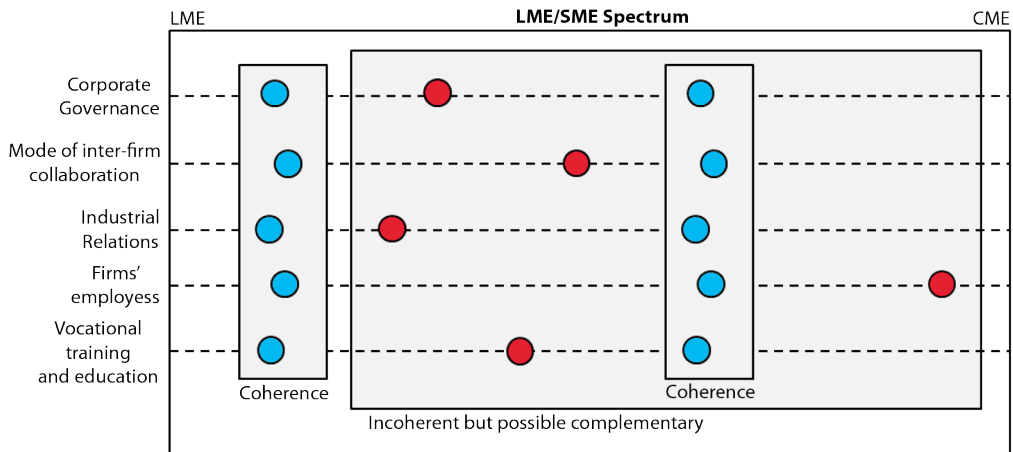
Firm behavior, especially entrepreneurial engagement, is often the result of strategic interaction among different actors (Hall & Soskice, 2001) as they are more dependent on the external environment than large firms. Coherence facilitates effective coordination among actors and organizations are, therefore, more efficient when consistent and well-integrated (Calori & Sarnin, 1991; Heskett & Kotter, 1992). We suggest that these synergistic effects apply anywhere along the LME/CME spectrum as it contributes to firms' internal production regimes.

A firm's success in developing, producing, and distributing goods or services in its own way depends to a large extent on its ability to coordinate activities with a wide range of actors in a coherent way. As firms gravitate towards the mode of coordination that has institutional support, institutions with conflicting governance principles increases complexity. Identical governance principles allow firms to work more effectively and reap more benefits from their entrepreneurial engagement. When those involved are using different governance principles, the development and production of goods should become more costly, as the coordination costs will be higher. Firms operating in countries with a less coherent institutional framework cannot leverage

the otherwise possible benefits from synergies arising from coherence. In addition, resolving coordination issues will be more difficult and more expensive when there is no institutional coherence, making it more difficult for firms to appropriate value from their entrepreneurial engagement.

Hypothesis 1:

The relationship between entrepreneurial engagement and performance will be strengthened by coherence across the institutional spheres in a country, namely corporate governance, mode of inter-firm collaboration, internal structure of the firm, employee relationship, and occupational training.

Figure 2 Conceptual Model
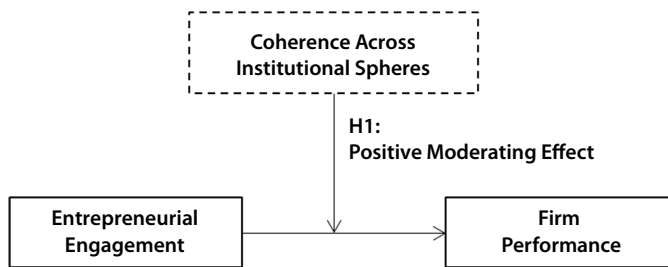
METHOD

We used established meta-analytical techniques to test our hypotheses. A meta-analysis examines studies with similar relationships and aggregates the empirical results statistically (Cumming, 2014; Hunter & Schmidt, 2004). Given the interdisciplinary and fragmented nature of entrepreneurship research and the need for evidence-based studies, a meta-analysis is especially suitable (Frese et al., 2012). By combining multiple single-country studies into one multiple-country study, we are able to use data spanning a wide diversity of countries that capture differences in institutional configurations.

Literature Search and Filtering

We trained and hired two graduate students, and conducted an exhaustive search for relevant entrepreneurship studies. We manually searched for *trepr* to avoid excluding relevant papers; using the asterisk in this way would allow us to find papers relating to 'entrepreneurship', 'entrepreneurial,' or other combinations. We also ran a similar search for papers relating to 'intrapreneurship'. Those search terms had to be mentioned in the title, abstract, or as a keyword for the paper to be included in our sample. This was done manually for 2001–2018 for the following journals: *Journal of Business Venturing*, *Small Business Economics*, *Entrepreneurship: Theory & Practice*, *Journal of Small Business Management*, and *Strategic Entrepreneurship Journal*.

Next, we filtered the studies, selecting them for inclusion based on the following criteria. First, the central relationship needed to be between the form of entrepreneurial engagement and performance. Second, data on the effect sizes of the focal relationship needed to be available. Finally, the unit of analysis needed to be the firm level. The resulting sample consisted of 175 partial correlations from 72 primary studies, and observations varied from 21 to 60,444 per study. An overview of these studies is presented in Appendix C. After the initial Hedges and Olkin meta-analysis, we focused only on OECD countries because these are advanced industrial countries that have been theorized about in the VoC literature (Hall & Soskice, 2001). Our sample contained 101 effect sizes from 41 studies from 13 OECD countries at the end of this process.

Meta-Analytical Procedures

Hedges and Olkin meta-analysis (HOMA). For the first meta-analysis, HOMA, we used the partial correlation coefficient ($r_{xy.z}$) as the effect size. By using ($r_{xy.z}$) we captured the relationship between entrepreneurial engagement (X) and firm performance (Y), given a set of n control variables (Z). Since a normal distribution is one of the assumptions of HOMA, we needed to account for skewness. Hence, we correct the effect sizes using Fisher's r-to-z[9] transformed correlation coefficient (Fisher, 1921). Secondly, using Hunter and Schmidt's (2004: 205–207) formula, we weighted the respective sample sizes using the inverse variance[10] to compute meta-analytical mean correlations and confidence

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[9] Fisher's z-transformation: $z = \frac{1}{2} ln \frac{1+r}{1-r}$, where r stands for the effect size

[10] The inverse variance weight w of each effect size is calculated as follows: $w_i = \frac{1}{se_i^2 + \hat{v}_\theta}$. SE stands for standard error of the effect size, which is calculated as $(z_r) = \frac{1}{\sqrt{n-3}}$. $\hat{v}$ is the random variance component, calculated as: $\hat{v} = \frac{Q_T - k - 1}{\sum w - \frac{\sum w^2}{\sum w}}$.

intervals[11]. We used fixed effects and random effects modeling; the latter considers the heterogeneity of effect sizes (Kisamore & Brannick, 2008; Raudenbush & Bryk, 2002). To test for heterogeneity across studies, we calculated the Q and I^2 statistics to assess the homogeneity of the effect size. The I^2 statistic describes the percentage of variation across studies that is due to heterogeneity rather than chance. High values of I^2 (greater than 75%) and Q (based on degrees of freedom) suggest that heterogeneity is present (Higgins et al., 2003). Furthermore, we conducted sub-group analyses to test whether heterogeneity in effect sizes can be partly attributed to differences across countries.

Meta-Analytical Regression Analysis (MARA). To test the moderating effects of local institutions, we applied meta-analytical regression analysis. Following current standards in meta-analysis, we used partial correlation because this effect size allows us to control for differences between studies (Stanley & Jarrel, 2005). It also allowed us to compare effect sizes across multiple studies, as the effect size has no unit of measurement. Another advantage of partial correlation is that it measures the effect while holding other factors constant and thus provides a measure of association, all other things being equal (Stanley & Doucouliagos, 2012).

In our MARA analyses, the dependent variable was the magnitude of effect size of the relationship between entrepreneurial engagement and firm performance. The estimates of MARA are conceptually identical to multiple regression analysis and are specifically designed to assess the relationship between effect sizes and moderators (Lipsey & Wilson, 2001). We estimated the parameters using mixed-effect modeling because this specification is more conservative (Geyskens et al., 2009), and we attributed variability in effect size to systematic between-study differences, firm-level sampling error, and unmeasured random components (Lipsey & Wilson, 2001). We conducted HOMA and MARA using the *Metafor* package in R (Viechtbauer, 2018).

Coding and Operationalization

Coding Scheme. Following Lipsey and Wilson (2001), we designed a coding protocol that allowed us to extract relevant information from the primary studies. As indicated above,

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[11] The meta-analytical mean is calculated as follows: $\overline{ES} = \frac{\Sigma(w * s\,ES)}{\Sigma w}$. The standard error is $SE_{\overline{ES}} = \sqrt{\frac{1}{\Sigma W}}$, with the confidence intervals measured as $\mathrm{CI} = \overline{ES} \pm 1.96 * (SE_{\overline{ES}})$

the dependent variable is the effect size of the relationship between entrepreneurial engagement and firm performance.

Entrepreneurial engagement. There are various indicators associated with output of entrepreneurial engagement (Shepherd et al., 2018). While we are interested in entrepreneurial engagement in its broadest sense, we controlled for different forms of entrepreneurial engagement, i.e., entrepreneurial organizing, commitment, sense-making, resource allocation, and decision-making.

Institutional incoherence and institutional spheres. For the institutional spheres of VoC, we used calibrated measures for each country, indicating whether these spheres can be classed as more coordinated or more liberal for each sphere based on the average scores across the period 1995–2000 (Witt & Jackson, 2016: 793). Given that the institutional spheres industrial relations, vocational training and education, and employee relations focus on delivering human capital to firms (Dilli et al., 2018), we created a composite index score of these three spheres.

To determine the institutional coherence, we calculated the statistical dispersion by computing the distance of the data to its mean, i.e., the mean absolute deviation. This gives us an idea about the variability in a dataset. We do so by (i) calculating the mean, (ii) calculating the absolute distance between the score of each institutional sphere and the mean, (iii) adding these distances together, and (iv) dividing it by the number of spheres (i.e., three). We correct the distance measure by multiplying the outcome with -1 to achieve a measure of coherence. We present the formula below, with i being the value of an institutional sphere:

$$Institutional\ coherence\ \ \frac{\sum |x_i - \overline{x}|}{n}\ * -1 \tag{1}$$

Firm performance. For firm outcomes, we included accounting- and market-based measures, with the first being an indicator of the firm's financial performance expressed in terms of its profits (e.g., return on assets) and the second being an indicator of market-based performance such as stock returns. We also included indicators of innovation to capture firm performance.

Country-level control variables. To test the robustness of our results against the influence of variable operationalization, model specification, and study artifacts, we control for several variables. First, to control for the effect of measurement artifacts, we control for different proxies of entrepreneurial engagement. We also controlled for country-level variation across studies. GDP affects value creation through higher purchasing power and is known to affect the diffusion of technology (Comin & Hobijn, 2004; Caselli & Coleman, 2001). We thus used country GDP and GDP growth to control for differences between countries in overall economic development. Data for country-level differences (i.e., GDP and GDP growth) was obtained from the World Bank database. The characteristics of the primary study (i.e., country code and the middle year of data collection for each publication) are then matched with the values in the database.

Field-level control variables. To control for exogenous factors that may affect value appropriation from entrepreneurship, we controlled for the industry in which firms operate because this may influence dynamism and growth rates (Zahra, 1993). We created separate dummy variables to indicate whether the data included in a specific study was gathered from a high-tech, service, or manufacturing industry or a mix of industries. We also created a dummy variable measuring whether the regression model included in a specific study controlled for firm capabilities, giving it a value of 1 if it did, and a value of 0 if not. Similarly, we created a dummy variable to measure whether the regression model included in a specific study controlled for ownership structure, firm age, and the individual characteristics of the entrepreneur. Finally, to control for the impact of the global financial crisis, we created a dummy variable that measured whether the data used in the primary source overlapped with the 2008 financial crisis.

Study-level control variables. We also controlled for study-level moderators such as publication outlet and publication date. We created a dummy variable measuring whether the primary study was published in *Entrepreneurship Theory & Practice* (value of 1) or elsewhere (value of 0). We also did this for studies published in the *Journal of Business Venturing*, *Small Business Economics*, *Strategic Entrepreneurship Journal*, and the *Global Strategy Journal*. For each primary study we included the journal's latest ISI impact factor. To control whether the effect size may differ over time due to changes in the macro-environment, for example, we created a dummy variable for whether the

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study was published before 2009 (value of 0) or after that date (value of 1), that year being the mid-point in our data collection range (i.e., 2000–2018). We also included a dummy variable capturing whether effect sizes were harvested from a study using a panel design (value of 0) or a cross-sectional design (value of 1). Table 2 presents an overview and description of the variables.

Robustness tests. Next to using a wide range of control variables, we conducted two robustness tests. First, we used the range in scores of governance principles as an additional measure of statistical dispersion. The range of institutional spheres is the difference between the maximum and minimum LME/CME orientation scores for each country. The second robustness test involves a model that focuses on the broader, more traditional interpretation of VoC. We conducted an additional MARA and included five institutional spheres (Hall & Soskice, 2001; Witt & Jackson, 2016) instead of three institutional spheres.

RESULTS

Table 2 presents an overview of the OECD countries, showing how each scored on the five institutional spheres, and whether there is incoherence across the scores of each sphere. The table shows that there are LMEs and CMEs that score either low or high on incoherence of institutional spheres. Austria, for example, tops the list in terms of its orientation towards the ideal form of CME and scores low on institutional incoherence. See Figure 3 for an overview of countries in each category.

Details of the meta-analytical results from the HOMA and MARA are provided below. The partial correlation-based HOMA ($r_{xy.z}$) of the focal relationship is shown in Table 3. The first line of the results indicate that there is a strong positive relationship between entrepreneurial engagement and performance ($r_{xy.z}$ = 0.105; *confidence interval* 0.096–0.113). Notably, the heterogeneity in effect size is considerable ($r_{xy.z}$ distribution: Q = 1,123.96, I^2 = 97,77%), suggesting that the accumulated effect size should be interpreted as an average rather than a true correlation value (Hedges & Olkin, 1985; Higgins et al., 2003). In fact, we observe differences in effect sizes across geographical sub-groups, and our heterogeneity tests indicate that between-study

Table 1 Definitions of Study Constructs and Measurements

Variable	Description
Entrepreneurial Engagement	
Engaged Decision-making	The process of choosing a course of action by those involved in exploiting a potential opportunity
Resource Acquisition and Allocation	Obtaining the inputs necessary for, or facilitating, an entrepreneurial endeavor; The portioning and distributing of acquired resources.
Entrepreneurial organizing	The activities involved in accessing and coordinating resources for exploiting a potential opportunity
Entrepreneurial commitment	A personal investment of time, energy, and other resources into the exploitation of a potential opportunity, which can generate affective outcomes and have implications for the entrepreneur's well-being.
Sense-making and Learning	Increased knowledge gained from participating in an entrepreneurial endeavor.
Performance	
Innovation, accounting or market performance	Any indicator of the innovation or financial performance of the firm, including both accounting-based measures and market-based measures of firm value. This can be expressed in the form of (1) a process or product, (2) an accounting-based measure of firm profits (e.g. return on assets, return on equity, earnings per share, and profit margin), or (3) a market-based measure of firm value (e.g. stock returns, market to book)
Spheres Varieties of Capitalism	
Institutional Coherence	Calculated as the statistical dispersion by computing the distance of the data to its mean for a specific country, i.e. the mean absolute deviation from the three institutional domains. We use truncated average scores of the institutional pillars underlying Varieties of Capitalism literature that vary from CME to LME (Source: Witt & Jackson, 2016)
Corporate Governance	Membership in set of countries with low dispersion and either low shareholder protection or low stock market size (Source: Witt & Jackson, 2016, Botero et al. (2004) and La Porta et al. (1999) and OECD Statistics)
Mode of Inter-firm Collaboration	Membership in set of countries with low M&A and low mergers (Source: Witt & Jackson, derived from S&P Capital IQ and Visser)
Firm's Employees	Membership in set of countries with high wage coordination and either low short-term employment (Source: Witt & Jackson, 2016, derived from OECD statistics). Note: Used seperately for robustness test
Industrial Relations	Membership in set of countries with high codetermination and high works council rights (Source: Witt & Jackson, 2016, derived from Jackson, 2005 and Visser). Note: Used seperately for robustness test
Vocational Training and Education	Membership in set of countries with high occupational training and low university training (Source: Witt & Jackson, 2016, derived from OECD statistics). Note: Used seperately for robustness test
Country-level Control Variables	Country-level control variables based on the location of the primary data of a specific study
GDP	Natural log of per-capita gross domestic product in U.S. dollars (Source: World Development Indicators (http://devdata.worldbank.org/dataonline/)).
GDP Growth	Growth of of per-capita gross domestic product in U.S. dollars (Source: World Development Indicators (http://devdata.worldbank.org/dataonline/)).
Field-level Control Variables	Field-level control variables based on the characteristics of a specific study
Turbulent External Environment	A dummy variable measuring whether the model included in a specific study controlled for an indicator of turbulence in the external environment, such as environmental dynamism (1) or not (0)
Service Industry	A dummy variable measuring whether the data included in a specific study was gathered from a service industry (1) or not (0)
Sample Overlap with Financial Crisis	A dummy variable measuring whether the data included in a specific study was gathered during the 2008 global financial crisis (1) or not (0)
Firm Age	A dummy variable measuring whether the regression model included in a specific study controlled for firm age (1) or not (0)
Individual Characteristics	A dummy variable measuring whether the regression model included in a specific study controlled for individual characteristics of the entrepreneur (1) or not (0)
Firm Capabilities	A dummy variable measuring whether the regression model included in a specific study controlled for firm capabilties (1) or not (0)
Study-level Control Variables	Study control variables based on the characteristics of a specific study
Survey Data	A dummy variable measuring whether the data included in a specific study were based on a survey (1) or a database or mix (0)
Journal of Business Venturing	A dummy variable measuring whether the primary study was published in Global Strategy Journal (1) or elsewhere (0)
Entrepreneurship Theory & Practice	A dummy variable measuring whether the primary study was published in Entrepreneurship Theory & Practice (1) or elsewhere (0)
Small Business Economics	A dummy variable measuring whether the primary study was published in Small Business Economics (1) or elsewhere (0)
Strategic Entrepreneurship Journal	A dummy variable measuring whether the primary study was published in Strategic Entrepreneurship Journal (1) or elsewhere (0)
ISI Impact Factor	A variable measuring the average number of citations of articles in a given journal, derived from articles that were published during the two preceding years (Source: ISI impact factor)
Published after 2009	A dummy variable measuring whether the primary study was published after 2009 (1) or before 2009 (0)

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difference are systematic This observation hints at other possible explanations for systematic differences in our focal relationship and led us to explore the heterogeneity across countries, because country-level institutions give firms the capacity to resolve coordination issues, decrease costs and ultimately increase performance.; see Table 3 for an overview.

Figure 3   Plot of Countries' Cores on LME/CME Spectrum and Institutional Inconsistency
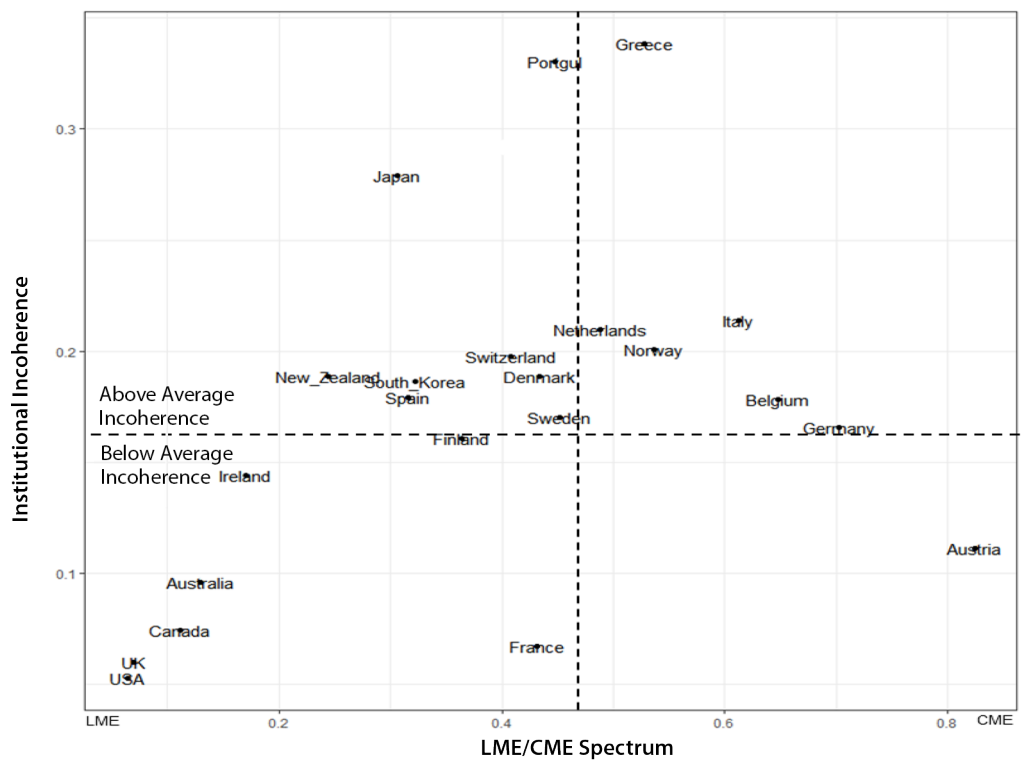
Table 2   Description of Variables

Country	Corporate Governance [a]	Mode of Inter-firm Collaboration [a]	Industrial Relations [a]	Firm's Employees [a]	Vocational Training and Education [a]	Average Score Five Institutional Domains	Institutional Inconsistency
Average Score Countries	0.44	0.40	0.34	0.49	0.29	0.39	0.17
Austria	0.90	0.63	0.95	0.74	0.90	0.82	0.11
Australia	0.08	0.17	0.00	0.33	0.07	0.13	0.10
Belgium	0.83	0.45	0.40	0.86	0.70	0.65	0.18
Canada	0.10	0.19	0.00	0.22	0.05	0.11	0.07
Denmark	0.61	0.36	0.73	0.30	0.17	0.43	0.19
Finland	0.40	0.14	0.73	0.36	0.19	0.36	0.16
France	0.40	0.40	0.60	0.38	0.38	0.43	0.07
Germany	0.36	0.63	0.95	0.74	0.83	0.70	0.17
Greece	0.85	0.75	0.05	0.83	0.16	0.53	0.34
Ireland	0.29	0.06	0.05	0.41	0.04	0.17	0.14
Italy	0.79	0.49	0.20	0.86	0.72	0.61	0.21
Japan	0.11	0.61	0.00	0.70	0.11	0.31	0.28
Netherlands	0.40	0.28	0.80	0.70	0.26	0.49	0.21
Norway	0.79	0.44	0.73	0.59	0.13	0.54	0.20
New Zealand	0.61	0.35	0.00	0.22	0.04	0.24	0.19
Portugal	0.77	0.83	0.05	0.57	0.02	0.45	0.33
South Korea	0.40	0.71	0.00	0.22	0.28	0.32	0.19
Spain	0.45	0.63	0.20	0.17	0.13	0.32	0.18
Sweden	0.30	0.22	0.73	0.60	0.41	0.45	0.17
Switzerland	0.18	0.28	0.27	0.57	0.74	0.41	0.20
UK	0.01	0.07	0.00	0.22	0.05	0.07	0.06
USA	0.01	0.07	0.00	0.19	0.05	0.06	0.05

[a]: Source: Hitt & Deeg, 2016. Low scores (0.0 to 0.5) indicate liberal institutional logics High scores (0.5 to 1) indicate coordinated institutional logics

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Now that we have established there is variation across effect sizes, we will explore the causes. We conducted a MARA analysis specifically designed to assess the relationship between effect sizes and moderators (Lipsey & Wilson, 2001). The results of the MARA are based on the partial correlation ($r_{xy.z}$) and are presented in Table 4.

Model 1, controlling for field- and study-level variables, suggests that entrepreneurial engagement positively influences firm performance ($\beta = 0.1349$, $p < 0.01$) and indicates that GDP positively influences the focal relationship ($\beta = 0.0262$, $p < 0.01$). In Model 2, we include the institutional spheres that give financial, intellectual, and human capital access. The results indicate that the institutional sphere related to employee relations positively influences the focal relationship when these adhere to coordinated market economy governance principles ($\beta = 0.1104$, $p < 0.01$). The third Model includes the different forms of entrepreneurial engagement as control variables. This model exhibits a large increase in model fit ($\Delta R^2 = 36.30\%$). Model 4 includes the effect of institutional coherence. Institutional coherence positively influences the focal relationship ($\beta = 0.5257$, $p < 0.05$), supporting Hypothesis 1.

Table 3 HOMA Results for Entrepreneurial Engagement on Firm Performance by Country

WB Code	Country	WB Code	k	n	Mean	SE	CI Lower Limit (B)	CI Upper Limit (B)	Q Test	I^2	T^2
			175	1,177,037	0.105	0.009	0.096	0.113	2452.678	97.77%	0.010
BEL*	Belgium	BEL	1	232	0.150	0.067	0.020	0.281	0.0000	0.00%	0.000
CAN*	Canada	CAN	5	12,231	0.020	0.018	-0.016	0.056	14.6647	74.27%	0.001
CHE*	Switzerland	CHE	1	199	0.157	0.072	0.016	0.299	0.0000	0.00%	0.000
CHN	China	CHN	9	4,366	0.116	0.028	0.061	0.170	24.9321	61.82%	0.004
DEU*	Germany	DEU	15	79,154	0.097	0.024	0.051	0.144	42.7735	82.43%	0.005
ESP*	Spain	ESP	12	2,273	0.217	0.038	0.143	0.291	34.2085	67.45%	0.011
FIN*	Finland	FIN	1	138	0.198	0.093	0.015	0.380	0.0000	0.00%	0.000
FRA*	France	FRA	7	3,096	0.103	0.023	0.057	0.149	10.2494	36.85%	0.001
GHA	Ghana	GHA	1	496	0.008	0.045	-0.080	0.097	0.0000	0.00%	0.000
IND	Indonesia	IND	2	672,213	0.016	0.029	-0.041	0.073	3.7623	73.42%	0.001
ITA*	Italy	ITA	2	510	0.065	0.065	-0.064	0.193	2.1340	53.14%	0.005
JPN	Japan	JPN	4	4,468	0.044	0.038	-0.030	0.118	19.1274	84.32%	0.005
KOR	Korea	KOR	3	10,724	-0.019	0.034	-0.085	0.047	15.3885	91.06%	0.003
Mix	Mix	Mix	29	311,958	0.111	0.023	0.065	0.156	238.6412	99.04%	0.013
MWI	Malawi	MWI	1	1,900	0.070	0.023	0.025	0.115	0.0000	0.00%	0.000
NLD*	Netherlands	NLD	6	2,950	0.042	0.025	-0.006	0.091	17.3408	38.16%	0.001
NOR*	Norway	NOR	3	612	0.111	0.094	-0.074	0.296	10.4348	80.83%	0.022
NPL	Nepal	NPL	9	4,509	0.039	0.041	-0.041	0.119	57.5853	86.11%	0.013
PHL	Philippines	PHL	1	197	0.274	0.072	0.133	0.415	0.0000	0.00%	0.000
POL*	Poland	POL	1	98	0.238	0.105	0.031	0.444	0.0000	0.00%	0.000
RUS	Russia	RUS	1	45	0.300	0.160	-0.013	0.614	0.0000	0.00%	0.000
SWE*	Sweden	SWE	10	22,865	0.072	0.017	0.039	0.105	50.4955	83.31%	0.002
TWN	Taiwan	TWN	4	4,188	0.102	0.019	0.064	0.140	4.6525	35.52%	0.001
USA*	USA	USA	43	32,023	0.125	0.022	0.082	0.167	527.7134	88.47%	0.013
VNM	Vietnam	VNM	4	5,592	0.221	0.072	0.080	0.362	85.7130	96.50%	0.020

(A) k = number of effect sizes ; N = firm observations; SE = the standard error of the mean correlation; Q test = Hedges & Olkin (1985) chi-square test for homogeneity; I2 = scale-free index of heterogeneity

(B): Confidence interval around the meta-analytic mean is set at 95%.

* Included in meta-analytic regression analysis because they are OECD countries

An exploration of the field and study moderators also revealed several salient effects. The focal relationship was weaker in studies for which the data was collected during the 2008 financial crisis (β = -0.1482; p < 0.05); however, we did not observe that a turbulent external environment reduces the strength of the focal relationship. We observed an overall negative relationship between the journal impact factor and the effect size (β = -0.0487; p < 0.05). Reporting smaller effect sizes thus does not prevent studies from being published. However, we cannot attribute variation in effect size to specific journals or whether studies are published after or before 2009. We also assessed other study- or field-moderating factors for which no prior theoretical intuition was provided. Our

Table 4   MARA Results [a, b, c]

Variable	Model 1 : Random Effects	Model 2: Random Effects	Model 3: Random Effects	Model 4: Random Effects	Model 5: Random Effect
constant	0.1349 (0.0468)**	0.1601 (0.0709)*	0.2755 (0.0985)**	0.3728 (0.1072)***	0.3551 (0.1048)***
Hypotheses					
H1 Institutional Coherence				0.5257 (0.2314)*	0.2272 (0.1042)*
Entrepreneurial Engagement					
Engaged Decision-making			-0.139 (0.0703)*	-0.1166 (0.0708)†	-0.1097 (0.0713)
Resource Acquisition and Allocation			-0.1426 (0.0647)*	-0.1135 (0.0658)†	-0.1101 (0.0662)†
Entrepreneurial organizing			-0.0883 (0.0668)	-0.0786 (0.0667)	-0.0732 (0.0669)
Entrepreneurial commitment			-0.0945 (0.065)	-0.0755 (0.0653)	-0.0701 (0.0657)
Sense-making and Learning			-0.2058 (0.0694)**	-0.1984 (0.0693)**	-0.1916 (0.0695)**
Institutional Spheres					
Corporate Governance		0.0321 (0.0739)	0.0382 (0.0634)	0.0123 (0.0642)	0.0345 (0.0632)
Mode of Inter-firm Collaboration		-0.0154 (0.0612)	0.0493 (0.0519)	0.1428 (0.0661)*	0.173 (0.0767)*
Employee Relationships		0.125 (0.0605)*	0.1104 (0.0512)*	0.1805 (0.0596)**	0.1875 (0.0621)**
Country-level Control Variables					
Gross Domestic Product	0.0262 (0.0086)**	0.0535 (0.0183)**	0.0664 (0.016)***	0.0689 (0.016)***	0.073 (0.0163)***
Growth in Gross Domestic Product	-0.0102 (0.0063)	-0.0059 (0.0123)	0.0122 (0.0119)	0.0229 (0.0128)†	0.0308 (0.0146)*
Field-level Control Variables					
Turbulent External Environment	0.0031 (0.0148)	0.0079 (0.0262)	-0.0012 (0.0228)	-0.0334 (0.0268)	-0.034 (0.0273)
Service industry	0.2938 (0.0938)**	0.5473 (0.2078)**	0.4987 (0.2031)*	0.5371 (0.2037)**	0.5204 (0.2033)*
Sample Overlap with Financial Crisis	-0.0468 (0.0389)	-0.0889 (0.0697)	-0.112 (0.0548)*	-0.1482 (0.0568)**	-0.1389 (0.0559)*
Age Entreneurial firm	0.004 (0.013)	-0.0322 (0.0231)	-0.0347 (0.0196)†	-0.0469 (0.0203)*	-0.0438 (0.02)*
Individual Characteristics	-0.031 (0.0142)*	-0.0435 (0.0302)	-0.0721 (0.0275)**	-0.0876 (0.0283)**	-0.0939 (0.0292)**
Firm Capabilities	-0.001 (0.0374)	-0.0257 (0.0571)	-0.0522 (0.0519)	-0.0693 (0.0524)	-0.0622 (0.052)

Continues on next page

Table 4   MARA Results *(Continued)*

Study-level Control Variables

	0.0219	0.0131	0.0463	0.0239	0.0319
Survey Data	(0.0139)	(0.0279)	(0.0258)†	(0.0275)	(0.0265)
Journal of Business Venturing	0.0495	0.0987	0.1037	0.1379	0.1421
	-0.0204	0.007	-0.0075	0.0398	0.0319
Entrepreneurship Theory & Practice	(0.0495)	(0.0743)	(0.0636)	(0.0667)	(0.0659)
	-0.0025	-0.0013	0.0174	-0.0021	0.0031
Small Business Economics	(0.0192)	(0.037)	(0.0332)	(0.0342)	(0.0337)
	-0.0552	-0.0081	0	0.0252	0.0274
Strategic Entrepreneurship Journal	(0.0446)	(0.0584)	(0.0511)	(0.0522)	(0.0525)
	-0.0161	-0.0324	-0.0335	-0.0504	-0.0487
Impact Factor in 2017	(0.014)	(0.023)	(0.0212)	(0.0224)*	(0.0222)*
	0.014	-0.007	-0.0167	-0.0312	-0.0191
Published after 2009	(0.0157)	(0.0237)	(0.0212)	(0.022)	(0.0211)
R^2	45.58%	31.30%	67.60%	68.04%	68.10%
k	101	101	101	101	101
	1244.1755	704.6332	384.8823	380.9689	380.4561
	($p < 0.0001$)	($p < 0.0001$)	($p < 0.0001$)	($p < 0.0001$)	($p < 0.0001$)
Q Residual					
Q Residual (df)	125	82	77	76	76
	45.1203	31.7409	69.2969	74.9811	74.6471
	($p = 0.0236$)	($p = 0.0236$)	($p < 0.0001$)	($p < 0.0001$)	($p < 0.0001$)
Q Moderators					
Q Moderators (df)	16	18	23	24	24
I^2	52.88%	75.06%	54.03%	53.65%	53.65%
Tau 2	0.0013	0.0036	0.0017	0.0017	0.0017
	(SE= 0.0001)	(SE= 0.0005)	(SE= 0.0002)	(SE= 0.0002)	(SE= 0.0002)

a Unstandardized regression coefficients; k is the total number of effect sizes; Q is the homogeneity statistic; standard errors are given in parentheses

b † < 0.10; * p <.05; ** p < 0.01; *** p < 0.001

c Model 5 includes the difference between the maximum and minimum of each institutional as indicator of institutional coherence

results indicate that firms operating in service industries (β = 0.5371; p < 0.01) benefit more from entrepreneurial engagement than those operating in other industries. We also found that studies that control for firm age (β = -0.0469; p < 0.05) or individual characteristics (β = -0.0876; p < 0.01) tend to yield smaller effect sizes.

Table 5   MARA Results for Five Institutional Spheres

Variable	Model 1 : Random Effects	Model 2: Random Effects	Model 3: Random Effects	Model 4: Random Effects
constant	0.1349 (0.0468)**	0.2577 (0.0882)**	0.3585 (0.1091)**	0.3586 (0.1084)***
Hypotheses				
H1 Institutional Coherence				1.0266 (0.5046)*
Entrepreneurial Engagement				
Engaged Decision-making			-0.1339 (0.0708)†	-0.1291 (0.0703)†
Resource Acquisition and Allocation			-0.134 (0.0659)*	-0.1281 (0.0655)†
Entrepreneurial organizing			-0.0873 (0.0664)	-0.0836 (0.066)
Entrepreneurial commitment			-0.091 (0.065)	-0.0827 (0.0647)
Sense-making and Learning			-0.2073 (0.069)**	-0.2055 (0.0685)**
Institutional Spheres				
Corporate Governance		0.0382 (0.0741)	0.0388 (0.0644)	0.0231 (0.0644)
Mode of Inter-firm Collaboration		-0.0248 (0.0781)	0.0129 (0.0668)	0.149 (0.0944)
Firm's Employees		-0.0854 (0.0849)	-0.0446 (0.0787)	0.2923 (0.1829)
Industrial Relations		0.027 (0.0519)	-0.0026 (0.0472)	-0.0015 (0.047)
Vocational Training and Education		0.1859 (0.0896)*	0.1918 (0.0784)*	0.0184 (0.1157)
Country-level Control Variables				
Gross Domestic Product	0.0262 (0.0086)**	0.0541 (0.0187)**	0.0647 (0.0165)***	0.0612 (0.0165)***
Growth in Gross Domestic Product	-0.0102 (0.0063)	-0.01 (0.0127)	0.0116 (0.0119)	0.0362 (0.0169)*
Field-level Control Variables				
Turbulent External Environment	0.0031 (0.0148)	-0.0184 (0.03)	-0.0236 (0.0268)	-0.0299 (0.0268)
Industry B	0.2938 (0.0938)**	0.5924 (0.2094)**	0.5493 (0.2045)**	0.5395 (0.2044)**
Sample Overlap with Financial Crisis	-0.0468 (0.0389)	-0.1245 (0.0724)†	-0.1358 (0.0563)*	-0.1435 (0.0558)*
Age Entreneurial firm	0.004 (0.013)	-0.0449 (0.0241)†	-0.0434 (0.0201)*	-0.0474 (0.0201)*
Individual Characteristics	-0.031 (0.0142)*	-0.0394 (0.0313)	-0.0646 (0.0282)*	-0.0914 (0.031)**
Firm Capabilities	-0.001 (0.0374)	-0.0366 (0.0572)	-0.0636 (0.0521)	-0.0701 (0.0519)

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Table 5 MARA Results for Five Institutional Spheres *(Continued)*

Study-level Control Variables				
	0.0219	-0.0121	0.0262	0.0393
Survey Data	(0.0139)	(0.0311)	(0.0294)	(0.0299)
Journal of Business Venturing	0.0495	0.1148	0.1235	0.149
	-0.0204	0.0539	0.0365	0.0406
Entrepreneurship Theory & Practice	(0.0495)	(0.0781)	(0.0673)	(0.0669)
	-0.0025	-0.0135	0.008	0.0072
Small Business Economics	(0.0192)	(0.038)	(0.0344)	(0.0342)
	-0.0552	-0.0035	-0.006	0.034
Strategic Entrepreneurship Journal	(0.0446)	(0.0595)	(0.0513)	(0.0547)
	-0.0161	-0.0426	-0.0441	-0.0511
Impact Factor in 2017	(0.014)	(0.0236)†	(0.022)*	(0.0221)*
	0.014	-0.0352	-0.0431	-0.0204
Published after 2009	(0.0157)	(0.0279)	(0.0251)†	(0.0274)
R^2	45.80%	32.01%	68.78%	69.77%
k	101	101	101	101
	1244.1755	696.7013	374.5282	365.8075
	(p < 0.0001)	(p < 0.0001)	(p < 0.0001)	(p < 0.0001)
Q Residual				
Q Residual (df)	125	80	75	74
	45.1203	35.5032	74.8178	80.2888
	(p = 0.0236)	(p = 0.0176)	(p < 0.0001)	(p < 0.0001)
Q Moderators				
Q Moderators (df)	16	20	25	26
I^2	52.88%	75.07%	53.17%	52.55%
Tau 2	0.0013	0.0035	0.0016	0.0016
	(SE= 0.0001)	(SE= 0.0005)	(SE= 0.0002)	(SE= 0.0002)

a Unstandardized regression coefficients; *k* is the total number of effect sizes; Q is the homogeneity statistic; standard errors are given in parentheses

b † < 0.10; * p <.05; ** p < 0.01; *** p < 0.001

We conducted two robustness tests. First, we used the range in scores of governance principles as an additional measure of institutional coherence. The results are shown in Model 5. The results are fairly similar and indicate that institutional coherence strengthens the influence of entrepreneurial engagement of firm performance, supporting Hypothesis 1. The second robustness test involves a model that focused on the wider, more traditional, interpretation of VoC. Here, we conducted an additional MARA and included five institutional spheres (Hall & Soskice, 2001; Witt & Jackson, 2016) instead of three institutional spheres. The results are summarized in Table 5 and the results also provides support for the Hypothesis of this study.

DISCUSSION

This study addresses one of the key questions at the intersection of entrepreneurship and institutions, namely how institutions matter, and more particularly, how do institutional configurations affect entrepreneurial activity? We investigate the relationship between entrepreneurial engagement and firm performance, drawing on the VoC literature to examine how this relationship is influenced by coherence between the institutional spheres. Our meta-analysis of the relationship revealed that coherence across institutional spheres matters, perhaps even more than individual institutions themselves. We seek to contribute to international business, entrepreneurship, and institutional equifinality.

International Business

First, while there is largely agreement within the entrepreneurship literature that institutions matter, this study shows *how* they matter. Redirecting our attention from eclectic analyses of institutional influences, we contribute to a parsimonious approach to studying how institutions affect entrepreneurial engagement and its outcome (e.g. Herrmann, 2020). Debates on the effects of individual institutions may be misleading because these are part of a more extensive (socio-economic) institutional system and should not be taken out of its context. Indeed, we demonstrate that cohesion across these institutions influences value creation from entrepreneurial engagement. These findings deepen our understanding of the influence of domestic institutions and flag the importance of examining the effect of all institutions in combination with one another.

More specifically, while some studies already recognized the importance of looking at the wider institutional context (see Jackson & Deeg, 2008; e.g., Whitley, 1999; Carney et al., 2019; Judge et al., 2014), we add the mechanism through which this occurs. Departing from the complementarity argument (Witt & Deeg, 2019), we highlight how coherence across all national institutions affects how much entrepreneurial engagement can create value. We find that the extent to which institutions are coherent in terms of their organizing principles is important for entrepreneurial activity. While the distinction between complementarity and coherence is not entirely new (see Höpner, 2005), this distinction has not been made within IB; coherence and complementarities exist with and without each other. This distinction is also novel to research on the intersection of institutional configurations within international business, and sheds light on *how* institutions matter.

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Entrepreneurship (Policy) and Varieties of Capitalism

Second, we add to the entrepreneurship literature by accentuating the vital role of the contextual environment (cf. Bjørnskov & Foss, 2016). While extant research focused on the impact of institutional configurations on national economies (Bruton, Peng, Ahlstrom, Ciprian, & Xu, 2015) and the implications of VoC for incumbent firms are clear, for instance, in terms of corporate performance (e.g., Witt & Deeg, 2018) and MNE location decision making (e.g., Carney et al., 2019), its implication for entrepreneurial ventures remained unclear. We shed further light on *how* comparative institutional systems *matter* for entrepreneurs (cf. Dilli et al., 2018; Herrmann, 2019). We demonstrate that institutional coherence increases value appropriation for entrepreneurial ventures.

The findings of this study may also have implications for entrepreneurship policy. Skepticism about the effectiveness of institutions has increased (e.g., Ge et al., 2017; Coad et al., 2014), and some studies have shown, for instance, that IPR institutions and foreign direct investments reduce entry into high-tech entrepreneurship in emerging countries (Pathak et al., 2013). The lack of institutional coherence of underlying governance between the entrepreneurship policy and the national configuration may explain why certain policies are not effective in some countries but effective in other countries. The policy should fit the institutional configuration's governance principles, and future studies should validate this. This corresponds with Bjørnskov and Foss' (2016) their call for future research, who state that research on the effect of different combinations of macro-economic policies is valuable because institutions work together to moderate the impact of other policies.

Governments may put policies in place to help new firms to overcome barriers to entrepreneurship. However, the effectiveness of government policy is debated, and there are opposing findings (Autio & Rannikko, 2016; Cantner & Kösters, 2012; Jourdan & Kivleniece, 2017). By focusing on this debate, our study may shed some light in understanding the mixed findings regarding the effect of policy interventions. While we do not directly measure the coherence of policies, the policies may be affected by institutional coherence. If, for instance, regional policies adhere to conflicting governance principles of institutional macro-level institutions, this may explain why these policies are so debated. Future studies may validate this logic. Our study, thus, provides some initial insights into how institutional forces alter the processes and outcomes of entrepreneurial engagement. Entrepreneurship policy should consider

whether it defects from national institutions' governance principles; policies cannot just be "imported" from other institutional contexts.

Institutional equifinality

In terms of the discussion about the degree to which the VoC concept is relevant (Dilli et al., 2018; Witt & Deeg, 2016), we demonstrate that the impact of coherence on performance is salient across different performance outcomes. While past research has shown that VoC is relevant for explaining differences in national comparative advantage (Hall & Soskice, 2001; Herrmann, 2019; Jackson & Deeg, 2008; 2019) – differences in innovation types (Witt & Jackson, 2016) or export, for example (Schneider et al., 2010) – we did not know whether coherence across the institutional spheres may function as a boundary condition for value appropriation. We argue that coherence contributes to firm performance irrespective of whether a country falls on the LME/CME spectrum. Coherence contributes towards efficiency synergies in internal production regimes.

Examining the effect of institutional coherence concerns studying whether different countries achieve similar outcomes in terms of value appropriation of institutional coherence. Our study contributes to institutional equifinality as we study whether different configurations of institutions can produce value appropriation from entrepreneurial engagement. Specifically, we have attempted to better understand how the institutional system, according to VoC, influences how firms in different countries perform differently. This equifinal finding supports that there is no optimal model of capitalism (cf. Carney et al., 2019; Judge et al., 2014). On the other hand, our work supports the notion of equifinality – institutional coherence within a country, independent of where is a country is arrayed on the LME/CME continuum, fosters value appropriation from entrepreneurial engagement.

Limitation and Future Research

Although this paper provides some valuable insights, it also has certain limitations that should be borne in mind when interpreting the findings. Meta-analyses are inherently vulnerable when it comes to validity tests since others have done the primary research in the studies included. It is hard to make conclusive causal inferences because all the input data would need to be based on experimental designs, which is very unlikely in strategic management (Bergh et al., 2016). Any meta-analysis also involves judgment calls that

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may influence the outcomes of the study (Aguinis et al., 2011). One such call is which studies are relevant to include. We included studies from six journals that focus mainly on entrepreneurship; however, studies from other journals might also be relevant.

Another point relates to the operationalization of variables. Entrepreneurial engagement has been operationalized in a variety of ways, and while we control for those different forms, future research may validate whether institutional coherence is relevant to all sorts of entrepreneurial firms. Herrmann (2019), for instance, showed that different institutional configurations lead to different forms of entrepreneurship. For the institutional context, we use the truncated averages scores for the institutional spheres for 1997 to 2003 (Jackson & Deeg, 2018), while our sample covers 2000 to 2018. While these scores would not change much, because they are stable over time due to path dependencies, future researchers could validate this by using new measurements over time.

Given that coherence and complementarity may exist with and without each other, future research should analyze the impact of these combinations. For instance, does the combination of coherence and complementarity more strongly increase value appropriation? Is this different for incumbent and entrepreneurial firms?

CONCLUSION

While many studies have focused on how particular spheres of a country's institutions affect entrepreneurial engagement and its outcomes, there are conflicting findings. Taking stock of research, we further contextualize entrepreneurship research by looking at the broader institutional context, instead of at institutions in isolation from one another. Specifically, we focus on the five core institutional spheres discussed in the VoC literature. By considering the extent to which there is coherence across these institutional spheres in which these adhere to similar governance principles, we theorize that institutional coherence strengthens the relationship between entrepreneurial engagement and firm performance. Our meta-analytical, empirical assessment supports this argument.

Chapter 5

Discussion
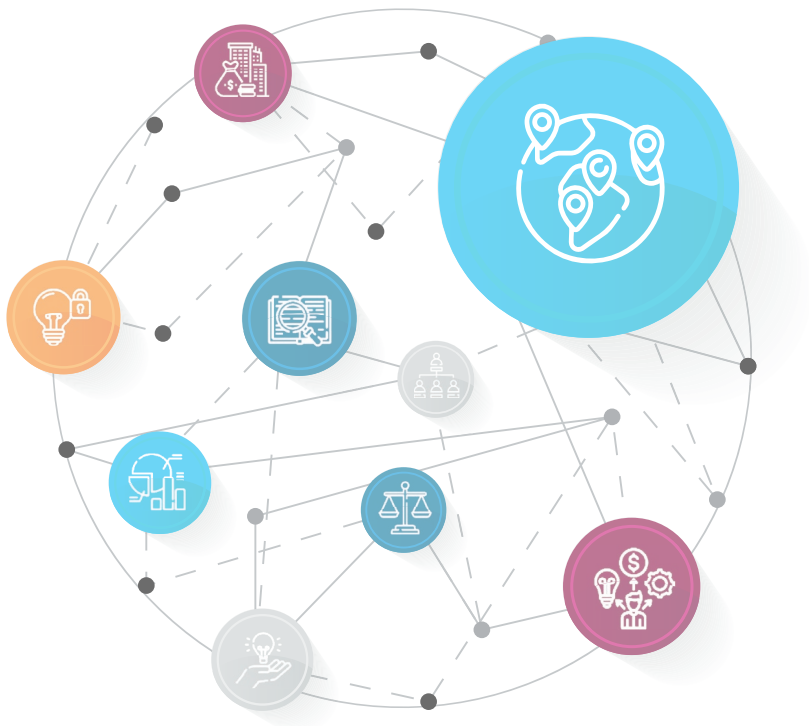
The three essays about the development of absorptive capacity, the influence of intellectual property regimes on appropriating value of AC, and the effect of institutional coherence on entrepreneurial engagement – firm performance relationship are presented in chapters 2, 3 and 4, respectively. These studies are designed and conducted to fill various significant gaps in the literature through meta-analytic techniques. This chapter concludes these studies by discussing the overall key findings, theoretical contribution, implications for managers and policymakers, limitations, and avenues for future research.

SUMMARY KEY FINDINGS

Study I: Antecedents of Absorptive Capacity

Categorizing past work on the antecedents of AC based on the implicit or explicit assumption that either path dependency or managerial agency determines AC, the first study of the dissertation looks at the relative influence of AC antecedents. Path dependency, here, reflects the idea that history matters, and that AC is to a large extent pre-determined by firms' past. Scholars who examine AC as a path-dependent phenomenon build on the notion that firms accumulate AC and look at three antecedents: firms' experiential learning, network embeddedness, and investment history. On the other hand, managerial agency refers to purposeful and goal-oriented individuals and practices that shape AC actively. I identify two antecedents that fall in the managerial agency stream of research: those concerned with managerial abilities and those focusing on practices. Building on this categorization, I theoretically contrast and empirically test the effects of antecedents that fall in either category.

The overall effect of antecedents related to path dependency and managerial agency on AC is positive and significant. The magnitude in effect size of antecedents associated with managerial agency exceeds that of path dependency. Taking a closer look at the antecedents that fall in each stream if research, the results indicate that the effect sizes vary for the antecedents. For instance, while a firm's investment history (i.e., ICT investment, organizational structure, and R&D investment) and experiential learning (i.e., accumulated knowledge, performance history, and firm age) – two indicators of path dependency – both positively influence AC, the effect size of the firm's investment history is more than four times as high. Similarly, managerial capabilities more strongly

influence AC within the managerial agency strand than managerial practices. These findings give insights into the relative effect of antecedents.

Further analyses indicate that path dependency and managerial agency's aggregated effect size is not contingent on firm size. However, when considering the magnitude of the effect size of its indicators, the findings indicate that the effect of a firm's network embeddedness is more pronounced in SMEs than in large firms. In contrast, management practices more strongly influence AC at large firms. Finally, this study presents a horse race between the opposing theories underlying both strands of research. Specifically, I studied whether managerial agency (partially) mediates the path dependency – AC relationship or vice versa. The best-fitting model indicates that path-dependent variables influence AC partially through their effect on managerial agency

Study II: Absorptive Capacity and Performance

The second study of the dissertation looks at the boundary conditions of the AC – firm performance relationship. I build on the notion that intellectual property rights (IPR) are central to knowledge and knowledge appropriation, and thus, affect organizational learning and the extent to which such learning can be leveraged to commercial and innovative means. Doing so, I explore the effect of IPR regimes on the focal relationship to explain heterogeneity in AC appropriability across countries.

First, the meta-analysis reveals that the AC – organizational outcomes relationship is positive. Notably, the heterogeneity of the focal relationship is considerable, which suggests the presence of alternative explanations for systematic differences in our focal relationship. First, the findings show that heterogeneity in effect size to differences can be attributed to differences in IPR. Next, I dissect IPR into IPR system strength and IPR enforcement. Specifically, the study shows that the strength of a country's IPR regime positively moderates the effect of AC on innovation performance but negatively influences financial performance. The study shows the opposite for IPR enforcement, i.e. the strength of a country's IPR regime negatively moderates the effect of AC on innovation performance and positively impacts financial performance.

Study III: Entrepreneurial Engagement and Performance

The final study highlights the importance of the institutional environment on the entrepreneurial engagement – firm performance relationship. I consider the interconnect-edness of countries' institutional spheres, instead of looking at institutions in isolation of

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each other. Building on Varieties of Capitalism (Hall & Soskice, 2001), institutional spheres within a country are placed on a continuum based on their underlying governance principles, ranging from market (i.e., LME) to non-market forms (i.e., CME) of organizing activities. I theorize that the coherence of the underlying governance principles across institutional spheres within a country influences the focal relationship.

First, using descriptive analysis, the findings confirm the existence of LMEs and CMEs that score either low, average, or high in terms of institutional coherence. The HOMA analysis indicates that there is a strong positive relationship between entrepreneurial engagement and firm performance. The analysis also shows differences in effect sizes across countries, and our heterogeneity tests indicate that between-study differences are systematic. Next, adding the effect of institutional spheres to the model, the results suggest that the impact of these spheres is weak or insignificant. Notably, when adding institutional coherence to the model, the effect of institutional spheres become clear. In addition, entrepreneurial firms appropriate less value from the focal relationship in countries in which these institutional spheres lack coherence.

KEY CONTRIBUTIONS

The studies in the dissertation present various contributions to the corresponding streams of literature.

Study I: Antecedents of Absorptive Capacity

Over the last four decades, institutional theory has developed into one of the leading theories in management research. The categorization of antecedents related to path dependency and managerial agency, reflects that of the discussion in the institutional theory regarding structure versus agency (Heugens & Lander, 2009; cf. Hirsch & Lounsbury, 1997), in which we find that the direct effect of managerial agency exceeds that of path dependency. Here, the former represents micro-level (i.e., individual or unit level) antecedents and the latter macro-level (i.e., firm and inter-firm level) antecedents. This dissertation complements that discussion by studying the micro-foundations (Felin et al., 2015; e.g., Distel, 2019) and macro-foundations of organizational capabilities (Barney & Felin, 2013; Felin et al., 2015). In support of the micro-foundations stream of research

(e.g., Felin et al., 2015), we found that managerial agency more strongly influences AC than path dependency. The study shows that managerial cognition exhibits the greatest magnitude in effect size, highlighting the cognitive underpinnings of micro-foundations research (Eggers & Kaplan, 2013; Helfat & Peteraf, 2015). The findings also hint at an interaction effect; when testing models that reflect both streams of research, I see that macro-foundational antecedents influence AC indirectly through micro-foundational antecedents, highlighting the importance of both streams of research.

Working towards an integrative framework and building on the micro-foundations, I applied Coleman's (1990) bathtub to demonstrate the emergence of AC at the micro and firm level (see Chapter 2, Figure 3). The framework also highlights the importance of considering variables at different levels of analysis. In this paper, I describe the expected macro-micro-macro interactions that result in the emergence of AC. Our suggested model complements prior work and calls for future research in which multiple levels of analysis are considered and focus on both streams of research (i.e. path dependency and managerial agency).

This framework also has a clear link to co-evolutionary theory (McKelvey, 1997; 2002; Lewin & Volberda, 1999; e.g., Hutzschenreuter et al., 2007). Unifying path dependency and managerial agency, the first study contributes a parsimonious, coevolutionary framework in which AC is shaped by the coevolution of variables relating to these two strands of research. Coevolutionairy theory is particularly suitable because the underlying assumption and its narrative help to solve the tension between the two streams of literature. More specifically coevolutionariy theory assumes (i) simultaneous evolution of variables, (ii) joint outcome of variables, (iii) analysis at multiple levels of analysis, (iv) recursive mutual causality and unidirectional causality, (v) nonlinearity and positive feedback loops, and (vi) path and history dependence (Volberda & Lewin, 2003).

The assumptions correspond to the properties of our adaption of Coleman's (1990) bathtub model. Firm AC is on the one hand determined by its natural history- and path-dependent nature, which is difficult to deviate from due to sunk costs and specialization. However, managerial agency may also influence path dependency, e.g. by deciding firm structure or alliance partner choice, and vise-versa. And even when managerial practices may lead to new structures, for instance with agile management, i.e. a managerial practice, resulting in squads, i.e. a new (temporary) organization structure (e.g. Birkenshaw, 2018); these new structures may in turn, forge new constraints, whether

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intended or unintended, which may lead to inertia and path dependence (Ortmann & Sydow, 2018).

In elaborating the coevolutionairy element of this framework, I draw on McKelvey's (1997) distinction between macrocoevolution and microcoevolution. Macrocoevolution deals with firm coevolution with the external environment at the meso, meta, or macro level. Microcoevolution, on the other hand, occurs within units, between units, or across units within a multiunit organization, recognizing micro-processes within the firm (Volberda & Lewin, 2003), and can be defined as 'coevolution of intrafirm resources, dynamic capabilities, and competencies in an intrafirm competitive context' Lewin and Volberda (1999: 526).

Recognizing this interplay between antecedents within the firm fits the micro-coevolution particularly well and helps to shed light on how antecedents coevolve, and together, influence AC. These mechanisms highlight the coevolution between path dependency and managerial agency. From this vantage point, we would conjecture that antecedents reinforce one another. This shift may offer a nuanced understanding of the mechanisms and outcomes of the antecedents that have been studied in the context of AC. Given that the coevolutionairy aspect assumes variables to be interconnected, this speaks particularly well to the notion of cumulativeness of AC (Van den Bosch et al., 1999). Altogether, this study lays some of the foundation for a co-evolutionary framework of AC that is based on managerial agency at the lower level of analysis and path-dependency variables at the macro-level of analysis.

Study II: Absorptive Capacity and Performance

Concerned with the boundary conditions of AC, scholars have identified various constraints to AC appropriation at multiple levels of analysis (Tortoriello, 2015; Wales, Parida & Patel, 2013; Tsai, 2001). Extant research focused on internal appropriation mechanisms focused on factors endogenous to the firms, such as secrecy and speed to market (Cohen et al., 2000; Hurmelinna-Laukkanen & Puumalainen, 2007; Leiponen & Byma, 2009; Ritala & Hurmelinna-Laukkanen, 2013). To compliment extant research and to further advance our understanding, I theorize and empirically demonstrate that characteristics of the national environment, here IPR system strength and enforcement, regulate the extent to which organizations benefit from their AC. In line with calls across disciplines (Eden, 2010; Li & Qian, 2013; Peng et al., 2009), the study emphasized the

importance of studying institutional contexts for innovation and organizational learning (e.g. Zhao, 2006).

The study also complements prior meta-analyses on AC (Maldano et al., 2018; Song et al., 2018; Yao et al., 2020; Zou et al., 2018) by addressing why some firms appropriate more value from their AC than others. Building on the notion that intellectual property rights (IPR) are central to knowledge and knowledge appropriation. I dissect IPR into IPR systems and enforcement, which provides a more nuanced view of the effect of IPR.

Extant studies show mixed findings of the influence of AC on performance indicators. A recent meta-study aggregated the effect of AC on firm performance (e.g., Yao et al., 2020), however, it did not consider examining the effect on innovation and financial performance separately. Our study shows that we should consider dissecting firm performance into innovation and finance related performance. Indeed, IPR may facilitate appropriation in terms of innovation and financial performance; however, it may also hinder the focal relationship, depending on which element of IPR one focuses.

Study III: Entrepreneurial Engagement and Performance

The final study adopts a holistic perspective of institutions and adds that it is not just an institutional factor, but also, and more specifically, the interplay of institutions that influence how firms appropriate value their entrepreneurial engagement. Responding to the call to examine the wider institutional environment (Aguilera & Grøgaard, 2019; Jackson & Deeg, 2019; Shepherd et al., 2018), this study highlights how institutions matter for the entrepreneurial engagement-firm performance relationship. I emphasize the importance of institutions for value appropriation and make three contributions.

First, building on VoC literature, we show that the extent to which institutions are coherent in terms of their organizing principles is essential for appropriating value from entrepreneurial engagement. More specifically, while some studies already recognized the importance of looking at the wider institutional context (see Jackson & Deeg, 2008; e.g., Whitley, 1999; Carney et al., 2019; Judge et al., 2014), we add the mechanism through which this occurs. Departing from the complementarity argument (Witt & Deeg, 2019), we highlight how coherence across all national institutions affects how much value can be created from entrepreneurial engagement. We find that the extent to which institutions are coherent in terms of their organizing principles is important for entrepreneurial activity. While the distinction between complementarity and coherence is not entirely

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new (see Höpner, 2005), this distinction has not been made within IB; coherence and complementarities exist with and without each other. This distinction is also novel to research on the intersection of institutional configurations within international business.

Second, debates on the effects of individual institutions may be misleading because these are part of a more extensive (socio-economic) institutional system and should not be taken out of its context. Indeed, when studying institutional spheres separately, our study showed that not all institutions have a significant influence on the relationship between entrepreneurial engagement and firm performance. Once we add in the concept of the coherence across the national institutions in a particular country, however, the effect of individual institutions crystallizes. The effect of institutions becomes more significant and we obtain a clearer picture of how those institutions influence this relationship. Notably, we find that the institutional sphere corporate governance does significantly influence our focal relationship. This finding deepens our understanding of the influence of domestic institutional configuration and cautions against examining institutions in isolation from the wider environment. Redirecting our attention from eclectic analyses of institutional influences, this study contributes to a parsimonious approach to studying how institutions affect entrepreneurial engagement and its outcome (e.g. Herrmann, 2020).

Third, we extend the relevance of VoC literature to the context of entrepreneurial firms (e.g., Herrmann, 2019; Foss & Bjørnskov, 2018). While extant research focused on the impact of institutional configurations on national economies (Bruton, et al., 2015) and the implications of VoC for incumbent firms are clear, for instance, in terms of corporate performance (e.g., Witt & Deeg, 2018) and MNE location decision making (e.g., Carney et al., 2019), its implication for entrepreneurial ventures remained unclear. We shed further light on how comparative institutional systems matter for entrepreneurs (cf. Dilli et al., 2018; Herrmann, 2019). We demonstrate that institutional coherence increases value appropriation for entrepreneurial ventures.

Fourth, examining the effect of institutional coherence concerns studying whether different countries achieve similar outcomes regarding value appropriation of institutional coherence, the study also contributes to institutional equifinality. In terms of the discussion about the degree to which the VoC concept is relevant (Dilli et al., 2018; Witt & Jackson, 2016), we demonstrate that the impact of coherence on performance is salient across different performance outcomes. We contribute to the understanding

of how the institutional system, according to VoC, influences how firms in different countries perform differently. This equifinal finding supports that there is no optimal model of capitalism (cf. Carney et al., 2019; Judge et al., 2014), supporting the notion of equifinality – institutional coherence, independent on LME/CME continuum, fosters value appropriation from entrepreneurial engagement.

MANAGERIAL AND POLICY IMPLICATIONS

Study I: Antecedents of Absorptive Capacity

The first essay examines how resources can be invested most effectively to develop firm AC. Our findings underline the importance of investing in managerial capabilities and managerial practices, as those have a relatively strong direct and indirect influence on AC. Our findings may guide managers in their resource allocation to enhance their organizational learning. For instance, managerial cognition and ICT antecedents are among the researched antecedents with the highest accumulated effect size.

In terms of antecedents at the firm or inter-firm level, the study shows that the firms' network embeddedness, i.e., the structural, cognitive and elements of inter-firm collaboration are of key importance for AC development. The findings also suggest that some antecedents may more strongly influence AC at small- and medium-sized companies, as opposed to large firms. For instance, the effect of manager capabilities is more pronounced in SMEs, while managerial practices work out more strongly on AC at large firms. In addition, the results highlight the importance of interaction between antecedents. To avoid an investment tunnel vision, i.e., focus on either, I suggest that the investment in different antecedents reinforces each other.

Study II: Absorptive Capacity and Performance

The essay produces insights on how organizations may benefit from their organizational learning ability depending on their national IPR regimes (Peng & Khoury, 2008; Peng et al., 2009). We advocate that firms may look beyond internal appropriation strategies and consider the national context when planning innovation endeavors. Specifically, issues related to IPR become pressing when firms operate in multiple or expand to different institutional settings, where the strength and enforcement of formal institutions may

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significantly vary (Peng et al., 2017). Our results support this prediction by showing that both moderate the relationship between AC and different organizational performance indicators. We further observe that the effect of IPR system strength is lower than that of enforcement. The relatively small effect size of IPR system strength could be due to its often-lamented drawbacks (e.g., patent thickets, fuzzy boundaries, etc.). This is in line with Dosi and colleagues (2006), who show that IPR systems have at best no effect on innovation. On the other hand, the use or threat of costly and time-consuming litigation in high-quality IPR enforcement environments may present a powerful regulating market mechanism discouraging imitation, and enabling organizations to ensure economic rents from their AC. Hence, we advocate that firms operating or planning to expand to differing countries closely consider the national environment when setting company performance goals, meaning some countries are better suited for innovative pursuits while others can generate better financial performance.

Understanding the heterogeneous national environment may also help better understand firm behavior and performance. Firms that wish to spur innovation may locate their R&D centers in countries with strong IPR systems and weak enforcement yet exploit contexts with weak systems and strong IPR enforcement to extract commercial rents from the same organizational learning done elsewhere. For instance, managers may be strategically taking advantage of institutional arbitrage. Firms may avoid patent wars in settings with strong enforcement by conducting business in countries with weak IPR protection (Zhao, 2006). Paik and Zhu (2016) also indicate that the IPR environment influences firms' product launch strategies; firms may use product launches strategically to counter competitors' aggressive patent enforcement strategies.

Overall, the study shows that intellectual property rights and their enforcement have different effects on organizational outcomes. Whereas the relationship between IPR regimes and innovation is positive, it negatively influences financial performance. IPR enforcement, on the other hand, has a surprisingly negative effect on innovation but enhances financial performance. Policymakers concerned with the effectiveness of organizational learning should strengthen their formal institutions further using IPR protection, particularly applicable to countries that score low on formal institutions (e.g., Ecuador and Russia). I call for more attention to the intricacies of IPR and its effects on firm behavior and outcomes.

The government is often portrayed as a bureaucratic and uncreative institute in terms of innovation policy. Mazzucato (2015), however, highlight the crucial role of governments in spurring entrepreneurship and innovation. This study, too, shows that the government plays a crucial in appropriating value from absorptive capacity at (large) firms. Specifically, through the development of institutional factors, such as issuing patents, governments facilitate value appropriation from institutions.

Study III: Entrepreneurial Engagement and Performance

This study also has implications for entrepreneurship policymakers. Recently, there has been an increase in skepticism about institutions' effectiveness to foster entrepreneurship (e.g., Autio & Rannikko, 2016; Cantner & Kösters, 2012; Coad et al., 2014; Jourdan & Kivleniece, 2017; Ge et al., 2017). The role of the government in spurring innovation has long been overlooked (Mazzucato, 2013). Focusing on entrepreneurial engagement, the final study shows the state's role through their institutions to ensure entrepreneurial engagement pays off. This aligns with Mazzucato (2011; 2015; 2016), who highlight governmental investing in successful technology and firms. The government determines governance principles related to corporate governance. One key pillar of VoC literature, short- vs. long-term financing, and dissecting finance from performance, is key for disruptive innovations to thrive (Mazzucato, 2011). If the underlying governance principles with governance principles related to other institutional spheres, this may cause inefficiencies and decrease the extent that entrepreneurial engagement pays off.

This study provides initial insights into how institutional forces alter the processes and outcomes of entrepreneurial engagement. Entrepreneurship policy research should consider whether policies are in coherence with the governance principles underlying national institutions; policies should not just be "imported" from other institutional contexts. Therefore, policy advisors should examine policy interventions considering the broader institutional context and search for coherence in governance principles within the institutional spheres.

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LIMITATIONS

As laid out in the individual chapters, this approach towards data synthesis has many advantages as it combines multiple primary studies and provides a more precise estimate of the effects than individual studies. Given the meta-analytic nature of these studies, there are some shared methodological shortcomings, which I discuss in this section.

First, the quality is dependent on the primary studies. I tackle this by controlling for quality in terms of the impact factor of the publication outlet in study III. Issues in relation to operationalization and context are dealt with in each study by controlling for different types of measurements and environmental conditions, respectively. Meta-analyses are also subject to judgment calls that may influence the outcomes of the study (Aguinis et al., 2011), for example, one related to the selection of relevant studies. In this dissertation, I try to minimize this bias by conducting an exhaustive search for potential studies ex-ante. Another issue that may arise is related to the file-drawer problem. The primary studies are published and the effect sizes may differ from those that are not published. This potential issue is not addressed in the dissertation.

Another limitation related to the implicit assumption that the country-level institutional setting/score adequately represents the entire country, including regions, states, districts, etc. However, this might not always be the case. For instance, in China, there is considerable variation in marketization and IPR regime strength across provinces (Wang et al., 2012). Therefore, institutional context may require a finer grained lens in the context of large economies.

FUTURE RESEARCH

The Development of Absorptive Capacity

Further research on AC antecedents may focus on the influence of antecedents on different levels of analysis. The within-firm multi-levelness of microcoevolution (Lewin & Volberda, 2003) corresponds to calls associated with the micro-foundations to examine further micro-macro interactions in the field of management and organizational learning (Felin et al., 2015; e.g. Distel, 2019) and studying intervening mechanisms that may together lead to AC. Specifically, multi-level methods can be used to test how

managerial agency that arises from the individual or unit level of analysis interacts with path dependencies that take place at the firm- or inter-firm level of analysis. How should firms invest antecedents associated with path-dependencies so that the effect of managerial agency on AC is also accelerated? For instance, the firm's embeddedness in its current network influences the type of leaders that will be recruited (Zhang & Rajagopalan, 2017), and hence the extent to which managerial agency can be used due to differences in their characteristics.

In contrast, consider, for example, how CEO hubris influences risk-taking (Li & Tang, 2017) or how managerial practices, such as agile working, influence firm structure (Birkenshaw, 2018), which both influence AC through path dependency. Practices such as agile are designed to overcome structural path dependencies. Even in traditional industries, such as banking and changes in managerial practices, may uplift path dependencies. The introduction of agile management methods may break down silos and influence organizational structures (Birkenshaw, 2018). Future research may explore how managerial practices and path dependencies coevolve and influence AC.

Formal Institutions

Relatedly, international business and strategy scholars strive to make cross-country generalizations, even though their primary observations are drawn from a limited number of countries (Franke & Richey, 2010). This all-too-common tendency, however, might be misleading. In light of the vast heterogeneity observed in AC appropriation studies, the field may benefit from comparative studies, further exploring the role of the institutional context on organizational learning.

We have only explored IPR as an institutional factor. Future studies could consider other formal institutions, such as financial markets. Historically, most studies have exclusively examined formal institutions, largely neglecting the unwritten, informal institutions as social constraints (Pejovich, 1999; Sartor & Beamish, 2014; Sauerwald & Peng, 2013). However, formal institutions can only paint part of the picture (North, 1990); particularly in (still) emerging countries (Khanna & Palepu, 1997). Future research could specifically elucidate how informal institutions influence international business, for instance, draw on the construct of political ideology (Jost et al., 2009; e.g. Aguilera et al., 2020), and its economic and social sub-dimensions (Crawford et al., 2017). On the continuum from liberal to conservative, the two dimensions of political ideology may

affect AC appropriation differently. Future studies could, thus, examine the intersection between home and host country ideologies. Specifically, given that expatriates often take on the role of boundary-spanners and trusted employees within MNEs (e.g. Fang et al. 2010; Oddou et al., 2009), do differences in ideology between home and host-country matter? Another interesting avenue could explore whether ideologies can potentially overcome weak formal institutions. And if so, how?

Informal Institutions

Formal institutions can only paint part of the picture (North, 1990); particularly, in emerging countries (Khanna & Palepu, 1997, 2000; Verbeke & Kano, 2013). Informal institutions partly emerge due to the incompleteness or dysfunctionality of formal institutions, addressing norms and procedures that are not adequately covered by formal rules and regulation (Helmke & Levitsky, 2004). Embedded in culture and social practices and reinforced through a continuous re-enactment of behavior (March & Olsen, 1983; 2010), informal institutions function as a set of spontaneously emerging (Williamson, 2000) and largely self-enforcing rules; set in motion and maintained by means of sanctions such as loss of reputation, ostracism by peers or expulsion from communities (Pejovich, 2012). Reflecting the accepted and expected ways of conducting business, informal institutions regulate and constrain the behavior of social actors (Leftwich, 2006), guiding organizational decision-making and behavior (North, 1990; Crossland & Hambrick, 2011).

   Further research may examine the effect of informal institutions on the focal relationship. Examples of informal institutions include commonly shared values, cognitions, beliefs, traditions, customs, sanctions, and norms of behavior, often expected or taken for granted (North, 1990, 2005). Future research may, for instance, turn toward informal institutions such as political ideology (Jost et al., 2009; Aguilera, Duran, Heugens, Sauerwald, Turturea & Van Essen, 2020). Political ideology can be defined as the relatively stable and enduring (Jost, Nosek & Gosling, 2008) "shared frameworks of mental models that groups of individuals possess that provide both an interpretation of the environment and a prescription on how that environment should be structured" (Parson, 1951: 24). Hence, the perception of government-imposed rules and regulations is closely intertwined with ideological stances (Denzau & North, 1994).

The manifestations of differences in political ideology can be observed in a wide range of behavioral and attitudinal outcomes of everyday life (Jost et al., 2009); making it possible to draw on ideology to explain firm behavior and outcomes (Christensen, Dhaliwal, Boivie & Graffin, 2015). The literature on political psychology informs that political orientation is indicative of social actors' motivated social cognition (Jost, Glaser, Kruglanski & Sulloway (2003), and associated to openness to new ideas and risk-taking ((Jost, Federico & Napier, 2009; Feldman & Johnston, 2014; Malka et al., 2014; van Hiel, Pandelaere, & Duriez, 2004), central to appropriating AC.

Institutional Configurations

It would provide great insight into the findings when institutional coherence's boundary conditions will be examined. Future research may validate whether institutional coherence is relevant to all sorts of entrepreneurial firms. Herrmann (2019), for instance, showed that different institutional configurations lead to different forms of entrepreneurship.

Given that coherence and complementarity may exist with and without each other, future research should analyze the impact of these combinations. For instance, does the combination of coherence and complementarity more strongly increase value appropriation? Is this different for incumbent and entrepreneurial firms?

Governments may put policies in place to help new firms to overcome barriers to entrepreneurship. However, the effectiveness of government policy is debated, and there are opposing findings (Autio & Rannikko, 2016; Cantner & Kösters, 2012; Jourdan & Kivleniece, 2017). The results of the third study related to institutional coherence present a potential answer to why some policies are effective, and others are not; the argument of institutional coherence may be extended to the level of policy. If policy makers introduce policies that are based on best practices from another institutional setting, that policy may become ineffective when it is incoherent with the governance principles of the new institutional context. Conflicting governance principles may increase coordination costs and decrease policy effectiveness. Future studies may validate this logic.

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CONCLUSION

This dissertation is composed of three essays on organizational learning and value appropriation. The first essay studies how organizations build their AC and find support for a model in which the relationship between path dependency and AC is partially mediated by managerial agency. The second study investigated IPR as a boundary condition of AC value appropriation. Distinguishing between IPR systems and enforcement, the study shows that the strength of a country's IPR regime positively moderates the effect of AC on innovation output but negatively influences financial output; the opposite is found with regard to IPR enforcement. The third essay estimates the effect of coherence across different institutional spheres. The meta-data supports our idea that institutional coherence strengthens the entrepreneurial engagement – firm performance relationship.

Appendices and References

Appendix A: Primary Studies Included in Meta-Analysis I

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Appendix B: Primary Studies Included in Meta-Analysis II

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Appendix C: Primary Studies Included in Meta-Analysis III

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Summary

META-ANALYTIC RESEARCH ON ABSORPTIVE CAPACITY AND ENTREPRENEURIAL ENGAGEMENT

Essays on antecedents and institutions

This dissertation discloses how firms achieve competitive advantage for which I conducted three studies. The first study highlights the development of absorptive capacity. The second study focuses the influence of intellectual property regimes on appropriating value of absorptive capacity (AC). The third study examines the effect of institutional coherence across socio-economic institutions on entrepreneurial engagement – firm performance relationship.

In the first study, I unravel how firms develop AC effectively. AC allows firms to recognize, assimilate and apply new information to commercial ends, critical to innovation. I do so by dividing its antecedents into two categories: those related to path-dependent processes and factors, and those related to managerial agency. While the path dependency studies examine in particular what effects a firm's past experiential learning, investments and network embeddedness have on AC, the managerial agency studies look at how AC is affected by managers' individual capabilities and practices. The meta-analysis indicates that managerial agency tends to be associated more strongly with AC. Also, I find support for a model of partial mediation, in which path-dependent variables influence AC partially through their effect on the managerial agency. Using a coevolutionary narrative, this chapter concludes with an integrative framework.

Building on scholarly endeavors on the importance of the institutional for innovation research, I study institutional contingencies that influence the AC- firm performance relationship across countries. Specifically, I research the intricacies of intellectual property rights (IPR), central to innovation. Distinguishing between IPR system strength and IPR enforcement to theorize and empirically test the moderating effect. The meta-analytical assessment shows that the strength of a country's IPR regime positively moderates the effect of AC on innovation performance, but negatively influences financial performance; the opposite is found for IPR enforcement. This research provides insights into how organizations effectively use intellectual property right across geographical boundaries.

The third study draws on the Varieties of Capitalism literature to examine how institutional arrangements in countries affect the relationship between entrepreneurial engagement and firm performance. Entrepreneurial engagement involves various activities related to exploiting a potential opportunity. The study shows that value appropriation is influenced by the level of coherence within institutions (i.e., the degree to which they adhere to the same governance principles) and that this performance impact holds at different institutional configurations, i.e., institutional equifinality. The results support that firms appropriate less value from entrepreneurial engagement in institutional configurations that lack coherence. This research shows that institutional configurations at the national level are essential for entrepreneurial engagement, particularly in terms of the coherence between the various institutions.

Samenvatting Dissertatie

META-ANALYTISCH ONDERZOEK NAAR HET ABSORPTIEVERMOGEN EN ONDERNEMERSBETROKKENHEID

Proefschrift over antecedenten en instituties

Dit proefschrift tracht bloot te leggen hoe bedrijven concurrentievoordeel behalen. Ik heb hiervoor drie onderzoeken uitgevoerd. Het eerste onderzoek richt zich op de ontwikkeling van het absorptievermogen van organisaties. Het tweede onderzoek belicht de invloed van intellectueel eigendom op de commercialisatie van het absorptievermogen. Het derde onderzoek richt zich op het effect van institutionele coherentie op de relatie tussen ondernemingsbetrokkenheid en bedrijfsprestaties.

Met het eerste onderzoek ontrafel ik hoe bedrijven effectief hun absorptievermogen ontwikkelen. Dit vermogen is cruciaal voor innovatie en stelt organisaties in staat om nieuwe informatie te herkennen, te assimileren en toe te passen voor commerciële doeleinden. Ik verdeel de antecedenten van het absorptievermogen in twee categorieën, namelijk antecedenten welke gerelateerd zijn aan padafhankelijke processen en factoren en antecedenten welke gerelateerd zijn aan bestuurlijke keuzevrijheid. De eerste categorie richt zich op de effecten die ervaringsleren, investeringen en de netwerkinbedding van een bedrijf hebben op het absorptievermogen. De tweede categorie omvat de manier waarop het absorptievermogen wordt beïnvloed door de individuele vaardigheden en werkwijzen van het management. De meta-analyse geeft aan dat de antecedenten van de tweede categorie sterker worden geassocieerd met het absorptievermogen van een bedrijf. Het onderzoek toont ook aan dat bestuurlijke keuzevrijheid de relatie tussen padafhankelijke variabelen en het absorptievermogen medieert. Dit onderzoek sluit ik af met een integratief raamwerk welke gebaseerd is op de co-evolutionaire theorie van organisaties.

Voortbouwend op eerdere wetenschappelijke inspanningen over het belang van het macro-economisch klimaat voor innovatieonderzoek, richt het tweede onderzoek zich op landelijke contingenties welke het effect van het absorptievermogen op bedrijfsprestaties beïnvloeden. Ik leg het effect van de verschillen in intellectuele eigendomsrechten (IER) bloot door onderscheid te maken tussen IER-systeemsterkte enerzijds

en IER-handhaving anderzijds. De meta-analytische bevindingen tonen aan dat de sterkte van het IER-systeemsterkte van een land het effect van het absorptievermogen op innovatieprestaties positief modereert, maar het effect op de financiële prestaties negatief modereert; het tegenovergestelde geldt voor IER-handhaving. Dit onderzoek geeft inzicht in hoe organisaties intellectueel eigendom effectief kunnen inzetten.

Het derde onderzoek is gebaseerd op de literatuur over typen kapitalisme om te onderzoeken hoe de samenhang tussen macro-instituties, waaronder intellectueel eigendom en financiële markten, de relatie tussen ondernemersbetrokkenheid en bedrijfsprestaties beïnvloedt. Ondernemersbetrokkenheid betreft de verschillende activiteiten die verband houden met het benutten van een potentiële kansen. Dit onderzoek bevestigt dat de waarde-toe-eigening van ondernemersbetrokkenheid wordt beïnvloed door het niveau van coherentie tussen de instituties van een land. Dit houdt in dat de mate waarin deze instituties dezelfde bestuursprincipes naleven waarde-toe-eigening bevorderd. Dit effect geldt voor verschillende institutionele configuraties, waardoor er sprake is van institutionele equifinaliteit. Dit onderzoek toont aan dat macro-institutionele configuraties essentieel zijn voor ondernemersbetrokkenheid, met name wat betreft de coherentie tussen de verschillende instituties.

About the Author

Lance Cosaert (born July 26th, 1993, in Uithoorn The Netherlands) completed his Bachelor of Science degree in Business Administration and Master of Science Degree in Strategic Management (with Honors) at the Rotterdam School of Management, Erasmus University. He also took coursework at the Chinese University of Hong Kong and the London School of Economics and Political Sciences during his studies.

Lance his Ph.D. was supervised by Prof. Dr. Henk Volberda (University of Amsterdam) and Prof. Dr. Jatinder Sidhu (University of Leeds). During his Ph.D., Lance presented his research at various invitation-only international competitive conferences and consortia, including the Academy of Management in Anaheim (2016), Chicago (2018) and Boston (2019), Strategic Management Society in Minneapolis (2019), European Group of Organization Studies Colloquium in Copenhagen (2017) and Tallin (2018), European Academy of Management in Reykjavik (2018), and Asian Academy of Management in Bali (2019). Lance was nominated for the Carolyn B. Dexter Award and AOM Best Paper award, both at the Entrepreneurship Division, during his last conference in Boston by the Academy of Management.

Lance supervised M.Sc. thesis students and taught various courses at B.Sc., M.Sc. and (E)MBA level on topics related strategy, digital strategy, digital transformation and consulting. He was also actively involved in multiple consultancy clubs. As a teacher and mentor for the RSM Case Society, he coached and joined students in various international case competitions. At the University of Amsterdam, Lance set up the ABS Case Society, where his team also won an award. His teams at both schools won various case competitions.