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*University of Massachusetts - Amherst*

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**THE EMERGENT STRATEGIC HUMAN CAPITAL RESOURCE:  
A MULTILEVEL MODEL INCORPORATING SOCIAL CAPITAL AND  
ABSORPTIVE CAPACITY**

A Dissertation Presented

by

ALIA CROCKER

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 2015

Management



THE EMERGENT STRATEGIC HUMAN CAPITAL RESOURCE: A MULTILEVEL  
MODEL INCORPORATING SOCIAL CAPITAL AND ABSORPTIVE CAPACITY

A Dissertation Presented by

ALIA CROCKER

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## **ABSTRACT**

### **THE EMERGENT STRATEGIC HUMAN CAPITAL RESOURCE: A MULTILEVEL MODEL INCORPORATING SOCIAL CAPITAL AND ABSORPTIVE CAPACITY**

SEPTEMBER 2015

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Strategy scholars have exhibited interest in human capital, and in this dissertation, I follow recent work in this area to explore human capital from a multilevel perspective. In particular, I seek to answer the question of how the individual resources that are component to the unit-level human capital resource (HCR) and the collective capabilities that are characteristic of the HCR together impact performance through absorptive capacity. In examining the emergent HCR, with respect to human capital, social capital, and absorptive capacity, I seek to reconcile the tension between the preference for firm specific knowledge, skills, and abilities in prior human capital theory with the need for new and outside knowledge in absorptive capacity theory. The theoretical model that I motivate proposes that microfoundations of external social capital and depth and breadth of human capital are associated with collective internal social capital and potential absorptive capacity. Through examining those resources component to and characteristic of the emergent HCR, I explain how individual and unit-level resources relate to realized performance outcomes via absorptive capacity. This research takes a departure from the

traditional view of human capital in strategy, as either firm-specific or general, by looking at depth and breadth of experience and incorporates an integrated view of human and social capital in exploring antecedents of absorptive capacity. I test my hypotheses on a sample of security analysts in investment banks.

*Keywords: human capital, absorptive capacity, social capital, emergence, multilevel*

# CONTENTS

	Page
ACKNOWLEDGEMENTS .....	iv
ABSTRACT.....	v
LIST OF TABLES .....	x
LIST OF FIGURES .....	xi
CHAPTER	
1. INTRODUCTION .....	1
Motivation and Research Question .....	1
The Emergent Unit-Level Human Capital Resource.....	4
Depth and Breadth of Human Capital .....	7
Human Capital and Absorptive Capacity .....	8
The Role of Social Capital at Multiple Levels .....	10
Contribution and Structure of the Dissertation.....	13
2. LITERATURE REVIEW .....	17
Introduction and Overview.....	17
The Resource Based View and Microfoundations of Strategy .....	17
The Resource Based View .....	17
Microfoundations of Strategy .....	19
Human Capital.....	20
Roots in Psychology and Economics .....	20
Human Resources and Organizational Behavior.....	24
Strategy and the Resource Based View .....	27
Multilevel Challenges: Individuals, Units, and Emergence .....	29
Categorization Challenges: Specificity and Experience.....	31
Absorptive Capacity .....	35
Defining and Situating the Concept of Absorptive Capacity .....	36
Refining and Categorizing Absorptive Capacity.....	37



Findings from the Absorptive Capacity Literature.....	39
Social Capital .....	41
Background on Social Networks Theory .....	41
Social Capital Definitions and Categorizations.....	42
Findings from the Social Capital Literature .....	43
Integrating Social Capital and Human Capital.....	45
Literature Review Conclusion.....	46
3. THEORETICAL DEVELOPMENT AND HYPOTHESES .....	47
Microfoundations, Attributes, Capabilities, and the Dynamic Nature of Human Capital Resource Emergence .....	49
Antecedents to Human Capital Resource Emergence .....	49
Attributes of the Emergent Unit-level Human Capital Resource.....	52
Capabilities and Outcomes of the Emergent Unit-level Human Capital Resource....	54
The Dynamic Nature of the Emergent Unit-level Human Capital Resource .....	57
Summary – Human Capital Emergence Process .....	58
The Emergent Unit-level Resource: Human Capital, Social Capital and Absorptive Capacity.....	59
Antecedents to Unit-level Human Capital Resource Emergence.....	60
Human Capital Depth and Breadth .....	60
External Social Capital .....	65
Linking Antecedents to Attributes and Outcomes of the Unit-level Human Capital Resource .....	66
Attributes and Outcomes of the Emergent Unit-level Human Capital Resource .....	67
Internal Social Capital at a Unit Level.....	68
Absorptive Capacity.....	72
Potential Absorptive Capacity .....	73
Realized Absorptive Capacity.....	78
4. METHODS .....	83
Introduction and Research Design .....	83
Sample .....	84

Empirical Context.....	84
Data Source and Sampling Frame .....	85
Variables.....	87
Independent Variables .....	87
Latent Variables.....	88
Dependent Variable .....	90
Variable Aggregation .....	91
Control Variables.....	92
Analysis.....	92
5. RESULTS .....	94
Structural Equation Modeling Analysis .....	94
Supplementary Regression Analysis .....	98
6. DISCUSSION AND CONCLUSION.....	105
Discussion .....	105
Limitations .....	113
Conclusion.....	114
APPENDICES	
A: COMMONLY USED TERMS .....	118
B: FAMA AND FRENCH CLASSIFICATION AND STANDARD INDUSTRY CLASSIFICATION CODES .....	120
C: HISTOGRAMS .....	121
D: SCATTERPLOTS.....	124
BIBLIOGRAPHY.....	128

## LIST OF TABLES

Table	Page
1: Descriptive Statistics.....	116
2: Correlation of Variables.....	116
3: Random Effects Regression of Unit-level Performance .....	117

## LIST OF FIGURES

Figure	Page
1: Theoretical Model .....	14
2: Human Capital Specificity .....	34
3: Human Capital Emergence .....	59
4: Proposed Hypotheses .....	82
5: Association between Human Capital Depth and Unit-level Performance .....	102
6: Association between Human Capital Breadth and Unit-level Performance .....	102

# **CHAPTER 1**

## **INTRODUCTION**

### **Motivation and Research Question**

Strategy scholars have long accepted that resource heterogeneity is an underlying factor in a variety of firm performance outcomes (Barney, 1986; Barney, 1991). Accordingly, theory has advanced on management of firm resources that lead to competitive advantage (Sirmon, Hitt, & Ireland, 2007; Sirmon, Hitt, Ireland, & Gilbert, 2011). One such firm resource, human capital, has been a topic of particular interest to strategy scholars. Previously conceptualized in economics research as the individual knowledge, skills, and ideas possessed by people (Becker, 1964), human capital has been reconceptualized as a collective resource that is strategically valuable (Ployhart & Moliterno, 2011). Indeed, the notion that firms can benefit from the value, rareness, and inimitability of employee knowledge, skills, and abilities (Barney & Wright, 1998) has been articulated and supported both theoretically (Wright, McMahan, & McWilliams, 1994) and empirically (Hitt, Bierman, Shimizu, & Kochar, 2001). However, human capital has not been fully explored with respect to antecedents or outcomes (Wright, Coff, Moliterno, 2014) despite multiple studies that demonstrate the link to performance (Crook, Combs, Todd, Woehr, & Ketchen, 2011).

In recent years, strategy theories have progressed to emphasize that resources exist at multiple levels in the firm. Although many strategy questions have been investigated at a single level of analysis, more insightful answers lie in investigating not just within but across these levels in the organization (Hitt, Beamish, Jackson, & Mathieu, 2007). Indeed, incorporating a multilevel view attempts to bridge the theoretical gap between micro and macro levels of scholarship (Molloy, Ployhart, &

Wright, 2011), integrating findings from multiple levels that provide alternative explanations for firm outcomes. Given this impetus to move beyond single level analysis, a focus on individual action and interaction within the firm may provide a richer understanding of higher level organizational capabilities (Foss, 2011; Felin, Foss, Heimeriks, and Madsen, 2012). As such, a recent push to develop microfoundations has occurred in the strategy literature wherein a focus on the individual level is central to understanding firm-level outcomes (Felin & Foss, 2005; Felin & Hesterly, 2007; Barney & Felin, 2013).

As strategy scholars have traveled this path from recognizing the value in resource heterogeneity to taking a more nuanced approach in focusing on foundations of firm outcomes through a multilevel lens, so too have human capital scholars. In part, this is a result of acknowledging the connection between human capital and firm performance (Crook et al., 2011) yet not fully understanding the details of antecedents and outcomes since analysis of the association is scarce (Nyberg, Moliterno, Hale, & Lepak, 2014). Consequently, strategic human capital scholars, or those in strategy and human resource management that have started to deeply study human capital (Wright et al., 2014), are narrowing in on how a collective resource is formed from individual knowledge, skills, abilities, and other characteristics, and how the resultant firm-level resource relates to performance outcomes (Ployhart & Moliterno, 2011; Nyberg et al., 2014). Moreover, scholars now recognize that human capital advantages likely result from combinations of individual and firm-level factors (Coff & Kryscynski, 2011), further contributing to the salience of multilevel analysis. However, strategic human capital scholars have only

started to unpack these issues (Wright et al., 2014), thus we are just beginning to understand how human capital at multiple levels impacts the firm.

Human capital can be viewed as a multilevel resource, defined as those firm assets that span levels in the organization, as it encompasses both individuals and collective groups in the firm. Studying human capital as a multilevel resource requires a way to account for the value derived from the individual level while concurrently keeping sight of the larger picture at the firm level. Consequently, the multilevel theoretic perspective on emergence (Kozlowski & Klein, 2000; Kozlowski, Chao, Grand, Braun, & Kulijanin, 2013) has been used to explain how individual human capital resources (Ployhart, Nyberg, Reilly, & Maltarich, 2014) cohere and become available for firm level use (Ployhart & Moliterno, 2011). This recent work departs from traditional human capital theory by emphasizing that collective human capital resources emerge from foundational individual characteristics and leverages prior multilevel theoretical insights to differentiate between individual- and unit-level human capital. In particular, this work draws on the notion of isomorphism, or the proposition that a given construct connotes the same meaning at both the individual and collective level (Kozlowski & Klein, 2000). Since not all constructs are isomorphic across levels, it is important to distinguish between the individual level of analysis and the “unit” level of analysis, which refers to any aggregation of individuals such as a work group, team, or firm. As a result of integrating multilevel theory and the microfoundations approach, human capital resources are now recognized as separately existing at both an individual and unit level in the firm (Ployhart et al., 2014) which helps scholars consider processes at lower levels that

provide alternative explanations for human capital derived competitive advantage (Foss, 2011).

In what follows, I seek to explain how human capital relates to performance through examining the way in which human capital resources are combined within the emergent unit-level resource with respect to the role of external and internal social capital as well as potential and realized absorptive capacity. I propose a multilevel model that outlines how human capital resources, at both the individual and unit-level, are linked to collective capabilities and outcomes. My focus is on the research question of how the individual-level resources that are component to and the unit-level capabilities that are characteristic of the emergent unit-level HCR impact performance outcomes through realized absorptive capacity. In doing so, I investigate the association of human capital depth and breadth and external social capital founded at the individual level to internal social capital and potential absorptive capacity at the collective unit level, which in turn shapes unit-level performance outcomes via realized absorptive capacity.

### **The Emergent Unit-Level Human Capital Resource**

Emergence theory incorporates foundational level resources within the context of collective-level constraints to explain collective-level outcomes (Kozlowski et al., 2013). Approaching human capital research from a multilevel perspective and leveraging the concept of emergence allows strategy scholars to account for foundational heterogeneity of individual-level characteristics which contrasts with taking a top-down approach such as that of resource management and orchestration (Sirmon et al., 2007; 2011). Emergence is the process through which lower level phenomena integrate to result in higher level phenomena and is valuable in describing how individuals combine across



levels, thus having bottom-up impact in the organization (Kozlowski & Chao, 2012; Kozlowski & Klein, 2000). Further, emergence theory considers contextual constraints that impact aggregation (Kozlowski & Chao, 2012) which are integral to examining microfoundations of firm-level constructs (Barney & Felin, 2013). As such, emergence helps explain how foundational human capital becomes a unique unit-level resource and how human capital resources that are component to and capabilities that are characteristic of the emergent unit-level resource are simultaneously considered.

The emergent human capital resource parallels what March (1991) described as “mutual learning” in that individuals shape the organizational “code” (i.e., the embedded beliefs, practices, or knowledge of the collective group), just as the organizational code simultaneously shapes the individuals. The analogy to March’s work on mutual learning is particularly relevant in the case of human capital emergence in that the unit-level human capital resource and the organizational code are conceptually related constructs: both comprise the interactive role between the collective and the individual. For example, as an individual with a certain stock of human capital becomes part of a unit that has a particular capability, that individual has the opportunity to impact the unit’s performance of that capability, while at the same time the activities of the unit may impact the development of the individual’s human capital. That is, while the individual shapes the code of the unit by contributing unique human capital, the existing code (or knowledge and practices in the unit) also shape how the human capital of those in the unit is deployed through contextual constraints. As such, emergence will differ depending on foundational resources as well as contextual constraints. Further, it is important to note that since emergence is a process that is theoretically assumed but not directly observable

(Kozlowski & Chao, 2012), examining those resources and capabilities that are component to and characteristic of the emergent unit-level HCR becomes integral to our understanding of the process and its impact.

Examining the individual- and unit-level components of the emergent unit-level HCR inherently incorporates the notion of complementary and substitutive resources. Separate from the concept of emergence, which distinctly describes how lower level components become a higher level resource, the notion of resource complements and substitutes has been proposed to explain variation in resources which arise within or across levels in the firm (Hess & Rothaermel, 2011; Ployhart et al., 2014). In the context of the emergent unit-level human capital resource, complementarities describe combinations that synergistically come together (Adegbesan, 2009), while substitutes describe combinations of strategically redundant assets (Hess & Rothaermel, 2011). Prior research shows the value of these relationships at both the individual and firm level in that firm level outcomes can be enhanced by complementarities (Hess & Rothaermel, 2011), unit-level human capital can complement individual human capital to impact performance (Crocker & Eckardt, 2014), and substitutive resources can provide advantages when resource availability is limited (Somaya, Williamson, & Zhang, 2007). However, the extant research on complementary and substitutive resources does not fully address how individual- and unit-level components of the emergent unit-level HCR, such as those related to human capital, social capital, and absorptive capacity, combine together.

## **Depth and Breadth of Human Capital**

In characterizing human capital, the strategy literature has followed economics (Becker, 1964) in predominantly categorizing human capital as firm-specific or general. Subsequently, some studies have shown a perceived benefit to firm-specific human capital (Hatch & Dyer, 2004; Kor & Leblebici, 2005). The perception that firm-specific human capital is more valuable to the firm than general human capital has recently been called into question on the grounds that the development of firm specific knowledge, skills, and abilities (KSAs) may be founded on general human capital (Ployhart, Weekley, & Ramsey, 2009) or valued inappropriately due to lack of consideration of idiosyncratic contextual factors (Campbell, Coff, & Kryscynski, 2012). I take a further step in this discourse to propose that rather than focus on firm-specific or general, a focus on breadth and depth of human capital can yield valuable insights by incorporating dimensions that are not narrowly limited by contextual setting with respect to the focal firm. In this way, characterizing human capital relevant to the emergent unit-level HCR becomes more dynamic than establishing a simple delineation between those KSAs applicable to a single firm or those across many firms.

Depth and breadth of human capital captures the experiences embedded in the firm-specific and general distinctions but from a different vantage point. For example, depth captures expertise in experiences whereas breadth captures diversity in experience in terms of strategic relevance, regardless of a firm-specific setting. To explain, whereas firm-specific human capital captures those knowledge, skills, abilities, and other characteristics (KSAOs) applicable only to the focal firm and general human capital captures all other remaining KSAOs applicable across firms, the depth and breadth

distinction captures the entire realm of KSAOs but in terms of magnitude of detail and degree of facets of experience, regardless of whether they were developed for the focal firm or another setting. As opposed to firm specific and general, which implies a mutually exclusive categorization, human capital can be both (or neither) broad and deep. Rather, other aspects of human capital, such as task, occupation, or industry acumen can be recognized as valuable to the emergent HCR. This is an important distinction in assessing the relationship between human capital and strategic outcomes for the firm, particularly in knowledge intensive settings where industry or occupation knowledge and skills may be more valuable than firm-specific human capital. Furthermore, including breadth and depth offers additional explanatory power in that these dimensions capture something beyond traditional views of firm specificity, which often limitedly connote only those characteristics applicable to the focal firm without regard for industry or occupation-specific KSAOs that are the basis for human capital-derived advantage in some settings. Breadth invokes the complexity and density of experiences that may otherwise be categorized as general, thereby capturing nuanced detail that would be lost, while depth invokes expertise with respect to experiences regardless of whether it was developed in the focal firm or in the same industry or occupation in a different firm or setting. Therefore, these two dimensions capture both individual and contextual attributes that relate to the emergent unit-level HCR, particularly in terms of expertise and variety of knowledge, skills, and abilities.

### **Human Capital and Absorptive Capacity**

Expert and diverse knowledge embedded in human capital resources is integral to absorptive capacity. Indeed, human capital resources have been suggested to lead to

advantages by enabling firm capabilities (Chadwick & Dabu, 2009) and by being accessible for strategic, unit-relevant purposes (Ployhart et al., 2014). Similarly, capabilities that exist at a collective level, have been described as originating in individual attributes and processes (Felin et al., 2012). As such, absorptive capacity which is defined as, “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends.” (Cohen & Levinthal, 1990: 128) and has been shown to relate positively to a variety of strategic firm level performance outcomes (Lane, Koka, & Pathak, 2006) characterizes the emergent unit level HCR.

Absorbing new knowledge is critical for firms, yet there is a lack of precision in explaining the microfoundations and development of this collective capability (Volberda, Foss, & Lyles, 2010). Furthermore, there is a tension between the extant human capital research that espouses the value of firm-specific knowledge, skills, and abilities and theory on absorptive capacity that argues for the importance of new and outside knowledge. If new and outside knowledge sources are valuable in developing absorptive capacity, then it would follow that general human capital could be valuable to the firm. As such, I propose that realized absorptive capacity is enabled through unit-level human capital emergence; in this way, the strategic combination of individual-level and unit-level resources, determine absorptive capacity-based outcomes. I ground this proposition in Cohen and Levinthal’s (1990) reasoning that absorptive capacity at a collective, firm level is rooted in individual-level knowledge and abilities, Volberda and colleagues’ (2010) claim that not enough is known about antecedents to absorptive capacity, and the notion that interactions among individuals can help explain collective level capabilities

(Felin & Foss, 2012). Human capital inherently provides the stocks and flow of knowledge along with the skills and abilities to recognize and apply it in the firm, which are necessary to absorptive capacity.

In linking human capital and absorptive capacity, it is important to note that there are two parts: “potential”, which refers to acquisition and assimilation as well as “realized”, which refers to transformation and exploitation of knowledge (Zahra and George, 2002). The emergent unit-level human capital resource can be characterized as having the potential capability based on collective knowledge, skills, abilities, and other characteristics, while also laying the foundation for realizing outcomes in part due to other attributes of the resource that impact the deployment of human capital. Relatedly, strategy scholars have long accepted that merely possessing human capital does not equate to performance advantages (Coff, 1997), which echoes the notion of a distinction between potential and realized. Coff’s point that human capital is different from physical resources, in that it is not always easily linked to performance, can be partially explained by behavioral factors such as social interactions. Therefore, I seek to explain how the emergent unit-level human capital resource is associated with absorptive capacity through the combination of human and social capital across levels.

### **The Role of Social Capital at Multiple Levels**

Malleable or situational attributes of individuals and units are outside the definition of human capital resources (Ployhart et al., 2014), yet offer additional explanatory power regarding human capital-related outcomes due to their impact on behavior (Wright & McMahan, 2011). Thus, bringing in related yet distinct concepts that rely on situational events, such as social capital, provides a more dynamic perspective on

the emergent unit-level HCR. Whereas human capital is viewed as an individual or unit-level resource available for strategic use by the firm (Ployhart et al., 2014), social capital is the access to resources through relationships (Lin, 2001). A link between social and human capital has been explored in prior theory that views them as reciprocally related and difficult to conceptually separate (Nahapiet & Goshal, 1998; Nahapiet, 2011).

Another link can be drawn in common challenges firms face when deploying human and social capital due to uncertainty derived from motivation and interaction (Coff, 1997; Adler & Kwon, 2002). Indeed, these two resources have much in common, from being deemed “capital” although not in the traditional economic sense, to being difficult to manage due to their intangible nature. Nonetheless, human and social capital are two distinct resources that provide firm-level advantages (Nahapiet, 2011). Therefore, integrating the two together provides a more complete picture of the emergent unit-level resource, particularly in the context of absorptive capacity based outcomes due to the reliance on not just new and different information but also internal as well as external knowledge sources.

Social capital is described as either “internal” or “external” because resource-rich relationships are formed both within and outside of a firm (Payne, Moore, Griffis, & Autry, 2011) and there are different implications of relationships both within and across firms (Adler & Kwon, 2002). Also, social capital can exist at an individual or collective level because relations with others can be viewed from the point of a single person or those within an aggregate group (Payne et al., 2011). In this way, social capital is an integral component of the firm’s resource bundle that should be considered alongside

human capital as it can impact the unit-level resource in two distinct ways in the form of bridging or bonding.

The first way that social capital impacts the emergent unit-level HCR is through access to outside resources at the individual level. The bridging component of social capital has received much attention (Burt, 1997; Payne et al., 2011) and I propose that individual external social capital provides a link to outside resources that complement or substitute for human capital. In this way, an individual with both high levels of human and social capital may produce synergistic benefits or add differential value to unit-level human capital emergence. An alternative scenario is the case of lower levels of human capital uses social capital as a substitute resource by accessing, and in a sense borrowing, the human capital of others outside the firm. Furthermore, there could be instances when individuals with low levels of individual social capital compensate with high levels of human capital to become strategically relevant to the unit. Therefore, bridging to external resources impacts the unit-level human capital resource and its potential absorptive capacity. That is, potential absorptive capacity can be enhanced through the unit's collective access to acquire, assimilate, and integrate knowledge and skills through external relationship leveraging.

The second way that social capital impacts the emergent unit-level HCR is through the relationships among those in the unit. Different from bridging, is the notion of social capital in the form of bonding (Coleman, 1988; Payne et al., 2011). To explain, since emergence results in a unit-level human capital resource, that resource has internal social capital at the collective level. Just as potential absorptive capacity characterizes the emergent resource, so too does internal social capital. This has important



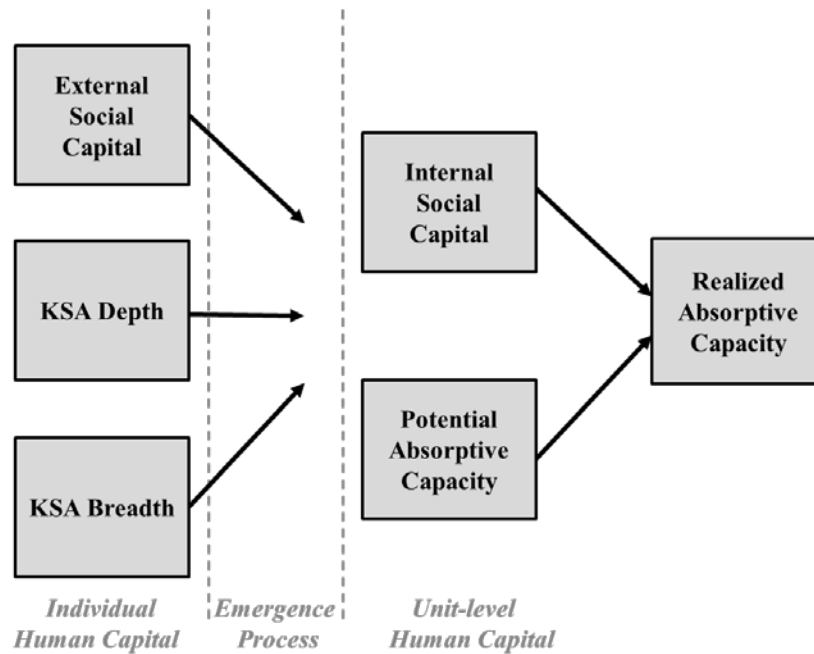
implications as to whether potential absorptive capacity becomes realized absorptive capacity, since social integration mechanisms are likely the link between the two (Zahra & George, 2002). For example, if a unit-level human capital resource emerges that can be categorized by members adhering to similar norms and having strong bonds it is likely that this unit-level resource may be capable of more advantageous outcomes compared to another unit-level resource where members do not have the same level of understanding and collegiality. Therefore, internal social capital of the unit can complement potential absorptive capacity to impact outcomes via realized absorptive capacity.

### **Contribution and Structure of the Dissertation**

In this dissertation I seek to integrate advances in multilevel strategic human capital research with the extant streams of literature on social capital and absorptive capacity to answer the question of how individual-level resources that are component to, and unit-level capabilities that are characteristic of, the emergent unit-level HCR impact performance outcomes. I propose that individual differences in human capital depth and breadth, in addition to external social capital, impact the emergent unit-level human capital resource as well as its attributes and outcomes. In doing so, I refocus the conversation from firm specific and general to depth and breadth of human capital. Human capital emergence is central to my arguments in that I theorize it incorporates two key resource attributes that shape unit-level outcomes: internal social capital and potential absorptive capacity; both of which in turn impact realized absorptive capacity. Figure 1 depicts these theorized relationships. Investigating these issues concurrently tackles several outstanding themes in the literature, such as further explicating the microfoundations and outcomes of human capital emergence as well as exploring the

potential antecedents to absorptive capacity. This work helps to clarify boundaries as to where human and social capital each begin and end as well as to contribute alternative dimensions, other than firm specificity, in the discussion on the value of human capital to the firm. Further, I seek to reconcile the tension between the need for new and outside knowledge in developing absorptive capacity and the preference for firm-specific knowledge, skills, and abilities as part of the human capital resource.

**Figure 1: Theoretical Model**



This dissertation makes several contributions. The primary contribution is to the multilevel strategic human capital literature (Ployhart & Moliterno, 2011; Ployhart et al., 2014; Wright et al., 2014). I explain how human capital at an individual level has a bottom up impact on outcomes through cross-level influence on unit-level social capital and absorptive capacity. Specifically, I detail how microfoundations, such as depth and breadth of human capital experience and external social capital, impact the unit-level

human capital resource that emerges and shapes the attributes of that resource, such as the potential absorptive capacity of the unit as well as the internal social capital of the unit that subsequently impacts realized outcomes. Additionally, I integrate social capital into the human capital literature and further unpack the within and cross level relationship between human and social capital (Nyberg et al., 2014; Nahapiet, 2011). I explain the importance of external social capital at an individual level as an input to the emergence process, as well as the separate, yet related, impact of internal social capital of the unit on realizing absorptive capacity based advantages. I do so by leveraging Payne and colleagues' social capital typology (2011) which provides a foundation for laying out an argument for a more socially integrated view of human capital (Nyberg et al., 2014; Wright et al., 2014).

I also contribute to the literature exploring absorptive capacity by explicating its microfoundations and emergence (Volberda et al., 2010), and thus elaborating on potential intraorganizational antecedents and processes, such as human and social capital complementary and substitutive combinations, that impact this important organizational capability. More generally, this work contributes to ongoing discussions on microfoundations of strategy (Barney & Felin, 2013) and the need for cross-level empirical human capital research (Wright & McMahan, 2011) by following individual-level attributes through a multilevel model to unit-level capabilities and outcomes. Lastly, this work helps reconcile the notion of preference for internally focused firm specificity in the human capital literature with the need for external knowledge and skills in absorptive capacity research. In sum, the contributions of the dissertation propose to push forward multilevel strategic human capital theory and the microfoundations of

strategy view, while making secondary contributions to the absorptive capacity and social capital literature streams in management research.

This dissertation is organized into chapters on the literature, theory, methods, results, and discussion. In Chapter 2, I provide a review of the scholarly literatures in the area of human capital, absorptive capacity, and social capital. In Chapter 3, I present my theoretical development and introduce several hypotheses from my model on the integration of multilevel human and social capital and the subsequent impact on absorptive capacity. In Chapter 4, I outline the methods I use to examine my model, including the data sample, variables, and empirical tests. Chapter 5 includes empirical results. Lastly, in Chapter 6, I provide a discussion of the results as well as conclusions from this dissertation.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **Introduction and Overview**

This chapter provides definitions and background for the ideas presented in the theory and model development in Chapter 3. In order to approach the question of how human and social capital characteristics impact the emergent human capital resource, it is necessary to review prior research on human capital, social capital, and absorptive capacity under the resource based view (RBV) and microfoundations view in strategy. As such, I begin with a brief overview of the RBV and microfoundations before going into the main sections on human capital, absorptive capacity, and social capital. The section on human capital includes a general overview in addition to sections on the theory's roots in psychology and economics and related work in organizational behavior and human resource management before connecting to the strategy literature, including multilevel and categorization challenges. The section on absorptive capacity situates the construct within the body of work on organizational learning and further elaborates on definitions, findings, and challenges. The section on social capital provides a review of various definitions and categorizations in addition to findings, and then ends with a discussion on the distinctions between social and human capital.

#### **The Resource Based View and Microfoundations of Strategy**

**The resource based view.** Barney (1991), in defining the RBV, asserted that firms can sustain competitive advantage through resources that are valuable, rare, inimitable, and non-substitutable. Resource based theory has since spurred investigation into a wide array of resources potentially available to the firm, such as human resources (Huselid, 1995), knowledge (Spender, 1996), the natural environment (Hart, 1995), and

reputation (Roberts & Dowling, 2002). Indeed, strategy scholars have noted that intangible resources are often a route to value capture (Delios & Beamish, 2001; Carmeli & Tishler, 2004), which has motivated ongoing discussions around the creation of valuable routines and capabilities (Winter, 2012; Foss et al., 2012). However, firm resources, particularly those that are not easily measured, often accumulate in a non-linear way as there is a certain path dependency in how they combine to result in competitive advantage (Dierickx and Cool, 1989).

In an attempt to uncover where firm capabilities and performance advantages come from, much attention has been devoted to how firms bundle resources (Sirmon, Gove, & Hitt, 2008). Related research has explored how to acquire and accumulate resources (Maritan & Peteraf, 2011), both tangible and intangible, and has shown that not just possessing resources, but actively orchestrating the process (Sirmon et al., 2011) can be a source of firm advantage. Importantly, it has been further noted that resource bundling does not guarantee performance advantages (Somaya et al., 2007) as simply aggregating resources does not always provide adequate complementarities to enhance firm outcomes (Tzabbar, Aharonson, Amburgey, & Al-Laham, 2008). In the context of the questions examined in this dissertation, this is an important point, particularly regarding human capital and knowledge intensive settings (von Nordenflycht, 2010). As such, the strategic aggregation of resources, specifically in regard to complementarities (Milgrom & Roberts, 1995) and with respect to fit (Peteraf, 1993) raises the question of how lower level resources are bundled within the firm. Lower level resources refer to the foundational components that are “constituent elements” of higher level collective

outcomes, resources, or capabilities (Felin & Foss, 2005). Focusing on lower level firm resources provides a point of entry to examine microfoundations of strategy.

**Microfoundations of Strategy.** Much insight into differences in firm performance can be gained by leveraging the microfoundations view in strategy (Felin & Foss, 2005; Abell, Felin, & Foss, 2008; Foss, 2011), particularly with respect to grasping a deeper understanding of how firm resources and capabilities emerge. In some ways, past work on organizational routines approached these questions from a different angle; similar to organizational learning, the research on routines led to the question of who is performing the routine or doing the learning, in that organizations do not actually learn and perform routines but individuals are in fact carrying out the related processes (Simon, 1991). The microfoundations view is founded on the notion that higher, firm level constructs have lower-level origins and acknowledges the importance of individuals in the firm (Felin and Foss, 2005; Felin and Hesterly, 2007). Research on microfoundations of strategy has taken the view that the individuals that are attracted to, stay in, or leave the organization cannot be ignored in explaining collective outcomes (Felin & Foss, 2005). This research stream has started to provide explanations to questions that otherwise would have been missed had they solely been approached from the top down or collective perspective (Felin et al., 2012).

Recent theory on microfoundations (Barney & Felin, 2013) emphasizes the importance of including contextual factors and the concept of emergence in discussions on how lower level resources are combined to relate to higher level firm constructs. As such, it has been noted that the concept of emergence should be central to any discussion on microfoundations, which may be particularly applicable to discussions on multilevel

human capital research (Barney & Felin, 2013). Emergence is a phenomenon that is “assumed theoretically but is not directly observed” (Kozlowski & Chao, 2012) and involves the bottom up, dynamic interaction among individuals that is shaped and constrained by contextual factors (Kozlowski et al., 2013). As such, the microfoundations view, along with theory on emergence, can contribute to how we understand human capital as a valuable resource in strategic management research.

### **Human Capital**

The concept of human capital has traveled a long path from Spearman’s work in psychology on abilities (1927) to Schultz (1961) and Becker’s (1964) work in economics on skills and knowledge, and even further to recent management research on multilevel human capital resources (Ployhart & Moliterno, 2011). The definition has evolved from psychology’s general intelligence factor and the focus on investing in skills in economics to the most recent description that human capital is a multilevel resource comprising knowledge, skills, abilities, and other characteristics that may be located at an individual or unit level within the firm (Ployhart et al., 2014), where the term unit refers to any collection of people such as a work group, team, or firm (Nyberg et al., 2014; Ployhart, Van Iddekinge, & MacKenzie, 2011). The theoretical development in this dissertation is based on this latest multilevel definition of human capital. However, the broader theory is meaningful in understanding how human capital is currently viewed in the strategic management literature.

**Roots in psychology and economics.** Prior to the recent interest within strategic management, human capital has long been studied in psychology, although not always referred to with the same terminology. Early work by Spearman (1927) explained how



total cognitive ability requires more than the study of differences between individuals with respect to qualities such as intellect, memory, attention, and perception since these characteristics are not independent; rather these and other factors representing ability are correlated and thus there is a general factor of intelligence. As such, a version of the aggregate concept has been used in providing explanations for differences in individual outcomes and is invoked in research on general mental ability, cognitive ability, or knowledge and skills (Hunter, Schmidt, & Judiesch, 1990). For example, general cognitive ability has been positively linked to faster learning and knowledge acquisition (Jensen, 1998) as well as having a positive impact on performance at an individual level (Schmidt & Hunter, 1998). Similarly, work in this area has been devoted to understanding intellectual development, particularly in light of individual knowledge, interests, personality, and ability (Ackerman, 1996; Ackerman & Heggstad, 1997) and other aspects of personality, such as agreeableness, conscientiousness (Neuman & Wright, 1999), and proactiveness (Parker & Sprigg, 1999; Seibert, Crant, & Kraimer, 1999) have been studied in the context of human capital as it relates to individual performance.

Other research on experience and contextual factors rounds out the findings on individual characteristics in psychology. For example, the attraction-selection-attrition model suggests a relationship between personality and interests with organizational climate and culture (Schneider, 1987) while other linkages, such as those with genetics and the environment to individual human capital development (Lubinski, 2000) have also been explored. Further, past research has shown support for the idea that education, training, and job complexity lead to career success for more intelligent individuals

(Judge, Klinger, & Simon, 2010). Additionally, the concept of human capital has been expanded to include studies on aggregate personality, which relates to job satisfaction and performance across levels (Ployhart, Weekley, & Baughman, 2006) as well as unit service orientation, which has been found to relate to the aggregate effectiveness of a unit over time (Ployhart et al., 2009), both at a collective level. These multilevel findings show that characteristics previously thought of as attributed to individuals, such as personality or service disposition, are indeed meaningful across levels. However, for the most part in the psychology literature, human capital is generally defined as individual abilities rooted in cognition (Carroll, 1997; Gottfredson, 1997).

Whereas the psychology literature tends to focus on cognitive ability, the work in economics is often centered on investments and outcomes. To illustrate, Becker (1964) posited that human capital consists of knowledge and skills, as well as the health of individuals and relates to such factors as schooling, on-the job training, medical care, and migration. He further finds that investments in human capital are related to outcomes such as future monetary gains and consumption (Becker, 1964; 11) which aligns with Schultz's (1961) contention that as quality of human effort improves, so too does productivity and earnings. Moreover, Becker's original work includes the notion that human capital cannot be separated from the individuals that possess it, and Schultz similarly points out that investment in acquiring skills and knowledge is deliberate and should be treated as capital much like physical assets, such as land.

The early work on human capital, which helped to explain earnings, employment levels, economic progress, and even how families impact their children, has been followed by studies in labor economics that explain the leveraging of particular types of

knowledge, skills, and abilities. Building on Becker's notion of firm-specific and general skills and Schultz's observation that despite improvements in general education there is no lack of on the job training, human capital can be segmented into those characteristics that have a constant value across firms (i.e., "general human capital") and those that cannot be perfectly deployed outside of a particular focal firm (i.e., "firm-specific human capital"). Recently, scholars have taken this segmentation further by defining occupational, industry, and task-specific human capital. First, research has shown the value of occupational human capital, which refers to those skills and abilities necessary for a particular profession or function that can be used across firms (Kambourov & Manovski, 2009). Second, industry-specific human capital, which refers to those characteristics that are not completely generally applicable across firms or only useful in one firm, but that are useful within a particular domain, regardless of occupation or firm has been found to relate to individual performance outcomes (Parent, 2000; Neal, 1995). Lastly, task-specific human capital, which denotes expertise in certain activities, has been linked to learning by doing within an occupation or industry but not specific to one firm (Gathmann & Schonberg, 2010; Gibbons & Waldman, 2004).

These conceptualizations of specificity relate to one another in that certain aspects of human capital, although categorized as differentially important depending on the venue of acquisition and deployment, are somewhat nested in one another and are all part of an individual's capabilities based on expertise or diversity of experiences. The related work in labor economics suggests that the value of specificity depends on the viewpoint; for example, a recent view indicates that occupations can be thought of as "bundle of tasks" (Yamaguchi, 2012). However, reconciling this more current conceptual work with

Becker's original definitions, we can consider occupational, industry, and task-specific human capital all to be special cases of general human capital. Nonetheless, these distinctions provide further granularity in describing how the firm is not the only categorization that warrants specific knowledge, skills, and abilities: tasks, occupations, and industries may result in specific types of human capital which may be of value to a firm, even if it is not developed or exclusively applicable in that particular firm (Lazear, 2009; Poletaev & Robinson, 2008; Yamaguchi, 2010).

This prior research in economics on investments in knowledge, skills, and abilities, as well as in psychology on cognitive and general mental ability, laid the groundwork for management scholars to pick up the construct of human capital and integrate it into other theoretical models, particularly in an effort to understand firm performance.

**Human resources and organizational behavior.** Much work in the management literature has approached human capital from the human resource management (HRM) perspective, which tends to focus on the collective human resources of a firm and how to best manage them through policies and practices (Huselid, 1995; Becker & Gerhart, 1996). Alternatively, organizational behavior research on teams also informs and relates to work on strategic human capital resources (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000; Marks, Mathieu, Zaccaro, 2001; Mathieu, Maynard, Rapp, & Gilson, 2008). As such, this section is divided into a brief review of the research on human resource practices and teams.

Research on HRM looks at the policies and practices related to how human capital is managed and the related strategic human resource management literature

(SHRM) subsequently ties those policies and practices to firm outcomes. Overall, evidence suggests that human resource practices relate to firm performance through the leveraging of firm human capital (Wright, Gardner, Moynihan, & Allen, 2005; Takeuchi, Lepak, Wang, & Takeuchi, 2007; Lepak, Liao, Chuan, & Harden, 2006). Research in this area has shown that strong HR systems help firms retain employees (Bowen & Ostroff, 2004) and that different HR systems relate differently to varying human capital resources (Lepak et al., 2006). Further, research suggests that diverse types of HR bundles relate to various firm structures (Soo, Morgeson, & Campion, 2008) and each individual contributes differently to the firm (Lepak & Snell, 1999).

Other research has investigated how human resources at a unit level relate to performance (Liao & Chuang, 2004) and is acquired and developed (Ployhart et al., 2011). Indeed, management practices that develop and leverage human capital resources to exploit organizational design and strategy can lead to enhanced performance (Carmeli & Schaubroeck, 2005). Further, more detailed studies have shown that the stocks and flows of human capital in a unit can impact performance through service orientation and effectiveness (Ployhart et al., 2009). While other research in this area has suggested that voluntary turnover tends to be more pronounced for those with higher and lower levels of cognitive ability, while those of medium cognitive ability do not see the same effect (Maltarich, Reilly, & Nyberg, 2010) and collective turnover may lead to a loss of human capital that can negatively impact unit performance (Nyberg & Ployhart, 2012). In sum, the HRM and related SHRM research sheds light on potential antecedents and outcomes linked to management policies and practices relevant to human capital resources in the firm.

Whereas the HRM research focuses on policies and practices with respect to managing human capital resources, research on teams focuses on how individuals collectively work together to impact aggregate outcomes. Becker defines a team as a group of workers that perform varied production tasks even though they may have competing interests and different goals (Becker, 1964: 301) while Alchian and Demsetz (1972) explain that the essence of a team is the combination of multiple resources as a collective input with the inability to separate the respective parts from the whole of the final output. Kozlowski and Bell (2003) explain that teams are collectives that exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity. In short, teams can be an example of a unit-level resource since they are a collective work group.

Research on teams (see Mathieu et al., 2008 for a review) has been extensive with some scholars examining what shapes, leverages, or aligns team processes (Kozlowski & Ilgen, 2006) and others looking at team design and the relation to team performance (Stewart, 2006). Mathieu and colleagues (2008) point out that it is often difficult to directly observe the link between team and firm level performance; for example they suggest this is the case with a sales team that brings in profit which readily impacts firm level performance. Other research shows that individual ability is related to team performance and viability (Barrick, Stewart, Neubert, & Mount, 1998) as is group cohesion (Cohen & Bailey, 1997). Indeed, interaction and context add to the complex nature of teams (Kozlowski & Ilgen, 2006) and cohesion, trust, and transactive memory

relate to effectiveness (Mathieu et al., 2008). Lastly, an interesting finding from the teams literature is that collectives have a “knowledge integration capability” which is described as a capability that transforms individual knowledge and expertise into team performance; this capability can be important to team configuration and resource bundling (Gardner, Gino, & Staats, 2011).

The HRM and teams literature informs strategy research on human capital. For example, the unit-level human capital resource, is in many ways theoretically similar to a team since teams are part of a multi-level system that inherently includes aspects of both the individual and the firm (Kozlowski & Ilgen, 2005); in this way, findings from team performance studies can inform strategy research on human capital resource emergence. Similarly, Wright and colleagues (1994) explain how human capital relates to overall strategy and performance by examining the relationship between the strategic preferences of managers and unit member characteristics, finding that alignment between the two relates positively to performance. Whereas the research discussed above approaches human capital at a micro level with respect to HR practices and teams, the strategic human capital literature attempts to integrate the micro and macro levels, often via the microfoundations view.

**Strategy and the resource based view.** Strategy scholars started researching the relationship between human capital and firm performance alongside the development of resource based theory (Barney, 1991; Peteraf, 1993). For example, Barney and Wright (1998) explained the role of human capital in providing value to the firm, resulting in competitive advantage. They outlined how human capital acquisition in strategic factor markets, where resources are acquired by firms for strategic use in obtaining competitive

advantage (Barney, 1986), and human resource management practices can impact a firm's ability to perform. As human capital has gained acceptance as an important firm resource, other scholars have cautioned that human capital is different, since unlike other firm resources it can leave at any time as it is not owned by the firm. Coff (1997) illustrates this point with the example of an oil field by explaining how a physical asset cannot quit, ask for more money, or lose motivation. This notion ties in with Spearman's early work where he mentioned mental energy and the law of fatigue with respect to decreased efficiency after continuous work (1927: p. 332-338) and Schultz's claim that human abilities are restrictive factors in growth (1961:7); that is, human capital is different from financial or physical assets in that there can be deployment and management limitations. In this way, the intangible and unpredictable nature of human capital is what on one hand can make it valuable, particularly if a firm is lucky or successful in a strategic factor market, but on the other hand can make it challenging, especially when it comes to knowledge intensive work that requires focused dedication to providing the firm with exceptional outcomes. Since the firm does not own employee human capital but instead merely "rents" it (Coff, 1997), consistency and quality of inputs and outputs may not match firm expectations or needs, and in the case of a negative discrepancy it can be ambiguous or costly to achieve competitive advantage. Indeed, simply having valuable, rare, inimitable, and non-substitutable resources does not always lead to competitive advantage (Barney & Arikan, 2001) and the extant strategy research has provided many studies that contribute to our understanding of viewing human capital as a firm level resource.



Empirical research supports the notion that human capital is an intangible asset that contributes to firm performance (Carmeli & Tishler, 2004). Human capital can be bundled with other non-human resources which enhance firm performance, particularly when context is taken into consideration (Carpenter, Sanders, & Gregersen, 2001). Indeed, studies by Kor and Mahoney (2005) and Hatch and Dyer (2004) suggest that firm human capital can provide advantages through increased efficiency in leveraging experts in the firm or through on the job training which impacts learning by doing. Further, as the focus on strategic human capital has expanded, the use of the human capital construct has surfaced in other strategy research such as its role in entrepreneurship as it relates to different types of innovative processes (Alvarez & Barney, 2007) or services and firm performance which links it to positive outcomes if appropriately matched to strategic positioning (Skaggs & Youndt, 2004). However, Kraaijenbrink (2011) notably pointed out that the resource based view does not account for the individual-level human capital resources that make up the collective level human capital resource of the firm. This concern is further strengthened by work from Hitt and colleagues (2001; 2007) which encourages multilevel study and looks at human capital as it relates to performance while noting that although the field of strategy typically deals with the firm level, it is important to look at other levels within the organization.

**Multilevel challenges: individuals, units, and emergence.** The multilevel nature of human capital resources presents several challenges to researchers in strategic management. First, Kraaijenbrink (2011) points out that human capital, although potentially a valuable resource for the firm, is typically not studied with the individual in mind; rather it is treated as an aggregate resource which loses important lower level

distinctions that can impact the resource and its relation to firm performance. Second, Molloy and colleagues (2011) explain how there are still conflicting theories being combined in human capital research due to the varying lenses from different disciplines. Their main point is that terms and findings mean different things to different audiences and this can create incoherence in human capital research. Certainly, if human capital is now defined as a unit-level resource that emerges from individual knowledge, skills, abilities, and other characteristics (Ployhart & Moliterno, 2011) that is quite different from past definitions in economics, psychology, and even other management research. Therefore, reconciling the level of analysis issue that is intertwined with different definitions and findings requires an understanding of the individual as well as the collective level which is not inherent in resource based theory.

The microfoundations of strategy view (Felin & Foss, 2005; Felin & Hesterly, 2007; Barney & Felin, 2013), which encourages acknowledging the individual level in strategy research, clarifies and connects strategic human capital to the research on human resource management and other fields (Wright & McMahan, 2011; Nyberg et al., 2014; Molloy & Ployhart, 2012). By integrating the microfoundations view, in addition to resource based theory, human capital scholars can develop models that address multilevel and multidisciplinary concerns. Incorporating a multi-level approach in human capital research ties together different perspectives, which include the individual from psychology and the microfoundations perspective, the practices and teams from HR and organizational behavior, and the firm level outcomes from strategy. Human capital is currently conceptualized as a multi-level firm resource (Ployhart & Moliterno, 2011) which is part of an effort to bridge the divide between the micro domain of human

resource management and the macro domain of strategic human capital scholarship (Nyberg et al., 2014; Wright & McMahan, 2011). With this effort and new conceptualization comes the necessity of including the concept of emergence in human capital research.

As previously explained, emergence is defined as the combination of lower level cognitive, behavioral, and affective characteristics of individuals through interaction over time that result in higher level collective phenomena (Kozlowski & Klein, 2000). What emergence is, how it happens, and the forms it may take are current topics of interest in this area (Kozlowski et al., 2013). Emergence can describe a simple process where individual-level characteristics are similar and aggregated to a unit that reflects these same characteristics, or a more complex process in which many different individual-level characteristics interact and aggregate to a unit that is distinctly different from the sum of its parts (Kozlowski et al., 2013). A key point in studying emergence is that individual characteristics impact how those in a unit interact with one another and thus shape higher level phenomena (Kozlowski & Chao, 2012). Leveraging emergence to explain the association between human capital and unit-level outcomes requires a deeper understanding of the lower level individual inputs. As such, I now discuss ways to categorize the foundational human capital resources.

**Categorization challenges: specificity and experience.** Scholars have taken various approaches to labeling or categorizing the individual and collective aggregation of knowledge, skills, abilities and other characteristics that make up human capital resources. However, a salient point of prior distinction to discuss is specificity, referring to the firm, task, occupation, industry, or general domain of where human capital is most

applicable or particularly valuable. In the next chapter, I will take up these conceptual threads and develop hypotheses surrounding the experience embedded in these different types of specificity. The section below expands on the way specificity has been viewed in the extant literature.

In Becker's (1964) discussion on human capital, a distinction is made between general and firm-specific investments. As explained, firm-specific human capital can only be deployed perfectly in the focal firm whereas general human capital has a constant value across firms. The distinction between firm-specific and general has been picked up by strategy scholars (Kor & Leblebici, 2005; Campbell et al., 2012), partly due to early work in the resource based view on the role of isolating mechanisms in maintaining firm resources (Rumelt, 1984; Barney, 1991) as well as the notion that limits to worker mobility are necessary to achieve competitive advantage (Peteraf, 1993). These assumptions led to the conclusion that since firm-specific human capital is most valued by the focal firm, then an individual's mobility is constrained to that firm since they will otherwise not receive the same benefits from the same skills and abilities elsewhere. This line of thinking has influenced how strategic management scholars explore human capital related questions.

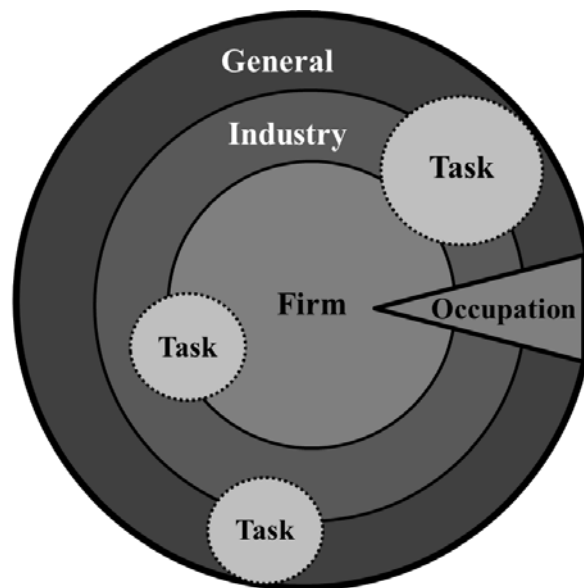
However, the value of firm-specific over general human capital is being called into question (Campbell et al., 2011). Campbell and colleagues explain that there are boundaries to the benefits of firm-specific human capital in that the human capital of some individuals may be over or under valued if contextual factors are not considered. Ployhart and colleagues had previously touched on the value of firm specificity when they explained how general is foundational to developing firm-specific human capital

(Ployhart et al., 2011). Further, general human capital changes, such as personality and cognitive traits, result in unit-specific human capital changes, such as training and experience, which can result in performance changes in terms of behavior and effectiveness (Ployhart et al., 2011). There has also been theorizing that both individual and firm level factors combine to create competitive advantage from human capital (Coff & Kryscynski, 2011) which is supported in the related literature on star knowledge workers (Groysberg, Lee, & Nanda, 2008). This means that not only should human capital be thought of in terms of general and firm-specific (as opposed to either one or the other), with each contributing to performance, but that there is also a need for deeper examination beyond what is currently considered general human capital, including contextual factors such as other individuals or resources available for unit relevant purposes. In other words, firm-specific human capital at an individual level is no longer adequate as a monolithic construct in conceptual explanations; this is particularly evident in the black and white view it provides when juxtaposed against general human capital as all one category, ignoring the grey areas that exist in human capital that may be applicable across settings.

In thinking about this black and white delineation of human capital as either firm-specific or general, it is useful to review Becker's original explanation. Becker observes that most training an individual receives in a firm cannot be classified as either completely specific or completely general (1964, p.40) and more recent work that suggests that individual workers are compensated for some part of human capital that cannot be distinctly described as either general or firm-specific (Neal, 1995). These points suggest that not only is the preference for firm-specific human capital problematic,

but there are also some issues that come with viewing human capital in such a simple manner. As a whole, general human capital is not dependent on the firm in which it is developed: it can instead be thought about in terms of associated tasks that may then be rolled up to an occupation, firm, or industry (Gathmann & Schonberg, 2010; Yamaguchi, 2012). While the task may not always be the proper level of granularity for strategy researchers, this line of thinking emphasizes the notion of nested and intersecting categories of human capital, as depicted in [Figure 2](#).

**Figure 2: Human Capital Specificity**



For example, tasks are part of an occupation and there are typically many different occupations in the same firm. However, individuals may have been in the same occupation but in a different firm, or the same firm but in a different occupation. Thus occupation and firm-specific human capital intimate different dimensions of experience in individual human capital. Similarly, a worker could have experience in different firms

or with different occupations but have spent their entire career in the same industry, which provides another angle to analyzing experience within general human capital. These examples are not meant to be exhaustive, rather they illustrate the validity of alternatives to viewing human capital as simply firm-specific or general. Only recently in the strategy literature has further specification been given with respect to general, where it has been broken into occupation- and industry- specific (Mayer et al., 2012). Another notable exception is Castanias and Helfat's work on managerial human capital in terms of cognition and functional skills (1991; 2001). These studies have broadened the perspective on human capital in strategy by showing that there is more to this valuable resource than firm-specific investments, yet additional work in this area is needed.

### **Absorptive Capacity**

Theory surrounding absorptive capacity has gone through several revisions and a variety of uses, resulting in a lack of deep understanding as to what the construct actually entails (Lane et al., 2006). The mechanisms behind absorptive capacity have been outlined through the use of changing terminology; whereas the construct was first explained through recognizing, valuing, assimilating, and applying knowledge (Cohen & Levinthal, 1990), other scholars have favored the use of additional terms such as identification, exploration, acquisition, transformation, and exploitation (Zahra & George, 2002; Todorova & Dirisin, 2007; Lane et al., 2006). Although the concept of absorptive capacity has evolved, the central notion regarding a firm taking in diverse knowledge and information to use in a potentially productive manner has remained consistent. The following section reviews the absorptive capacity literature and related definitions, refinements, and findings.

**Defining and situating the concept of absorptive capacity.** Cohen and

Levinthal define absorptive capacity as, “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends.” (1990: 128).

This definition expands on previous work outlining how ease of learning is related to stocks of prior knowledge in a firm as well as characteristics of the underlying knowledge important to an industry (Cohen & Levinthal, 1989: 570). As defined, absorptive capacity is an important part of organizational learning and much of the original argument for absorptive capacity was founded on individual learning and cognition research. Organizational learning involves levels subordinate to the firm, such as individuals and groups, since it is process oriented and requires intuition, interpretation, integration, and a way to institutionalize knowledge (Crossan, Lane, & White, 1999).

Cohen and Levinthal discussed how learning and problem solving capabilities at an individual level aid in assimilating and creating knowledge. These points are in line with the main ideas of firm behavior being rooted in lower level individual and group processes that were behind the organizational learning literature that resulted from behavioral theory (Cyert and March, 1963: Gavetti, Greve, Levinthal, & Ocasio, 2012).

The broad theoretical domain of behavioral theory encompasses organizational learning theory, although much of the research on organizational learning does not explicitly state how processes that are founded in individual cognition and behavior emerge to a higher firm level resource or capability (Argote and Greve, 2007). Cohen and Levinthal (1990) point out that most critical knowledge is sourced from outside the organizational unit, therefore organizations must be able to incorporate outside knowledge in order to ensure future capabilities. They further describe how individual



employee experience may play a role in how an organization learns and integrates new knowledge. In this way, individual diversity of knowledge is important to the absorptive capacity theory, as is the association with closely related knowledge domains. However, Cohen and Levinthal caution that firm level absorptive capacity is more than the sum of individual employee absorptive capacities as it is also dependent on the links between those individuals. As described in the next several sections however, much of the extant literature on absorptive capacity has focused on the aggregate, along with efforts to further describe what absorptive capacity is and how it relates to other firm level phenomena.

**Refining and categorizing absorptive capacity.** Increasingly, absorptive capacity has been explained through more nuanced depictions which further refine components of the theory and provide deeper explanations. For example, absorptive capacity has been expanded to potential and realized components (Zahra & George, 2002), viewed as latitudinal or longitudinal in nature (Vasudeva & Anand, 2011), and also referred to as external versus internal (Lewin & Massini, 2003; Lewin, Massini, & Peeters, 2011). Redefining absorptive capacity has added to the way that management scholars leverage the concept to describe the type of knowledge being absorbed and where it comes from to benefit the firm.

Zahra and George (2002) refined Cohen and Levinthal's model by breaking absorptive capacity into "potential," which refers to acquisition and assimilation and "realized," which refers to transformation and exploitation. In this work, the authors reconceptualize absorptive capacity as a dynamic capability that relates to how firms create and use knowledge and they further include the "transformation" dimension.

Transformation is important in that it is the mechanism through which knowledge is added, deleted, and interpreted and as such impacts the development and refinement of routines in the firm (2002: p.190). Zahra and George conceptualize realized absorptive capacity as a percentage of potential absorptive capacity, which provides an important distinction since not all capabilities available in a firm ultimately result in outcomes. They further argue that the path from potential to realized absorptive capacity can be enhanced through social integration mechanisms that lower barriers to efficient knowledge transfer. However, despite this initial claim regarding the importance of social integration mechanisms (Zahra & George, 2002), which has been briefly picked up in studies on connectedness and socialization tactics (Jansen, Van den Bosch, & Volberda, 2005), refinements to absorptive capacity theory have not provided elaborate detail on the social component (Todorova & Dirisin, 2007).

In addition to potential and realized, absorptive capacity has been described through categorizing different types or sources of knowledge such as diverse and distant or internal and external. First is research that breaks absorptive capacity into “diverse” and “distant” dimensions where the measure of diversity is representative of how different the knowledge is that is being absorbed, and the measure of distance is how similar the focal firm is to the outside firm where knowledge resides. Diverse (also referred to as “latitudinal”) and distant (also referred to as “longitudinal”) knowledge each play a different role in firm knowledge utilization as there is a cost in attempting to assimilate both types of knowledge (Vasudeva & Anand, 2011). Second, and in a similar vein, Lewin and others (2011) argue for delineating between internal and external microfoundations of absorptive capacity because knowledge creation is a much different

process when compared to trying to properly identify, acquire, and assimilate outside knowledge. Whereas potential and realized absorptive capacity sheds light on the notion that possible advantages do not always equate to positive performance, diverse and distant, as well as internal and external, absorptive capacity highlights the idea that knowledge come from varied sources.

**Findings from the absorptive capacity literature.** Refining how absorptive capacity is conceptualized has been useful in starting to unpack underlying explanations for the capability. For example, Zahra and George's addition of social integration mechanisms as reinforced by work by Jansen and colleagues (2005) that stressed the importance of socialization capabilities as well as by Todorova and Dirisin (2007) when they argued for clearer meanings behind what social integration mechanisms entail. Similarly, the notion that absorptive capacity is a result of path dependence on prior knowledge in the firm (Cohen and Levinthal, 1990) relates to other research that argues for the role of power relationships, both inside and outside the firm that may have an impact on how knowledge is absorbed and used. For example, those with power in the organization may have unfair influence over what types of knowledge are considered valuable and how the new knowledge is to be used for strategic initiatives (Todorova & Dirisin, 2007). These arguments support further investigation on the social component of absorptive capacity and how both individuals and groups can shape the processes around absorptive capacity.

Other research has been more definitive in providing explanations to how knowledge similarity, management, and incentives relate to the way that firms collaborate or imitate to learn from other firms (Lane & Lubatkin, 1998). Similarly,

coordination capabilities, such as job rotation or participation in decision making, have been found to enhance absorptive capacity (Jansen et al., 2005). Separately, in research on strategic alliances, results suggest that technological capability transfer is to some extent explained by absorptive capacity and overlapping experience aids in this transfer of knowledge (Mowery, Oxley, & Silverman, 1996). Further, in examining international joint ventures, it has been found that knowledge understanding is impacted by trust while knowledge application is impacted by learning structures and processes (Lane, Salk, & Lyles, 2001). This is important in that it suggests there is a personal, social component as well as firm level contextual component to absorptive capacity. The ideas in these studies are further supported in research that shows that organizational form, other capabilities, and prior related knowledge play a role in absorptive capacity levels (Van den Bosch, Volberda, & DeBoer, 1999).

Lastly, more recent work takes a departure from focusing on firm-level components of absorptive capacity and instead argues for a focus on multilevel antecedents of absorptive capacity in that internal and external contextual factors at both the individual and firm level can shape outcomes (Volberda et al., 2010). This relates to past work that mentioned the potential importance of lower level routines, in addition to the focus on new and external information in the absorptive capacity literature (Lewin & Massini, 2003). Volberda and colleagues discuss how the microfoundations and emergence of absorptive capacity has relatively gone ignored in the literature. As such, they suggest further research to unpack antecedents and fill conceptual gaps on the impact of individuals, the origin of collective level absorptive capacity, the sources and types of knowledge, and the role of social networks and communication.

## **Social Capital**

The construct of social capital encompasses a broad domain as it has different connotations at different levels within and across organizations (Adler & Kwon, 2002). In this dissertation the focus is largely on social capital in terms of access to resources through relationships as defined by Lin (2001) and specifically on two points of interest in the firm: external social capital at an individual level and internal social capital at a unit level. This section explains the concept of social capital through referencing the related social networks research as well as recent work on social capital that advocates for multilevel analysis.

**Background on social networks theory.** There are many actions that may not readily be explained as economically rational yet these same actions make sense when viewed from the lens of social networks (Granovetter, 1985). Early work by Blau (1964) suggests that all exchanges are inherently social and therefore entail reciprocity issues and power imbalance. Further, interactions are typically nested within a larger social structure as opposed to a simple dyadic, linear view of relations (Harary & Batell, 1981), which emphasizes the importance of social context in the firm. Indeed, research has found that different people relate to and interact in networks in different ways (Ibarra, 1992). The value of seemingly simple relations can provide returns that exceed expectations due to norms, trust, and familiarity (Granovetter, 2005). Therefore, taking a social perspective provides explanatory power beyond that of purely economic models in that it accounts for benefits from trust, knowledge transfer, and more integrative problem solving that result from social activity (Uzzi, 1996). As such, findings from the network perspective inform and establish the basis for incorporating social capital in strategic management research; particularly since social capital is a means through which

opportunities to use other resources, such as human capital, present themselves (Burt, 1992).

**Social capital definitions and categorizations.** As research on social capital has progressed, so too has the way in which scholars explain this broad concept. Whereas the work on social networks has been largely categorized as a technique to view social relations (Salancik, 1995), work on social capital provides explanations for behavior such as obligations and expectations, information flow, and norms and sanctions (Coleman, 1988). Social capital can be defined as the access to resources through relationships (Lin, 2001) or as a representation of a closed structure in which people or organizations act in a particular way due to bonds (Coleman, 1988). Whereas Coleman's definition connotes relationships within a closed unit – that is, the social bonds among individuals in a group – other research in this area (i.e. Burt's 1997 work on structural holes) focuses on relations across units – that is, ties that connect individuals together between groups. Recent scholarship by Payne and colleagues (2011) leverages this extant research and provides a typology that considers internal and external relations as well as individual and collective social capital. To further explain, social capital can have internal or external components (Adler & Kwon, 2002), with internal referring to inside the unit or firm, which relates to the “bonding” side of social capital and with external referring to outside of the unit of firm, which relates to the “bridging” notion of social capital (Coleman, 1988; Burt, 1997; Payne et al., 2011).

Payne and colleagues' typology not only supports multilevel assessments of social capital but is in line with conceptualizations of social capital in social science research outside of the management literature. For example, Whitley and McKenzie (2005)

explain that social capital has been described in several ways. First, is the distinction between ecological and individuals, which considers the extent to which social capital is a property of one person or a group of people. Second is the distinction between structural and cognitive, which refers to the difference between group relationships that are part of a structure versus value and norms that are cognitively embedded in people. Third is the bonding and bridging distinction previously discussed, which refers to the loyalty and ties within the group in the case of bonding or the links to external individuals or groups in the case of bridging. Lastly, Whitley and McKenzie (2005) explain the vertical and horizontal distinction, which refers to the difference between similar individuals or units relating to one another, versus relations along a hierarchy where individuals or units may have different levels of social standing. In sum, social capital provides access to resources, external or internal to the firm, via complex relationships among individuals or collectives.

**Findings from the social capital literature.** Past studies on social capital have shown that the connections between people are indeed a valuable resource (Nahapiet & Ghoshal, 1998) and there are many benefits to these relations. For example, diversity in a network can provide organizational learning benefits (Beckman & Haunschild, 2002) and social capital provides access to information and opportunities (Burt, 1997). Other benefits from social capital come in the form of diversity, richness, and volume of information (Koka & Prescott, 2002). For instance, social capital relates to a manager's ability to access diverse knowledge and can enhance individual performance through access to information and resources as well as mentoring (Seibert, Kraimer, and Liden, 2001). Relatedly in terms of the human capital of a firm, a positive relationship has been

found between investment in human resource management and social capital (Youndt, Subramaniam, & Snell, 2005). Further, social capital relates to knowledge creation, although the quality of relations may be more meaningful to performance than quantity (McFadyen & Cannella, 2004) yet it has also been found that both cohesion and range of relations relate positively to outcomes such as knowledge transfer (Reagans & McEvily, 2003). Indeed, both incremental and radical innovation in firms are enhanced by social capital (Subramaniam & Youndt, 2005). In sum these findings suggest that relationships play an important, albeit sometimes indirect or difficult to detect, role in outcomes particularly since benefits from social capital are varied and often intertwined with human capital resources in the firm.

However, not all influence from social capital is positive (Adler & Kwon, 2002). Certainly social relations provide opportunities, yet they also enforce restrictions as they are linked to power and resources among individuals, units, and firms (Brass, Galaskiewicz, Greve, & Tsai, 2004). For example, individuals seeking advantages from social capital can hurt the group if acting in their own self-interest is to the detriment of the collective (Ibarra, Kilduff, & Tsai, 2005). A separate potentially negative behavior associated with social capital is group think in which the unit may follow consensus without the necessary critical questioning of alternatives (Janis, 1972). Other research also shows how too much of a good thing can be detrimental, particularly for star knowledge workers because social capital can lead to information overload (Oldroyd & Morris, 2012). Furthermore, social capital can play a role in turnover and can thus impact firm performance if stocks of valuable human capital are depleted (Dess & Shaw, 2001; Shaw, Johnson, & Lockhart, 2005). Nonetheless, despite potential negative



factors, social capital enables learning for individuals and firms (Carmeli, 2007) and further examination, particularly when examined in conjunction with other resources, may shed light on other benefits.

**Integrating social capital and human capital.** Viewing social capital from a multilevel perspective (Payne et al., 2011) is one of several ways in which social capital theory parallels recent advances in the human capital theory, where multilevel models are starting to offer explanations beyond those in prior single within level analyses (Ployhart & Moliterno, 2011). It follows that the two types of capital may both benefit from a multilevel lens in order to address theoretical gaps that cannot be satisfied through either individual or unit-level analysis, especially considering that these two resources have much in common and are often difficult to separate (Nahapiet, 2011). Indeed, it has been suggested that social capital facilitates intellectual capital in the firm (Nahapiet & Goshal, 1998) and that social and human capital are reciprocally integrated and co-evolve over time (Nahapiet, 2011: 8). Further, there are some overlapping challenges with these two types of intangible capital resources, as both are derived from individual employees that the firm does not “own” (Coff, 1997). For example, much like human capital, for which Coff (1997) described dilemmas to productive use (such as motivation), social capital also has uncertainties such as indefinite time horizons or tacit understanding of the exchange of resources (Adler & Kwon, 2002). As such, examining social and human capital in tandem and from multiple perspectives may offer new insight.

Although research on both social and human capital is beginning to include multilevel perspectives, it has yet to be seen what this means for integrating theory. For example, two recent reviews in each domain have mentioned further integration of social

and human capital, seemingly from a multilevel lens. First, Payne and colleagues (2011), in discussing future research on multilevel social capital, suggest that the relation between human and social capital has not been fully explored and future research should include how individuals impact collective characteristics. Second, Wright and colleagues mention increased inclusion of social capital in recent strategic human capital research and note that scholars may be “taking a more socialized view of human capital” (Wright et al., 2014: 14). Indeed, human and social capital can relate to one another in a number of ways within and across levels, however there is a gap in what we know about integrating social capital and human capital through the lens of multilevel theory.

### **Literature Review Conclusion**

The various streams of literature on human capital, social capital, and absorptive capacity presented in this chapter provide the basis for the theory and hypotheses development in the following chapter. The extant literature motivates questions as to how the emergence of the human capital resource, and its microfoundations, relate to resource attributes and outcomes with respect to social capital and absorptive capacity. As such, the next chapter develops several propositions regarding the emergent human capital resource as well as testable hypotheses on how human and social capital combine together to impact absorptive capacity.

### **CHAPTER 3**

#### **THEORETICAL DEVELOPMENT AND HYPOTHESES**

The last chapter provided a review of the relevant literature on human capital, absorptive capacity, and social capital. In this chapter, I integrate insights from these different streams of literature to explore how the emergent human capital resource is impacted by human and social capital, while impacting absorptive capacity. To explain how human capital emergence relates individual-level resources to unit-level capabilities, I explore the role of breadth and depth of human capital and external social capital. Further, I describe how the unit-level human capital resource in turn is characterized by its own levels of internal social capital and potential absorptive capacity that impact unit-level outcomes.

This chapter develops a model of human capital resource emergence that recognizes social and learning theories as being integral to how human capital enables collective outcomes. Many studies have shown a relationship between human capital and performance but the mechanisms as to how and why human capital impacts performance remain unexplored (Crook et al., 2011). Despite research linking human capital to performance within individual and collective levels, there are still open questions in this area (Wright et al., 2014), as we do not fully understand how individual human capital resources translate into collective level performance. At the same time, we know very little about where capabilities such as absorptive capacity come from (Volberda et al., 2010) as well as how social capital is integrated with human capital (Nahapiet, 2011; Nyberg et al., 2014). As such, the theory in this chapter builds on recent work to explore the relationships between human capital, social capital, and absorptive capacity through leveraging the concept of emergence.

As elaborated on in the previous chapter, theories of emergence focus on the interaction of individuals together in a unit (Kozlowski & Klein, 2000) and through this concept, scholars have started to explain unit-level constructs such as culture, identity, transactive memory, and learning through a focus on multiple levels in the firm (Robertson & Swan, 2003; Corley & Gioia, 2004; Lewis, 2003; Kozlowski & Chao, 2012). Without invoking emergence, many of these studies would otherwise be considered too complex due to the intricacies involved in relating individual components to collective outcomes. For example, prior studies on human capital have been labeled as oversimplifying the aggregation of individual knowledge, skills, and abilities as they relate to firm performance (Wright & McMahan, 2011; Crook et al., 2011). However, recent theory on human capital emergence has explained how individual knowledge, skills, abilities, and other characteristics relate to a unit-level human capital resource that is different from the sum of its parts and can lead to competitive advantage (Ployhart & Moliterno, 2011). I take another step in integrating multilevel theories of emergence into human capital research by examining how characteristics of human and social capital at the individual and unit level impact absorptive capacity outcomes. Whereas Ployhart and Moliterno (2011) theorized a unit-level human capital resource emergence process in terms of combining individual characteristics in the context of task complexity and emergence enabling states, and Ployhart and colleagues (2014) discussed different ways to distinguish human capital resource combinations at individual and unit levels, I focus on the microfoundational antecedents and unit-level attributes that underlie human capital resource emergence and subsequent capabilities and outcomes.

This chapter is divided into two main sections. First, I develop several propositions relating to the antecedents, attributes, outcomes, and dynamic nature of the emergent unit-level human capital resource. I base this discussion on the concept of emergence as explained by Kozlowski and colleagues (Kozlowski & Klein, 2000; Kozlowski et al., 2013) and parallel work done explicitly on human capital resource emergence by Ployhart and Moliterno (2011). Important to the theory development is the integration of March's (1991) concept of mutual learning in which individuals shape the organization while the organization, in turn, shapes the individuals. In the second main section, I develop hypotheses regarding the emergent human capital resources. I build on the microfoundations of strategy view (Abell et al., 2008; Barney & Felin, 2013) and resource based theory (Barney, 1991) to articulate how human capital and social capital are meaningful in realizing absorptive capacity based outcomes.

### **Microfoundations, Attributes, Capabilities, and the Dynamic Nature of Human Capital Resource Emergence**

In this section, I offer four propositions on which to ground the theoretical model and hypotheses that follow in the next section. These propositions consider the human capital emergence process and relevant antecedents, attributes, outcomes, and nature of the unit-level resource.

**Antecedents to human capital resource emergence.** Antecedents to emergence in general include individual characteristics along with other contextual factors (Kozlowski & Klein, 2000; Kozlowski et al., 2013). Ployhart and Moliterno (2011) explain that the human capital resource emergence process is specifically founded on individual knowledge, skills, abilities, and other characteristics, including cognitive and

non-cognitive factors. However, additional characteristics outside the realm of an individual's human capital endowment, including those qualities that are socially related or malleable such as motivation, satisfaction, and attitudes (Wright & McMahan, 2011; Ployhart et al., 2014) may also impact the deployment of strategic human capital resources. In this way, there are some individual-level characteristics that are intrinsic to human capital, while there are other characteristics outside the realm of those explicitly defining human capital. Although these additional characteristics are external to the definition of individual human capital, they are nonetheless embedded within the individual. In the same way that Penrose (1959) describes how resources comprise bundles of "services," these additional characteristics are bundled alongside human capital. It is not possible to unbundle characteristics from the complete service bundle; this notion aligns with Becker's (1964) early assessment that human capital is inseparable from the person that possesses it. Hence, these additional individual characteristics, outside of strategically relevant human capital, are component to the emergent unit-level human capital resource.

To illustrate how characteristics both inclusive to and beyond the scope of human capital combine together, take for example a hospital hiring a surgeon specialized in a particular procedure with a certain amount of experience. In this case, characteristics of human capital may include surgical skills, knowledge of common or best practices, or experience in the operating room. However, with hiring an individual with a specific type of human capital also comes additional characteristics, such as social relationships developed in other settings. Barney (1991) alludes to this concept when he mentions that human resources usually encompass additional characteristics other than what the firm is

looking to acquire, such as relationships. Likewise, Coff (1997) mentions the importance of effort, motivation, or satisfaction; these individual-level characteristics can impact the unit-level human capital resource. Moreover, recent research finds that factors such as extraversion, emotional stability, and conscientiousness can impact employee labor productivity or managerial job satisfaction which in turn indirectly impact firm financial performance (Oh, Kim, & Van Iddekinge, 2015). Indeed, including additional individual-level characteristics is important since employee behavior can impact deployment of knowledge, skills, and abilities (Becker, 1996; Wright & McMahan, 2011). Therefore, in hiring a surgeon, the hospital thereby acquires access to services beyond medical acumen applicable to the operating room

Building on Becker's (1964) point that human capital cannot be separated from the individuals that possess it, as well as Penrose's (1959) argument that the way in which resources are combined in a firm impact the services that firm can provide, there are several takeaways for the study of how individual-level characteristics impact the emergent unit-level human capital resource. In order to access strategically relevant human capital, the firm typically cannot access only those specific characteristics deemed to be of strategic importance. Rather, sought after human capital is attached to an individual that also possesses an array of other characteristics. In the same way that not all human capital is strategically valuable (Ployhart et al., 2014), not all individual-level characteristics that strategically impact unit-level human capital resource emergence are necessarily part of human capital. Thus, in addition to individual-level human capital characteristics, other characteristics embedded in individuals impact unit-level human capital resource emergence such as motivation, satisfaction, or social acumen. These

individual-level characteristics are combined through the process of emergence in the creation of the unit-level human capital resource. Therefore, I propose that, although outside the realm of strategic human capital, these individual characteristics are nonetheless antecedent to unit-level human capital and thus component to the emergent resource.

**Proposition 1:** Attributes of individuals, other than human capital KSAOs, are component to the emergent unit-level human capital resource in the same manner as human capital KSAOs and thereby impact capabilities.

**Attributes of the emergent unit-level human capital resource.** The emergent unit-level human capital resource is different from the sum of individual-level parts (Ployhart & Moliterno, 2011); it encompasses something more than just individual characteristics and associated individual-level capabilities. In this way, the unit-level resource is comprised of the interaction of individual attributes, not necessarily a simple transfer of individual attributes to the unit level. Unique capabilities exist at the collective level that do not come about at the individual level and are embedded in the emergence of the human capital resource. For example, internal social capital inherently involves relationships among those in the unit; as such, it implicitly integrates the foundational individual attributes of the unit with the collective context. The bonds that develop among individuals in the unit happen as part of human capital resource emergence. As the unit-level human capital resource develops, so too do the attributes of that resource, particularly those associated with relationships or learning because the interaction of individuals becomes contextual for capability development.



Unit-level capabilities, specifically absorptive capacity and social capital, become attributes that characterize the emergent human capital resource. Although rooted in individual-level abilities to identify, internalize, and apply knowledge, absorptive capacity is a uniquely collective capability (Cohen & Levinthal, 1991). Similarly, social capital, although linked to particular individuals, becomes a salient collective level property (Coleman, 1988). Associating absorptive capacity and social capital with the human capital resource builds on the notion of emergence enabling states (Ployhart & Moliterno, 2011) and extends them to capability development at the unit level. Emergence enabling states include those relating to behavioral, cognitive, and affective qualities such as coordination, communication, climate, memory, learning, cohesion, and trust. To illustrate, a unit-level human capital resource with high levels of trust and cohesion or another unit that lacks in communication and memory could each be distinctly related to particular attributes reflecting the collective capabilities of the resource. Therefore, a unit-level human capital resource that is embedded with enhanced communication, learning, and cohesion may be described as having relatively higher levels of social capital and absorptive capacity when compared to other units. Indeed, social capital and absorptive capacity characterize the emergent unit-level human capital resource.

Thus, although comprising individual-level resources, the unit-level resource that emerges is distinct with its own capabilities that cannot exist at the individual level. Rather, associating the unit-level human capital resource with collective capabilities helps explain important within-level relationships. Individual-level explanations are often not appropriate because lower and higher level concepts are not always

interchangeable (Kozlowski & Klein, 2000; Kozlowski et al., 2013). For example, relying on human capital specificity or other constructs associated with individual-level resources may not always be meaningful for the unit-level resource. Simply because there are several individual components of the unit-level human capital resource that may be categorized as general (or firm specific) on their own does not mean that the unit-level resource can be categorized as general (or firm specific). The reason for this is twofold: these terms mean something different at an individual versus a unit level and the human capital embedded in individuals is often firm-specific and general, not exclusively one or the other. Further, human capital resource emergence is similar to team production in that it is often difficult to distinguish which parts of the collective output come from each individual input (Alchian & Demsetz, 1972). Individual-level qualities are indirectly associated with understanding unit-level outcomes, but unit-level capabilities characterize the emergent unit-level resource. As such, linking to capabilities of the unit becomes more theoretically meaningful when compared to describing individual-level characteristics that are bundled in the unit-level human capital resource.

**Proposition 2:** The emergent unit-level human capital resource is characterized by its own distinct attributes that uniquely manifest at the collective level in the form of unit-level capabilities.

**Capabilities and outcomes of the emergent unit-level human capital resource.**

As described above, the emergent human capital resource encompasses individual-level characteristics and unit-level attributes. To further explain, it is useful to describe how individual- and unit-level resources are integrated. March's (1991) theory on mutual learning, which incorporates individual learners and an organizational "code" that reflects

collective beliefs and knowledge in the firm, adds richness to our study of the unit-level human capital resource. March explains the concept of mutual learning in which individuals are shaped by the organization's code of beliefs, while the organizational code simultaneously adapts to individuals. In this way, there are reciprocal relationships among individual members of the collective unit. This is similar to the concept of emergence in that there is simultaneous impact from individuals and contextual constraints (Kozlowski & Klein, 2000); however, in mutual learning, the role of individuals is slightly more active in how they shape beliefs, practices, and processes via the organizational code which in turn shapes other individuals. March's theory of mutual learning can provide additional insight into the mechanisms at work in the emergence process to help explain how capabilities simultaneously emerge with the human capital resource.

Emergence is inherently a bottom-up process in which the individual impacts the unit; however, emergence theory also includes context and constraints from higher levels (Kozlowski et al., 2013). In this way, human capital emergence is analogous to the code, and leveraging March's notion of mutual learning expands our understanding of emergence in two ways. The first is the more active role of the individual in mutual learning which expands our view of the emergent resource and the second is the unit-level context as a constraint or enabler of the process, much like the organizational code. Together these two points expand how we think about the human capital emergence process as well as collective capabilities. Leveraging the theory of the code allows for an examination of potential reciprocal impact in how individual-level human capital relates to unit-level human capital in that there is path dependency to the individual-level human

capital being constrained by the contextual aspects of the unit-level attributes. In this way, the contextual unit-level attributes act similarly to the code in that they shape and constrain mutual interaction among individuals in the unit. At the same time, the individuals in the unit can shape the collective attributes. This subtle yet important point underscores how unit-level capabilities can impact and be impacted by the individuals that comprise the emergent resource.

The mutually impactful relationship between individual- and unit-level factors can be illustrated through the example of research and development (R&D) capabilities in pharmaceutical firms. A unit-level R&D team, with respect to a specific therapeutic area, can directly impact the innovative output of the firm. Different team knowledge bases will differentially impact outcomes. The lead scientist impacts unit-level human capital and potential patents since the expertise belonging to that individual is related to the strategic direction the team takes. As such, the unit's R&D capability would not exist without the human capital resources of the firm; it reflects the knowledge and abilities of the collective unit, while simultaneously encompassing individual scientist characteristics. Further, individual scientist characteristics are impacted by the contextual constraints of the therapeutic area and the patents sought after by the firm. In this way, the individual-level antecedents discussed in Proposition 1, as well as the attributes of the collective emergent resource described in Proposition 2 simultaneously impact unit-level capabilities and outcomes.

**Proposition 3:** The emergent unit-level human capital resource is shaped by the concurrent influence of individual and unit-level characteristics on one another.

### **The dynamic nature of the emergent unit-level human capital resource.**

Existing multilevel theory cautions that emergence should be studied from the inception of the unit, since that is the time when the process occurs for most emergent unit-level constructs (Kozlowski & Klein, 2000; Kozlowski et al., 2013). While this may be the case when a project group or work team is short term or easily defined over time, this suggestion could be limiting when examining human capital resources and the association to performance outcomes. Much of the theory on emergence is grounded in work on teams, where the rationale to capture initial observations on individual differences and unit context is warranted. However, in strategic management, particularly working under resource based theory, due to the role of resource stocks and flows (Dierickx & Cool, 1989) and the relevance of other structural components, such as organizational processes or routines (Felin et al., 2012), emergence is in some ways similar to a dynamic capability in that the human capital resource is continuously being rebuilt within the firm (Teece et al., 1997). As such, while initial conditions may be integral to the emergence of the human capital resource, the process itself is ongoing and constantly changing due to resource stocks and flows as well as continual capability development.

Human capital resource emergence is a continual and dynamic process that is shaped by idiosyncratic individual- and unit-level resource combinations. The mutually related facets of the emergent resource lend themselves to change over time. As human capital resource emergence is an ongoing process involving people, interactions, and context, it is similar to performing a routine within the firm (cf. Feldman & Pentland, 2003). In this way, individuals have agency in how they interact and perform; this

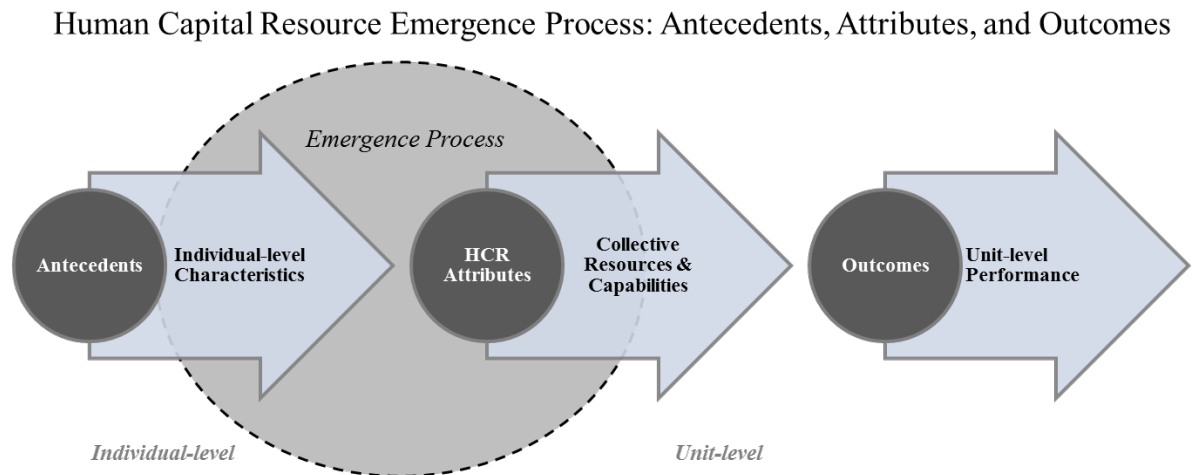
represents the opportunity for modifications over time, not just in the initial stages of emergence. There are also changes in stocks and flows of individual resources which contribute to the dynamic aspects of human capital resource emergence. Just as the performance, capabilities, and stocks of resources changes in a firm, so too does the individual antecedents discussed in Proposition 1 as well as the context of unit-level attributes discussed in Proposition 2. As such, ongoing observation, not pinned to unit inception, is useful in tying the emergent human capital resource to outcomes in strategy research. Therefore, although initial conditions are impactful, they are embedded in the process of emergence and as such become part of the dynamic structure that impacts the human capital resource.

**Proposition 4:** The emergent unit-level human capital resource should be studied at various points over time, as opposed to solely at initial inception, to account for the dynamic stocks and flows of individual human capital resources.

**Summary – human capital emergence process.** I have offered several propositions with respect to the antecedents, attributes, outcomes, and dynamic nature of the emergent human capital resource in this section. Proposition 1 explained how antecedents to emergence include individual-level characteristics that pertain to human capital as well as other qualities. In Proposition 2, I described how the unit-level resource that emerges is categorized by attributes specific to the resource at that level, which reflect the collective capabilities of the unit, instead of spuriously applying individual-level characteristics. Further in Proposition 3, I detail how the attributes of the unit-level human capital resource and the characteristics of the individual resources embedded in the unit mutually impact one another and outcomes. Lastly, Proposition 4

focuses on how the human capital resource emergence process is dynamic due to the ever changing nature of firm resource stocks and flows, as well as individual agency, and therefore can be more meaningfully studied over a strategically relevant period of time frame, as opposed to past recommendations to observe emergence during the original inception of the unit. The following section introduces hypotheses specifically concerning social capital and absorptive capacity in the context of the emergent human capital resource with respect to the theory around antecedents, attributes, and outcomes introduced in this section.

**Figure 3: Human Capital Emergence**



### **The Emergent Unit-Level Resource: Human Capital, Social Capital, and Absorptive Capacity**

As proposed in the last section, the antecedents, attributes, and outcomes of the emergent resource are interrelated in a variety of ways. In this section, I elaborate on these ideas to develop hypotheses regarding the microfoundations and capabilities of the

unit-level human capital resource. A key point in explaining how individual-level human capital fits into the model is that it is necessary to depart from thinking about human capital solely in terms of firm-specific or general. Rather, other aspects, such as depth and breadth of human capital, are more fitting since all unit-level human capital resources are by definition firm-specific (cf. Ployhart & Moliterno, 2011). Depth and breadth of human capital, along with external social capital, are antecedent to the unit-level human capital resource emergence process as discussed in Proposition 1. Subsequently, internal social capital and potential absorptive capacity characterize the emergent unit-level resource as described in Proposition 2. Further, as described in Propositions 3 and 4, the emergent resource is impacted by dynamic combinations of individual and unit-level human capital that differentially contribute to unit outcomes. In what follows, I explain these relationships in more detail and offer several testable hypotheses.

**Antecedents to unit-level human capital resource emergence.** The primary antecedents to human capital resource emergence are individual depth and breadth of human capital and external social capital. These individual-level characteristics capture qualities that are component to the emergent unit-level human capital resource. Breadth and depth of human capital concern those experiences that capture knowledge, skills, abilities, and other characteristics from expert and varied exposure that impact the unit-level resource. External social capital captures access to resources outside the focal firm that impacts the unit-level resource. I discuss these ideas in more detail below.

**Human capital depth and breadth.** Viewing individual-level human capital in terms of depth and breadth, as opposed to firm-specific versus general, requires an overview of existing issues around specificity. Human capital specificity, which has been



widely examined in the labor economics literature is typically segmented into the knowledge, skills, and abilities that are applicable to a specific task, industry, occupation, or firm, (Gibbons & Waldman; Kambourov & Manovskii, 2009; Parent, 2000; Neal, 1995). Yet strategic human capital research tends to focus on a more black and white delineation between firm-specific (only useful to the focal firm) and general (applicable across firms). This is partly due to a reliance on Becker's original work in economics on firm-specific versus generic investments at an individual level (cf. Molloy et al., 2011). However, when combined with current thinking in terms of multilevel human capital models under the framework of the RBV, the traditional view of human capital as firm-specific or general presents some issues.

The binary categorization leads to a notion of mutual exclusivity in terms of categorizing human capital resource specificity. This is limiting in that individuals have both general and firm-specific human capital (Lazear, 2009) and the two work together (cf. Lepak & Snell, 1999; Campbell et al., 2012). In the same way that Penrose (1959) discusses bundles of services, it is more precise to conceptualize individuals as having both firm-specific and general human capital of varying value to the focal firm. As Wright and colleagues (2014) point out, individuals contribute to the firm in a number of different ways and there may be an individual with high levels of one characteristic and another with average levels of many characteristics. As such, a portfolio of characteristics, including different types of knowledge, skills, and abilities is a more precise representation (Lepak & Snell, 1998; Nyberg et al., 2014). Thinking of human capital in terms of breadth and depth can help in articulating the association with outcomes, particularly given the evidence that diverse and distant knowledge sources

(Vasudeva & Anand, 2011) as well as working across functions and jobs (Jansen et al., 2005) favorably link to outcomes such as absorptive capacity.

When overly simplified categorizations from an individual level flow through to the collective level in human capital models, we miss the intricacies of the different subtypes and thus lose opportunity to provide a richer view of what is happening across levels within the firm. In the current view of firm-specific or general human capital, we lose the granularity of different characteristics of general human capital that may be affiliated with salient tasks, industries, occupations to the focal firm, or even additional explanations that may come from idiosyncratic combinations of human capital within the firm (Groysberg et al., 2008; Campbell et al., 2012). Therefore, I propose examining depth and breadth of human capital to better facilitate analysis of human capital resources under the resource based view, particularly since very few KSAOs of strategic importance could be limited in utility to one firm. Since firms exist within industries and concern a variety of occupations and tasks it follows that valuable aggregate human capital resources would be founded on complex and varied KSAOs. A categorization based on extent and diversity of knowledge, skills, and abilities adds nuance that is missing in borrowing the idea of firm-specific individual investments from economics to explain strategic firm outcomes.

Depth of human capital represents the complexity of understanding and grasping certain knowledge, skills and abilities and is defined as expertise or relative length of time in a particular experience, where the more experience an individual gains changes the way in which they contribute to emergence. Therefore, deep expertise, not necessarily derived from experience in that particular firm, can nonetheless be useful to

that firm. Similarly, breadth of human capital represents the range of knowledge, skills, and abilities and is defined as exposure to diverse experiences; the greater the variety of experience an individual gains, the more diverse human capital they can contribute to emergence. Depth may be beneficial in perfecting skills and abilities (cf. Kogut & Zander, 1992), whereas breadth may be advantageous in avoiding potential pitfalls of over-specialization (cf. Levinthal and March, 1993). As such, the classifications of breadth and depth are different from the traditional firm-specific or general lens; instead of focusing solely on the current firm, they relate to a richer representation of human capital – either through narrow focus, in the case of depth or through comparative experiences, in the case of breadth. Indeed, they encompass relevant occupation, industry, firm, or task human capital that is applicable to the current setting without being restricted to the delineation between inside and outside the focal firm. In this way, depth and breadth avoid the firm-specific limitation of potentially confusing non-strategic firm processes and procedures with being valuable while also expanding inclusion of general KSAOs as potentially being part of valuable human capital resources. For example, depth of human capital experience may be expressed in terms of how long an individual has been in a particular occupation or breadth may indicate a range of task exposure an individual has experienced in a firm; in this way, depth and breadth are not siloed under the constraints of human capital specificity.

Depth and breadth of human capital can add nuance where the firm-specific versus general delineation misses relevant distinctions. Individuals can have multiple experiences within a firm, such as different tasks or occupations, yet those experiences are grouped under firm-specific human capital. Alternatively, an individual can have

similar experiences in multiple firms, such as perfecting skills or gaining knowledge relevant to the same occupation or industry, which falls under the umbrella of general human capital. Further, individuals have experiences that hold little relevance to the current setting that could inflate the perceived value of human capital. To illustrate, in the case of an auditor working at an accounting firm there may be two different individuals in the same position. Both have human capital related to analyzing a set of reports in an industry; however, one individual may have developed this ability while in the focal firm whereas another may have moved from a competitor firm or a client. In this case, both individuals have similar breadth and depth of human capital when it comes to report analysis to the extent that the two resources may be substitutable with one another. Through leveraging depth and breadth of human capital neither of these individuals' human capital will be discounted due to it being honed inside or outside the focal firm. Furthermore, if either of these two individuals had additional experience that holds little relevance to the current setting (i.e. landscaping skills for someone analyzing reports) then general human capital could have also been inflated. This illustrates how the focus on firm-specific or general can be vague and that human capital be over- or under-valued due to limits from leveraging borrowed and all-encompassing categorization.

As a departure in the literature, recent work that examines industry and occupation-specific human capital, which otherwise would have been previously discounted as general human capital (Mayer et al., 2012), provides evidence as to how too narrow a focus may miss important findings on the value of human capital to the firm. Whereas the traditional view of firm-specific or general may be useful from an

economics perspective in explaining individual investments or rent appropriation, this binary categorization falls short in explaining the human capital resource emergence process which requires a way of characterizing human capital that captures multiple dimensions as they relate to strategic unit-level capabilities instead of simply the venue or setting. The categorizations of breadth and depth are particularly useful in applying multilevel theory to human capital in that they are meaningful at both the individual and unit-level and further delineate human capital from other benefits that may be derived from idiosyncratic individual and firm combinations, such as social capital.

**External Social Capital.** External social capital is separate from individual-level human capital, yet is an important antecedent to unit-level human capital resource emergence. In general, social capital provides access to resources through relationships (Lin, 2001). More specifically, external social capital can link individuals within the firm to those outside the firm and the respective resources that may be accessed via the relationship (Payne et al., 2011). Although social capital is not something that one individual can solely control or own, since it exists between individuals (Coleman, 1998), its origins can be linked to an individual much like any other characteristic. To illustrate, in the case of an individual joining a firm, that person, although joining the firm independently of other people to which he or she is linked to outside the firm, has a measure of external social capital that, similar to human capital, can enhance the resource and capability pool of the firm. The “bridging” aspect of external social capital (Payne et al., 2011) links individuals to external resources that can substitute or complement human capital. Accessing external resources via individual social capital impacts internal performance through enhancing information flow, resource exchange, and learning (Lin,

2001; Adler & Kwon, 2002), which can help the unit to acquire outside knowledge that contributes to unit-level human capital. Therefore, the information, resources, and potential for learning that individuals have access to via external social capital become available to the unit for strategic purposes in conjunction with depth and breadth of human capital.

Further, social capital plays an important role in how employees perform, through deploying human capital, as part of the unit. To illustrate, an employee hired to complete certain tasks may not possess the necessary KSAOs and therefore may reach out to others outside of the firm, such as a former co-worker in an effort to improve their skill or acquire new knowledge. In this way, social capital may be viewed as a complement or substitute for other human capital resources (Adler & Kwon, 2002: 21) thus enhancing the deployment of individual-level human capital or filling a gap in individual knowledge or skills. In this case, the employee that is part of the human capital resource pool of the firm can use not just their own knowledge, skills, and abilities, but may also access those of others outside of the firm. In doing so, the individual can either enhance their own human capital by internalizing learning from the social relation outside the firm or can leverage the human capital of the outside contact for use inside the firm. As such, individual-level external social capital, along with human capital depth and breadth are antecedent to unit-level human capital resource emergence and become component to the emergent resource.

**Linking antecedents to attributes and outcomes of the unit-level human capital resource.** Investigating the impact of antecedents to the human capital resource emergence process on unit-level realized absorptive capacity requires examination of not

just individual-level characteristics in aggregate but also unit-level attributes, such as internal social capital and potential absorptive capacity. Scholars have suggested that absorptive capacity does not reside in the firm alone (Lane et al., 2006: 853), therefore individual characteristics are key in explaining this capability attributed to the unit-level resource. Individual level components, through value enhancing unit-specific aggregations (Ployhart & Moliterno, 2011), impact unit-level attributes. The human capital resource emergence process is further impacted by complementarities among resources (Ployhart et al., 2014), which can lead to absorptive capacity based advantages (Lewin, et al., 2011). In sum, the characteristics embedded within the individual become resources available to the unit and thus shape attributes of the resource while also influencing outcomes.

**Attributes and outcomes of the emergent unit-level human capital resource.**

With the combining of individuals to create a unit-level resource that embodies the depth and breadth of individual human capital, as well as the resources accessible through external social capital, the attributes of the unit-level human capital resource start to take shape. These characteristics of the emergent unit-level human capital resource, are accurately depicted through attributes that relate to capabilities rather than merely describing individual components of the collective resource. Therefore, I propose that the development of collective attributes is embedded as part of the emergence process; internal social capital and potential absorptive capacity are developed during human capital resource emergence and as such are outcomes of the process. That is, the unit-level human capital resource that emerges can be described as having a certain level of internal social capital or potential absorptive capacity, because the individuals in that

specific unit have a unique bonding capacity as well as an acumen for identifying and assimilating knowledge. More specifically, depth and breadth of human capital, as well as external social capital, are individual-level characteristics that are inputs to the human capital resource emergence process; variation in these inputs impacts the unit-level human capital resource that emerges and consequently the resulting attributes of that resource.

**Internal social capital at a unit level.** Internal social capital, defined as the norms and bonds within a group (Coleman, 1988; Payne et al., 2011), helps characterize the emergent unit-level human capital resources. Social capital in the unit-level context captures benefits that accrue from idiosyncratic firm and worker combinations (cf. Groysberg et al., 2008; Campbell et al., 2012). For example, shared experience (Berman, Down, & Hill, 2002; Luo, 2001), stable trust (Frank & Cook, 1995), and overlapping tenure (Harris, McMahan, & Wright, 2012) have been suggested to contribute favorably to unit-level outcomes. Additionally, the higher quality human capital pool and turnover reduction, assumed to come with enhanced social capital (Adler & Kwon, 2002: 17; Nyberg & Ployhart, 2013), similarly relate to performance (Barney & Wright, 1998; Nyberg et al., 2014). Indeed, relationships are part of emergence (Kozlowski et al., 2013) and development of internal social capital within the unit happens as part of human capital resource emergence; in this way, the human capital resource that emerges is dependent on a certain level of internal social capital to realize unit-level outcomes. Accordingly, internal social capital is an attribute of the unit-level human capital resource. Thus, as the unit-level human capital resource is created, so too are the



relationships, norms, and expectations that define social capital (cf Lin, 2001; Coleman, 1988).

Therefore, internal social capital, as an attribute of the unit-level resource, can be impacted by the inputs to emergence. Social capital has the potential to benefit not just the individual but the collective (Coleman, 1988) and relatedly, human capital depth may be associated with levels of internal social capital. That is, higher levels of human capital depth may relate to higher levels of internal social capital, particularly in light of the role of emergence enabling states which refer to how individuals in the unit “...act, think, and feel” (Ployhart & Moliterno, 2011: 135). For example, the unit may benefit from increased solidarity (Adler & Kwon, 2002: 29) or cohesion as a result of working relationships (Wright et al., 2014: 13) which could also be enhanced through human capital depth. Depth of human capital at a unit level encompasses the collective level of expert understanding as it relates to the refinement of knowledge, skills, and abilities. This links to internal social capital in that greater opportunity for similar experiences over time in the form of familiarity of industry norms or occupational jargon can aid in bonding, communication, and general understanding in the unit. The relatable experiences that come from having similar expertise in the same industry or occupation may strengthen internal social capital, independent of whether those in the unit gained the depth of experience in the same firm. Benefits range from general familiarity to actual bonding among unit members. Prior research suggest there is a tendency to form bonds with others based on commonalities in experience (McPherson, Smith-Lovin, & Cook, 2001) and that shared occupational experience impacts work groups (Ruef, Aldrich, & Carter, 2003). In this way, factors derived from human capital depth, such as familiarity

or bonding can change how members act, think, and feel within the emergent resource. As such, I predict that the depth of human capital in the unit positively relates to unit-level social capital.

*Hypothesis 1: Unit-level human capital depth is positively associated with unit-level internal social capital.*

In the same way that human capital depth impacts the emergent resource, human capital breadth can also relate to internal social capital. In this case, a unit-level human capital resource with higher levels of human capital breadth may exhibit lower levels of internal social capital due to challenges associated with the aggregation of disparate experiences. Diversity in groups can have a complex impact on performance (Carpenter & Fredrickson, 2001; Cannella, Park, & Lee, 2008). Although diversity in experience may lead to better decision making and outcomes, it can also lead to lack of consensus and increased conflict (Knight, Pearce, Smith, Olian, Sims, Smith, & Flood, 1999; Eisenhardt & Schoonhoven, 1990). Indeed, less overlap in norms and values may result from disparate experiences associated with a broader spectrum of knowledge, skills, and abilities. On one hand, individuals may have more potential for overlap in norms and values due to increased exposure to different settings, yet on the other hand, this connection may be too superficial to enable emergence of internal social capital because it does not change how those in the unit act, think, and feel. Even in the presence of efforts to incentivize internal social capital, which some firms may implement (Dess & Shaw, 2001), higher levels of breadth of human capital can hinder bonding due to overwhelming diversity or conflict where there is little room for meaningful connection. Despite the association between diversity of information and social capital benefits (Koka

& Prescott, 2002), if ties either do not form or are not strong enough due to disparate experiences, then internal social capital may not be realized. In this way, high levels of breadth of human capital among unit members relate to lower overall internal social capital in the unit-level resource. As such, I predict that breadth of human capital in the unit negatively relates to unit-level internal social capital.

*Hypothesis 2: Unit-level human capital breadth is negatively associated with unit-level internal social capital.*

Further, external and internal social capital of the unit-level human capital resource are associated with one another due to the complex nature of social relations. External social capital can positively influence internal social capital for two reasons. First, those with external social capital have developed a competence in building bonds signaled by their relationships with those outside the firm. Secondly, the access to additional resources via external social capital motivates other members in the unit to form bonds to bridge to those additional outside resources. Indeed, past research theorizes how some group members may be self-serving in their quest for social capital (Ibarra et al., 2005) which could motivate those with external social capital to also seek internal social capital in a quest for many valuable ties, as well as motivate those within the unit to connect to others with valuable outside ties, thereby enhancing internal social capital from multiple angles. However, the impact from social capital may not always be positive on the group. Indeed, Becker (1964) in discussing groups highlighted competing interests among members and Whitley and McKenzie (2005) point out the difference in social relations between actually sharing values and simply being part of the same structure in the organization. Therefore, it is important to consider how there are limits to

the positive association between external and internal social capital. For example, high levels of external social capital for individual members relate to an information burden (Oldroyd & Morris, 2012), therefore units with members that are constantly viewed as conduits for resources may suffer. Further, social ties can have a restrictive and powerful nature (Brass et al., 2004) and therefore, what could be beneficial to the individual could be detrimental to the unit. Thus, in units with extremely high levels of external social capital there can be a negative impact on internal social capital. Due to potential negative consequences to very high levels of external social capital, I predict that it is those units with moderate to high levels of external social capital that will relate to high levels of internal social capital.

*Hypothesis 3: Unit-level external social capital and unit-level internal social capital are curvilinearly associated such that the association is initially positive but becomes negative as external social capital increases.*

**Absorptive capacity.** Scholars researching absorptive capacity have noted that at the firm level the collective capacity is rooted in individual-level absorptive capacity, but have cautioned that it is not merely an additive result of foundational individual-level characteristics (Cohen & Levinthal, 1990). Accordingly, absorptive capacity is derived from more than just individual inputs; in this way, the original conception of absorptive capacity alludes to the process of emergence without explicitly naming it as such. Cohen and Levinthal outline the importance of individuals and knowledge accumulation in collective absorptive capacity development. However, more recently, it has been noted that the emergence process of absorptive capacity, as it relates to individual and organizational level antecedents, is currently not clear (Volberda et al., 2011; 931). I

propose that the emergence of absorptive capacity is a byproduct of the human capital resource emergence process as both are rooted in individual knowledge, skills, abilities, and other characteristics. That is, since absorptive capacity is founded in individuals and is based on the ability to leverage knowledge in a particular manner, it is dependent on the human capital within the firm. Thus, absorptive capacity is embedded in human capital and its emergence process, in that it is simultaneously derived from individuals to the unit level, while being influenced by contextual factors.

Absorptive capacity has been categorized as having potential and realized components, with the difference between the two being attributed to social mechanisms (Zahra & George, 2002). This partition is useful in examining how human and social capital at both the individual and unit level impact absorptive capacity, yet details distinguishing the social component have not been fully explored in the literature. I pick up this notion and further propose that potential absorptive capacity is directly linked to the emergent unit-level human capital resource, and that internal social capital of the unit, which is similarly associated with the emergence process, impacts this relationship to result in realized absorptive capacity. That is, as characteristics at the individual level impact human capital emergence, they also shape the attributes and outcomes of the process, such as absorptive capacity. I provide additional explanatory detail in the following sections on potential and realized absorptive capacity.

**Potential absorptive capacity.** Potential absorptive capacity, or the firm's ability to recognize, understand, acquire, and assimilate new information (Zahra & George, 2002; Todorova & Dirisin, 2007) is a direct result of the human capital emergence process in which individual-level characteristics combine to create a unit-level resource.

Cohen and Levinthal described absorptive capacity as being cumulative and dependent on individual absorptive capacity (1990), suggesting that there is both a time component and an individual human foundation due to a reliance on individual-level knowledge, skills, abilities, much like unit-level human capital resource emergence. Relatedly, recent work points out that human capital resources are available for “potential action” and “...focuses on capacities for producing outcomes” (Ployhart et al., 2014: 16-20); suggesting that the potential for unit-level capabilities is embedded within the unit-level human capital resource. If the unit-level human capital resource is characterized by potential absorptive capacity, then a unit comprised of individuals with an abundance of diverse experiences in a variety of settings would likely emerge with different potential compared to another unit that consists of new college graduates with minimal work histories. As such, the potential absorptive capacity of the unit-level human capital resource inherently reflects individual-level characteristics of human and social capital.

In terms of human capital breadth, it has been suggested that related knowledge can impact absorptive capacity (Van den Bosch et al., 1999). Therefore, the variety in exposure to different knowledge, skills, and abilities derived from breadth can enhance potential absorptive capacity through increased comfort with new knowledge. Indeed, different varieties of experience may act as substitutes or complements in learning (Argote & Miron-Spektor, 2011) and groups that work on different, but similar tasks tend to learn at a more rapid pace than those that are specialized, which enhances problem solving abilities (Schilling, Vidal, Ployhart, & Marangoni, 2003), both of which can impact unit-level potential absorptive capacity. Firms need to gain insight from other firms (Lane & Lubatkin, 1998). One way of doing so, is through the breadth of human

capital derived from past experiences. Indeed, research suggests that human capital that is applicable across contexts can help firms exploit opportunities in uncertain environments (Alvarez & Barney, 2007). This suggests that human capital breadth provides advantages through leveraging a variety of skills and abilities from past contexts in new contexts. However, there may be limits in that being too generally broad can hinder potential absorptive capacity, which is evidenced in research on specialization (Starbuck, 1992; Brusoni, 2005) and in work that shows there is a cost associated with assimilating diverse and distant knowledge (Vasudeva & Anand, 2011). Further, although prior knowledge is useful in absorptive capacity, there is also the need for relevance with respect to the applicability of the underlying knowledge to the current setting (Cohen & Levinthal, 1989). Therefore, I predict that moderate levels of breadth allow for efficient leveraging of human capital from prior contexts in new contexts thereby increasing potential absorptive capacity, but too much breadth may hinder potential absorptive capacity due the costs associated with assimilating too much vastly different knowledge in the unit.

*Hypothesis 4: Unit-level human capital breadth and unit-level potential absorptive capacity are curvilinearly associated such that the association is initially positive but becomes less so as breadth increases*

In addition to human capital breadth, depth of human capital is also associated with potential absorptive capacity. Indeed, the experience of employees can impact collective knowledge integration (Cohen & Levinthal, 1990) and expertise that comes with higher levels of human capital depth can help the unit to understand and assimilate new information. Knowledge and skills gained from experience over time or expert

abilities help in detecting nuances to knowledge appropriation that may otherwise be missed. For example, refining skills and abilities can enhance the development of tacit knowledge (Polanyi, 1967; Grant, 1996) and improve communication through increased time exposed to industry or occupational jargon, both theorized to assist in developing absorptive capacity (Cohen & Levinthal, 1990). Further, deep expertise that is associated with overlapping experiences can relate to absorptive capacity (Mowery et al., 1996). In this way, the wisdom that comes from deep levels of relevant human capital and benefits that come from improved communication expedite knowledge assimilation and acquisition in the unit. Moreover, self-efficacy rooted in human capital depth can enable potential absorptive capacity through enhanced confidence to attempt to assimilate new and different knowledge in a novel manner to the benefit of the unit. Self-efficacy, or the belief in capabilities to attain goals or execute tasks (Bandura, 1997) which also concerns the perceived capability to develop new competencies (Bandura, 2012), has subsequently been found to relate to performance (Stajkovic, Lee, & Nyberg, 2009). However, there may be a point at which incremental benefits diminish due to knowledge depreciation or organizational forgetting (cf. Argote, Beckman, & Epple, 1990; de Holan & Phillips, 2004). Therefore, I hypothesize that this positive impact is likely to be limited and even turn negative once a certain level of human capital depth is reached by the unit-level resource.

*Hypothesis 5: Unit-level human capital depth and unit-level potential absorptive capacity are curvilinearly associated such that the association is initially positive but becomes negative as depth increases.*



External social capital, or the access to outside resources through relationships (Lin, 2001; Payne et al., 2010), has the potential to impact the unit's ability to absorb new and outside knowledge, which is fundamentally important to absorptive capacity. Indeed, Cohen and Levinthal (1990) assert that some of the most important knowledge to a firm exists outside of that firm. To illustrate, in a benchmarking analysis, when a firm is attempting to determine differences in terms of processes compared to other firms, having high levels of external social capital could be beneficial in that unit members can access external information through former co-workers or classmates that are now employed in peer group firms. Not only has diversity in social networks been suggested to relate to learning in general, particularly with respect to richness and volume of information (Beckman & Haunschild, 2002; Koka & Prescott, 2002) but knowledge transfer is likely to occur when good relationships are present (Szulanski, 1996). As such, having ties outside of the firm enhances the unit's ability to understand and identify potentially valuable information. Moreover, vicarious learning, in which firms learn not just through the actions of those within the firm, but also through observation and reflection on the actions of other firms (Bandura, 1977; Baum, Li, & Usher, 2000; Argote, McEvily, & Reagans, 2003) is another way that external ties can enhance unit-level potential absorptive capacity. In this way, knowledge transfer or vicarious learning may occur from firm to firm through employee relationships across organizations. Additionally, the proper identification and incorporation of external knowledge entails different complexities when compared to internal knowledge creation (Lewin et al., 2011); as such, external ties can provide a different angle on internal approaches.

Therefore, I predict that unit-level potential absorptive capacity is strengthened by external social capital.

*Hypothesis 6: Unit-level external social capital is positively associated with unit-level potential absorptive capacity.*

**Realized absorptive capacity.** The capability to apply absorbed knowledge, referred to as realized absorptive capacity (Zahra & George, 2002), is only feasible at the collective level despite incorporating individual-level abilities (Cohen & Levinthal, 1990; p .131). The main antecedent to realized absorptive capacity is potential absorptive capacity, in that recognizing, understanding, acquiring, and assimilating new information are pre-requisite to the firm's ability to apply, transform, and exploit knowledge (Lane et al., 2001; Zahra & George, 2002; Todorova & Dirisin, 2007). However, in the same way that acquiring valuable human capital resources does not always lead to competitive advantage (Coff, 1997), having potential absorptive capacity does not always lead to realized absorptive capacity. Indeed, Zahra and George (2002) described the difference between potential and realized absorptive capacity as the "efficiency factor," which is the gap between absorbing knowledge and applying it to the benefit of the firm. This gap echoes notions embedded in research on valuable resources that theorizes that simply having those resources does not equate to performance advantages (Barney & Ariken, 2001) and early work on human capital that notes decreases in efficiency due to human factors such as fatigue (Spearman, 1927) or limits to growth associated with restrictions in human ability (Schultz, 1961). Further, related research on human capital acquisition shows the importance of complementarities and collaboration in realizing absorptive capacity advantages (Cockburn & Henderson, 1998) which emphasizes the importance of

factors outside of human capital in deploying the KSAOs embedded in human capital resources. Rather, there is a social component that, in addition to potential absorptive capacity, precludes realized outcomes.

Social integration mechanisms are associated with realizing the potential of absorptive capacity; yet the prior research only briefly touches upon what these mechanisms entail (Todorova & Dirisin, 2007), citing employee interaction and information flow (Zahra & George, 2002: 194). Other scholars have noted variations of this proposition in that Lane and colleagues (2001) emphasized the importance of trust in the relationship between absorptive capacity and performance outcomes. Similarly, Jansen and colleagues (2005) found that organizational socialization tactics contributed to knowledge transformation in the firm. This notion is supported by findings suggesting that the quality of social relations relates to knowledge creation and transfer (Reagans & McEvily, 2003; McFadyen & Cannella, 2004). Although these explanations start to unpack the intangible social component of absorptive capacity, there is little evidence explaining what it is or where it comes from. At the same time, antecedents underlying absorptive capacity outcomes have largely gone ignored in the literature (Volberda et al., 2010). Thus, a more nuanced examination of the social component of realizing absorptive capacity can be beneficial. Consequently, I propose that the internal social capital that characterizes the emergent human capital resource is impactful in realizing unit-level outcomes since organizational factors and other capabilities are theorized to play a role in absorptive capacity (Van den Bosch et al., 1999). In this way, realized absorptive capacity results from both potential absorptive capacity and internal social capital of the unit-level human capital resource.

To the extent that realized absorptive capacity is dependent on both internal social capital and potential absorptive capacity, the human capital emergence process has a compound effect on unit-level outcomes. However, these two attributes of the unit-level human capital resource impact realized absorptive capacity in different ways. Potential absorptive capacity relates to realized absorptive capacity in a linear manner in that the more the unit has the capacity to understand, the more the unit is able to apply (Zahra & George, 2002). However, the association between internal social capital and realized absorptive capacity is more complex due to the nature of group relations, norms, and values.

Indeed, it has been noted that social capital facilitates intellectual capital and that collective absorptive capacity is dependent on the links between individuals (Cohen & Levinthal, 1990; Nahapiet & Ghoshal, 1998). Internal social capital of the unit can positively impact realized absorptive capacity through trust and knowledge transfer of diverse information (Uzzi, 1996; Koka & Prescott, 2002). High levels of social capital may also suggest that unit members want or trust information from outside of the unit (Tsai & Ghoshal, 1998). However, not all associations between social capital and realized outcomes are positive and linear. For example, a unit with high levels of internal social capital may experience groupthink where those in the unit are unable to acknowledge or critically analyze outside perspectives (Janis, 1972; 1982; Arregle, Hitt, Sirmon, & Very, 2007) which may result in an aversion to conflict and limits in realizing absorptive capacity. Although trust plays a positive role in cases where diversity leads to conflict (Olson, Parayitam, & Bao, 2007) and spending time together can positively impact performance of groups even in the event of diverse perspectives (Cannella et al.,

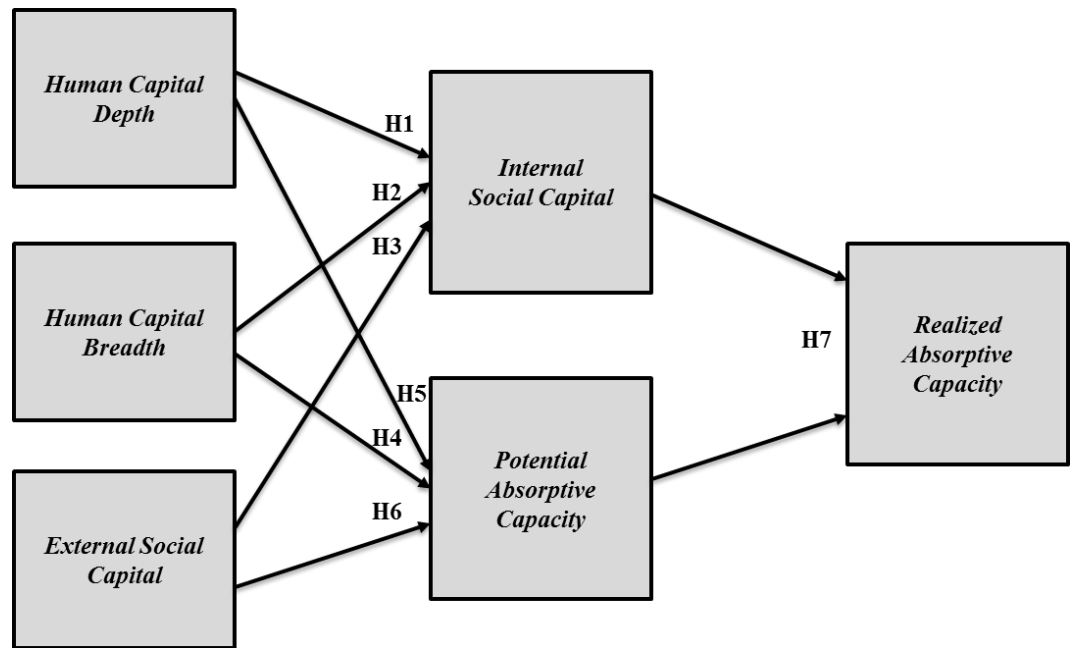
2008), there may be limits to very high levels of internal social capital in realizing outcomes. Further, factors such as power relations that impact social behavior may impact the strategic use of knowledge (Todorova & Dirisin, 2007), thereby limiting or amplifying certain aspects of absorptive capacity. As such, I predict the following with respect to potential absorptive capacity, internal social capital, and realized absorptive capacity:

*Hypothesis 7a: Unit-level potential absorptive capacity is positively associated with unit-level realized absorptive capacity.*

*Hypothesis 7b: Unit-level internal social capital and unit-level realized absorptive capacity are curvilinearly associated such that the association is initially positive but plateaus as internal social capital increases.*

In sum, the theoretical model that I propose includes human capital depth and breadth in addition to external social capital founded at the individual level as antecedents of human capital resource emergence. These antecedents relate to attributes of the unit-level human capital resource, namely internal social capital and potential absorptive capacity, both at the unit level, which in turn impact unit-level realized absorptive capacity. Figure 4 depicts the hypotheses proposed in this chapter:

**Figure 4: Proposed Hypotheses**



## **CHAPTER 4**

### **METHODS**

#### **Introduction and Research Design**

The previous chapter outlined my theoretical development and model along with several testable hypotheses. In this chapter, I explain how I tested these hypotheses in terms of the empirical context, data sources, sample, and analysis. I performed statistical analysis in Stata using archival data collected from several disparate data sources, including IBES, Compustat, and CRSP, to test my theory in the setting of sell-side security analysts in investment banks. Sell-side analysts have been used as an empirical setting in recent management studies (Groysberg et al., 2008; Groysberg, Polzer, & Elfenbein, 2011) and extensively in the finance and accounting literature (Jacob, Lys, & Neale 1999; Clement & Tse, 2003; Jegadeesh, Kim, Krische, & Lee, 2004). In the following sections, I detail the intricacies of this context as well as the measurement of variables relating to human capital, social capital, and absorptive capacity. The theoretical development outlined in the previous chapter required a sample that allows for unit-level measurement of variables. Further, focusing on a single setting enables meaningful consideration of similar context with respect to both firm industry environment and individual occupation. Additionally, longitudinal data provides comprehensive analysis over time, protecting against potential bias from time period selection. Lastly, since my theory included constructs related to both human and social capital as well as absorptive capacity related outcomes, it is important that the sample relates to a knowledge intensive setting.

## Sample

**Empirical context.** I tested my hypotheses by examining sell-side security analysts in investment banks, which provides an aggregate human capital resource in which to examine individual- and unit-level characteristics and outcomes. Security analysts issue research reports, along with stock recommendations and earnings per share forecasts, on a range of publically traded companies. Analysts are employed by investment banks and research institutions that provide these reports to clients (mostly institutional investors) to help them make investment decisions. In addition to reporting insights based on industry data and company filings, analysts spend almost a third of their time talking about their ideas, including time spent with other analysts (Groysberg & Healy, 2013; 21, 95). Accordingly, this is an ideal setting in which to test my hypotheses as it represents a profession that relies on human capital at its foundation as well as an inherent social component in an industry that depends on knowledge absorption.

In examining this context, I looked at individual analysts aggregated to a unit level based on the investment bank where they are employed. To illustrate, all analysts at Goldman Sachs would be considered a single unit and all analysts at Morgan Stanley would be another single unit. In this way, each firm is represented by a single unit of analysts in aggregate. Through this design, I was able to capture individual- and unit-level characteristics that are both integral to the study of microfoundations of strategy and multilevel human capital resources (Felin & Foss, 2012; Nyberg et al., 2014).

**Data source and sampling frame.** In order to construct the measures for my analysis, I used the forecast data from IBES to determine the sample of analysts and associated investment banks. I subsequently linked to the Compustat and CRSP datasets



to gain more information about the companies and industries that the analysts cover in their forecasting activities. This combined data set allows me to measure various analyst characteristics, number of forecasts made, years of experience, companies followed, and associated industry classifications.

I compiled the data set by first using earnings per share forecast-level data observations from IBES which I then aggregate to an analyst level. When doing so, I kept additional information such as the investment bank that the analyst is affiliated with as well as the forecasted company information. From the IBES data set, I created variables related to analyst experience and association with banks. From IBES, I also obtained information related to actual earnings per share for the companies that the analysts cover. This allowed me to compare forecasts versus actual earnings per share to calculate accuracy outcomes as well as create other variables regarding analyst characteristics that depend on the consensus, such as boldness in forecasting. I further linked to Compustat and CRSP in order to obtain financial information, such as share price, related to the firms that analysts cover.

Based on the company the analysts cover, I followed previous research on analysts in investment banks in assigning them to one of 12 industry groupings (Groysberg and Lee, 2008). I defined industry based on Fama and French's (1997) 12 industry portfolios which assign 4-digit Standard Industry Classification (SIC) codes into industry groups. This results in the following industry groupings: consumer non-durables, consumer durables, manufacturing, energy, chemicals, business equipment, telecom, utilities, shops, healthcare, finance, and other (see Appendix B for additional detail). The Fama and French classification is intended to arrange SIC codes together

based on similar risk profiles and is not fundamentally different from using SIC or the North American Industry Classification System (Bhojraj, Lee, and Oler, 2003). This allowed for the creation of variables related to human capital with respect to task experience in different industries.

I constructed variables going back to 1980 based on the IBES file, in order to consider a fuller employment history. However, I restricted the analysis period to a shorter time frame. The sampling time frame is the period between 2001 and 2010. I started the analysis in 2001 as prior to that year, security analysts had the potential to receive private information from the companies that they cover in their reports. However, this practice was restricted due to the introduction of Regulation Fair Disclosure by the U.S. Securities and Exchange Commission in the Fall of 2000. Prior research suggests that Regulation Fair Disclosure made analysts' jobs more demanding and difficult (Bailey, Li, Mao, and Zhong, 2003). Thus, starting the analysis in the calendar year following the introduction of Regulation Fair Disclosure by the SEC captured a more consistent environment with respect to a practice that could otherwise bias the analysis. The theoretical development required that I examine the data at a unit level. Accordingly, the individual analysts were grouped within an investment bank into a unit-level aggregation. The final sample contains 342 unique investment banks over a sampling time frame of 40 quarters.

## **Variables**

**Independent variables.** To measure human capital to test my hypotheses, I first constructed breadth and depth of human capital at the individual level. *Human capital breadth* is measured as the total number of industries covered by an analyst over the

course of his/her career. *Human capital depth* is measured as total experience being an analyst to reflect the expertise that comes with experience in an occupation. More specifically, total number of industries covered is measured as the count of different industries that the analyst issued earnings forecasts for in their career to date, and total experience as an analyst is a count of the number of quarters since the analyst first appears in the IBES data. These measures capture the breadth and depth of human capital as it relates to strategic activities (i.e. occupation and task) with respect to diversity and expertise regarding similar task settings (industry forecasted) and the same occupation, regardless of the investment bank of employment.

I measured *external social capital* by computing a unique count of past coworkers at other investment banks using individual unit-member links based on prior firms worked for throughout the career which is made possible through creating a work history file from IBES based on common broker identification. Measuring social capital in this way allows for inclusion of outside contacts based on past professional engagements or through industry contacts that may be relevant to the focal unit. This measure captures the quantity of contacts that link to external resources, also referred to as degree centrality in social network analysis, in that it captures the network of analysts in the investment banking industry. Variations of network centrality, commonly used in social network analysis (Bonacich 1997; Borgatti, 2005; Wasserman & Faust, 1994) have been leveraged in multiple forms in prior studies such as the aggregation of personal, business, or stakeholder ties outside the firm (Lee, Lee, & Pennings, 2001 Pennings, Lee, & Van Witteloostuijn, 1998; Florin, Lubatkin, & Schulze, 2003; Fischer & Pollock, 2004).

**Latent variables.** In the structural equation model, there are two constructs that are not directly observed and therefore are indicated by other observable measures. As such, I measured parts of the model that relate to *potential absorptive capacity* by using other indicator variables associated with the unit-level resource. In doing so, I was able to attempt to test conceptual parts of the model that I otherwise would not be able to include in the analysis. Relatedly, I describe the use of SEM in the section on analysis at the end of this chapter.

I measured *internal social capital* based on two different criteria – shared norms and familiarity from time together in the unit. First, by looking at the similarity in forecasting within the unit, which is measured by the coefficient of variation of both boldness and optimism in forecasts. Measures of boldness and optimism are each well established in the finance and accounting literature (Hong, Kubik, & Solomon, 2000; Ke & Yu, 2006) and represent how bold or optimistic analyst forecasts are relative to the consensus. Examining the similarity within these measures in the unit is indicative of internal social capital as it reflects the degree to which norms and values are shared in the unit. Bold forecasts have been suggested to include an enhanced level of private information (Clement & Tse, 2005) and if analysts within a unit are similarly bold it implies that they are socially closer and share more information than those in another unit where there is more variability in boldness. Optimistic forecasts have been shown to relate to within firm incentives based on relationships (Libby, Hunton, Tan, & Seybert, 2008) and if analysts within a unit are similar in how optimistic (or pessimistic) they are relative to the consensus, then there is overlap in thought and analysis that may result from a close-knit working group that shares values and procedures. Secondly, I create a

measure of overlapping firm tenure to include as an indicator of *internal social capital* as the time together allows for shared experience that has been suggested to relate to a “collective mind” (Berman et al., 2002) indicative of strong ties within a group.

Overlapping firm tenure of unit members, related to relationship stability, is measured as the relative amount of time that individuals have worked together in the firm (Harris et al., 2012). Internal social capital has been measured in past studies through counts of internal ties (Balkundi & Harrison, 2006) and through capturing shared norms via survey questions on feelings in the work environment (Hughes, Morgan, Ireland, & Hughes, 2014).

I measured the latent variable *potential absorptive capacity* by looking at the mean of timeliness and frequency of forecast reporting in the unit. These measures are also prominent in the finance and accounting literature (Clement & Tse, 2005) and represent how frequently forecasts are issued as well as how timely they are issued relative to the consensus. *Timeliness* is calculated as the number of days between an analyst’s forecast and forecasts from other analysts covering the same firm and considers the time period both before and after the analyst report is released. Timeliness has been shown to relate to analysts that lead in information processing, with increased timeliness representing greater aptitude in collecting and understanding information (Cooper, Day, & Lewis, 2001). In this way, analysts may either “lead” or “lag” relative to the consensus. *Frequency* of forecast reports is calculated as the total number of reports issued in the time period by analysts in the unit. Frequency has been suggested to relate to analyst capacity to incorporate the latest information into forecast reports (Jacob et al.,

1999). As such, a unit's ability to be timely and frequent in forecasting reflects the potential to acquire and assimilate knowledge as part of absorptive capacity.

**Dependent variable.** The final variable is *realized absorptive capacity* measured as unit-level performance in regards to forecast accuracy for the unit which reflects the aggregate ability of the analysts in the unit to collect, understand, process, and incorporate information in an effective manner. The ability to realize absorptive capacity from potential absorptive capacity has been described as the actual outcome of incorporating, assimilating, and transforming knowledge (Zahra & George, 2002; Volberda et al., 2010). In this way, realized absorptive capacity is best measured through the use of a variable such as accuracy that explicitly considers the value of information assimilated as opposed to a market-based metric that may obfuscate the nature of knowledge absorption. Accuracy is calculated by comparing forecasted earnings per share to actual earnings per share of the covered company and scaling by price to account for relative differences across companies due to number of shares outstanding when aggregating. This method of measurement is commonly used for performance in the finance and accounting literature (DeFranco and Zhou, 2009; Stickel, 1992). Accuracy represents realized absorptive capacity in that it shows not just productive output but the quality of the unit's ability to transform and exploit knowledge. To explain, forecast accuracy is important to the investment bank since portfolio managers influence stock purchases based on the research that the analysts produce (Groysberg and Lee, 2008). In further support of this, finance and accounting research has shown that accuracy is valued by the investment banks as a main determinant of promotions (Hong et al., 2000), which

underscores the relevance of using it as a performance measure related to the ability to transform and exploit knowledge in this setting.

**Variable aggregation.** The variables for human and social capital are aggregated to the unit level (grouped by analysts within each firm). I calculate unit-level variables by taking the mean, or coefficient of variation where appropriate, of the individuals (analysts) in each respective unit. Using the mean is a common measure of aggregation in the teams literature (Mathieu et al., 2008) while using coefficient of variation is a common measure related to diversity in organizational research (Bedeian & Mossholder, 2000). For example, using coefficient of variation (the ratio of the standard deviation to the mean) provides a more precise measure than simply using the mean due to the degree of diversity that some measures are intended to capture. In the case of measuring internal social capital with respect to variation in boldness of forecasting, the coefficient of variation provides a measure that is representative of unit-level variation in that it accounts for the heterogeneity by summarizing variation in the unit. Lower values represent less variation. On the other hand, using the mean provides a clear depiction of the overall measure within the unit which is used for human capital depth, breadth, and external social capital. For example in regards to external social capital, using the mean for aggregation depicts the unit's overall bridging to outside sources in that it represents the unit's access to outside resources on average. In this way, the mean will provide a measure that is representative of standardized unit-level depth of human capital and external social to compare across units in that it accounts for the average overall value in the unit. Higher values represent greater depth or breadth of human capital and more external social capital. As such, the focus is not on the lowest or highest individual

values but is centered on the unit as a whole, whether the value is derived from a unit where one individual is at the extremes or all members of the unit are similar.

**Control variables.** I implement several controls in the analysis of the unit-level data since performance outcomes can be affected by a variety of factors. To account for temporal changes, I control for year by using dummy variables since the forecasting environment may vary from year to year. Further, I control for investment bank size using the number of analysts within the firm to create the *firm size* variable. Investment bank size may be related to available resources which could bias results.

## **Analysis**

In order to analyze the data set, I employ structural equation modeling (SEM). Specifically, I attempt to implement SEM to test portions of the model that involve latent variables, through the use of directly observable variables (Kline, 1998; Hoyle & Panter, 1995), such is the case with the measures for internal social capital and potential absorptive capacity of the unit. SEM necessitates indicator variables and as explained above, these include overlapping tenure as well as boldness, optimism, timeliness, and frequency of the analyst reports in the unit. Specifically, I use the *sem* command along with the *SEM Builder* in Stata 13 that allows for the use of path diagrams to input models that include latent variables (StataCorp., 2013). Using SEM requires assessment of factor loading and significance values (Shook, Ketchen, Hult, & Kacmar, 2004) and as such I test these before finalizing the model. Further, I reference the goodness-of-fit tests to check for missing paths and model specification (StataCorp., 2013).



## **CHAPTER 5**

### **RESULTS**

In the previous chapter, I outlined the methods to test my hypotheses. In this chapter, I discuss the results of the data analysis. Table 1 presents descriptive statistics while Table 2 presents the correlation matrix for all variables. In terms of human capital, units have analysts with around 4.5 years of experience ( $M = 18.66$  quarters,  $SD = 10.26$ ) that have covered 3 industries ( $M = 3.07$ ,  $SD = 1.22$ ) over the course of their careers, on average. In looking at the control variables, the average unit has 17 analysts ( $M = 17.19$ ,  $SD = 20.96$ ) that issue 10 reports ( $M = 10.68$ ,  $SD = 5.31$ ) and cover 140 firms ( $M = 140.55$ ,  $SD = 187.43$ ), which shows there are investment banks of varying size in the sample. There were no issues with multi-collinearity, with overall VIF ( $M = 4.55$ ) and all individual variable VIFs ( $\max = 3.83$ ) under the recommended threshold of 10 (Wooldridge, 2002). Although it is noteworthy that firm size is correlated with external social capital at 0.73, and that the correlation between internal social capital and human capital depth is 0.59, with both being rooted in notions of tenure. Human capital depth as well as external social capital measures are positively correlated with realized absorptive capacity, while human capital breadth is negatively correlated with realized absorptive capacity. Histograms of the focal variables reveal that data is not normally distributed (please see Appendix C for more information).

#### **Structural Equation Modeling Analysis**

In order to analyze the data, I used Stata version 13 to run structural equation models (SEM). As such, I performed a number of exploratory analyses prior to running the full models. In addition to examining the summary statistics, correlations, and

histograms as previously outlined, I also tested for reliability via Cronbach's alpha and checked for convergent and discriminant validity through exploratory factor analysis. In regards to the two latent variables in the model, *potential absorptive capacity* and *internal social capital*, I had to revise variables inclusion and composition in order to run the structural model.

For example, the originally proposed operationalization of the *internal social capital* latent variable included the coefficient of variation of both boldness and optimism as well as overlapping tenure. Exploratory analysis revealed that these indicators represent different constructs in that the similarity in forecasting, measured as variation in boldness (or optimism) of earnings per share forecast does not align with overlapping tenure in a way that can coalesce to one measure of internal social capital. Together these factors did not meet loading requirements for neither convergent nor discriminant validity (all loading under 0.45 for convergent and different factors for discriminant). This may be partly attributed to the multiple notions of social capital that relate to norms and values as opposed to bonding or familiarity. After reviewing the theory in conjunction with the analysis that showed a Cronbach's alpha of 0.3288 (much lower than the standard of 0.70 or the minimal acceptable level of 0.50; Gaskin, 2012) these variables were treated as two separate measures, with *internal social capital norms* capturing variance in boldness of forecasting and *internal social capital overlap* capturing the amount of shared time together in the unit.

Further, the originally proposed operationalization of *potential absorptive capacity* only included *timeliness* and *frequency* of reporting. However, additional exploratory analyses and a review of the hypothesized theory led to the revision that this

measure should not focus on capturing the logistical ability to potentially realize outcomes, but the requisite knowledge enhancing resources that make absorptive capacity possible, such as human and social capital. Indeed, past research has measured absorptive capacity through the use of survey questions capturing the self-reported amount of outside knowledge used in the unit (Minbaeva, Pedersen, Björkman, Fey, & Park, 2003), other questions inquiring on interactions and meetings with firm outsiders and frequency of discussion as to how to learn from past and exploit knowledge (Jansen et al., 2005; Hughes et al., 2014), and through the counting of patents where firms cite outside firms (Vasudeva & Anand, 2011). Therefore, I revised this measure to more accurately capture the potential absorptive capacity founded on human and social capital. As such, the results for reliability for *potential absorptive capacity* as measured by *human capital depth*, *human capital breadth*, and *external social capital* were at 0.17, which is less than the recommended level of Cronbach's alpha of 0.70 (Gaskin, 2012), however *human capital depth* and *external social capital* did load on the same factor representing some level of convergent validity (loadings above 0.50). Further, in terms of discriminant validity, there were some issues with factor cross-loadings with respect to *human capital depth* and *internal social capital overlap* which is not surprising in that these two variables both take into account the longevity of career whether with respect to the analyst occupation or investment bank.

I also examined modification indices, however SEM best practices recommend that theory should take precedence over implementing model revisions to purely improve the model from a statistical standpoint, particularly if it goes against hypothesized associations (Kenny, 2014; Gaskin, 2012). It is important to note that a MIMIC (multiple

indicators, multiple paths) model is warranted due to the way in which the latent construct of *potential absorptive capacity* should be measured. I modeled potential absorptive capacity as a formative construct to align with my theory outlined in Chapter 3 that is based on emergence theory which assumes that absorptive capacity is founded on human and social capital. A formative construct is based on items that are not interchangeable in that variation in these measured variables relates to variation in the latent constructs, whereas a reflective construct refers to the latent variable being the cause of the measured variables, which are generally interchangeable with one another (Kline, 1998; Edwards, 2010).

In moving from exploratory to confirmatory factor analysis in regards to the SEM model, some revisions were necessary to derive estimates. I ran several models, starting with the default observed information matrix. However, I implemented robust standard errors as opposed to the default of maximum likelihood due to violations of normality. Although the measurement model did show some positive results linking human capital and external social capital to the latent construct of potential absorptive capacity and the structural model produced results positively linking internal social capital to realized absorptive capacity, these results should not be interpreted and therefore are not discussed further due to poor model fit. The goodness of fit tests indicated that many statistics were not within the desired ranges (Bollen & Long, 1993; Hu & Bentler, 1999). For example, the root mean square error of approximation (RMSEA) was 0.267 which is above the desired level of 0.06, the comparative fit index (CFI) was at 0.619 which is below the acceptable cut off of 0.95, and the standardized root mean squared residual

(SRMR) was 0.109 above the acceptable cut off of being less than 0.08. Thus interpreting the structural model is not fruitful.

As such, further modifications to the model could improve fit, but are not warranted due to conformance with the theoretical model, underlying issues in the data sample, and previously detailed issues with latent variable reliability and validity. In terms of the underlying data, in addition to already mentioned violations of normality as evidenced in histograms there is also no strong evidence of linear relationships when scatterplots are referenced (please see Appendix D for more detail). As such, supplemental analysis outside of SEM was warranted to further investigate the proposed theory with this data set.

### **Supplementary Regression Analysis**

In Chapter 3, I outlined several hypotheses associating human and social capital with potential and realized absorptive capacity. Since the structural model did not result in interpretable results, I explored the direct relationships between the measured constructs via simpler regression techniques without the consideration of latent variables in the model. It is unfortunate that the analysis is not able to capture the latent variables, and therefore cannot fully test the hypotheses concerning the association between human capital depth, breadth, or external social capital to potential absorptive capacity or internal social capital. However, regression analysis shed light on the associations between human and social capital independent variables to the dependent variable of realized absorptive capacity captured as unit-level performance in accuracy of forecasting. In this way, this supplemental analysis sought to examine the association between the human and social capital constructs with realized absorptive capacity: the

proposed theoretical mechanisms that ties them together, then, are potential absorptive capacity and internal social capital.

The supplemental analysis was performed through the use of Stata 13 and the *xtreg* command to perform random effects regression, which allows for interpreting differences across units while also taking into account potential intragroup correlation issues due to repeated observations on firm (Rabe-Heketh & Skrondal, 2012; StataCorp., 2013). Using *xtreg* with random effects takes into account the panel nature of the data with respect to time period and firm, and includes the generalized least squares (GLS) estimator that leverages a matrix-weighted average of between and within effects (Stata, 2013). However, I first ran fixed effects regression and performed a Hausman specification test to ensure that random effects is the most efficient estimator (Kennedy, 2008). The results of the test that the differences in coefficients were not systemic was not significant (P-value, Prob > Chi-square = 0.1126), therefore I use random effects to analyze the data, which is an unbalanced panel data set on quarter and unit (Wooldridge, 2002).

Table 3 reports the results of the random effect regression of *realized absorptive capacity* measured as unit-level performance. Model 1 includes the *firm size* control variable captured as number of analysts in the unit. I further include report *frequency* and *timeliness* as controls in this supplemental analysis due to their relevance to potentially realizing outcomes as described in the variables section of the methods chapter. In Model 2, I added the human capital measures and the results show that *human capital depth* has a statistically significant positive association with unit-level performance ( $\beta = 0.047, p < 0.01$ ), while *human capital breadth* has a statistically significant negative

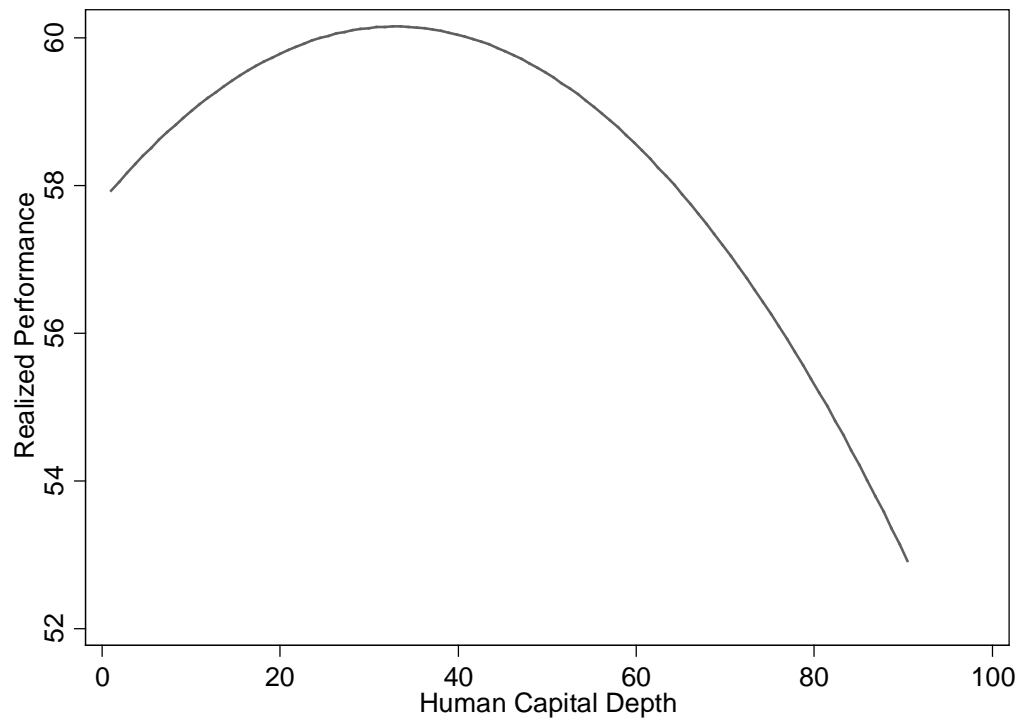
association with unit-level performance ( $\beta = -0.481, p < 0.01$ ). This provides support for the notion that more depth and less breadth of human capital in the unit positively relate to realized absorptive capacity. In Model 3, I added the remaining social capital variables and the results from Model 2 for human capital breadth hold while those for human capital depth do not. Further, *external social capital* as well as *internal social capital norms* and *internal social capital overlap* all positively relate to unit-level performance ( $\beta = 0.015, \beta = 0.082, \beta = 0.138$ , respectively all at  $p < 0.01$ ). This provides support for the notion that external social capital, as well as overlapping tenure, positively relate to realized absorptive capacity. However, it is interesting to note that since the measure for internal social capital in terms of norms is based on a coefficient of variation calculation, higher values relate to higher variation. Thus, more variation in norms of forecasting relate positively to realized performance outcomes.

Finally, Model 4 includes all controls and social capital measures along with the quadratic term for both human capital depth and breadth. I include the quadratic term in order to test for curvilinear effects. That is, the association between human capital and absorptive capacity, as outlined in the theoretical development, may not be a simple linear relationship. Rather, a curved line may better represent these associations. The results for the social capital variables hold and the quadratic terms show that both depth and breadth have non-linear associations with performance. Specifically, the linear term for *human capital depth* has a statistically significant positive association with unit-level performance ( $\beta = 0.078, p < 0.05$ ), while the quadratic term for *human capital depth* has a statistically significant negative association with unit-level performance ( $\beta = -0.002, p < 0.01$ ). Further, the linear term for *human capital breadth* has a statistically significant

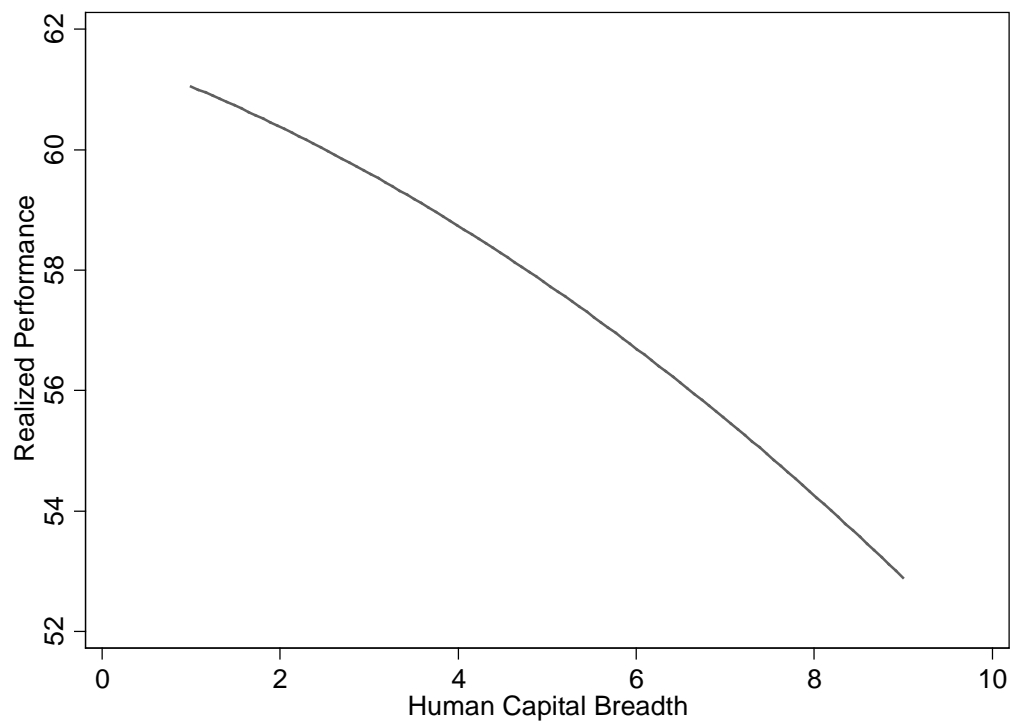
negative association with unit-level performance ( $\beta = -1.605, p < 0.01$ ), while the quadratic term for *human capital breadth* has a statistically significant positive association with unit-level performance ( $\beta = 0.119, p < 0.05$ ). This provides support for the notion that there are boundaries to the positive association that human capital has with performance. Please see Figures 5 and 6 for visual representations of these associations.



**Figure 5: Association between Human Capital Depth and Unit-level Performance**



**Figure 6: Association between Human Capital Breadth and Unit-level Performance**



In further interpreting these results it is helpful to analyze what the coefficients mean in terms of performance outcomes for the unit-level human capital resource. The dependent variable measures accuracy on a scale of 0 to 100; thus the small coefficients should be interpreted relative to the significant impact on performance. For example, in terms of human capital depth, it takes an additional 3 years of experience to increase performance by 1% (i.e. 12.8 quarters of experience on average in the unit would increase accuracy by 1 on the scale of 0 to 100). In looking at Figure 5, we see that this tapers off around 10 years (40 quarters) and it is at this point that additional depth is negatively associated with unit-level performance. Alternatively, in terms of human capital breadth, the more industries covered on average by a unit, the greater the negative association with unit-level performance as displayed in Figure 6. As such, if a unit increased in coverage experience by an additional industry, the associated decrease in performance would be 1.6%. For example, if comparing a unit that has human capital breadth of 2 with a unit that has 5, there could be nearly a 5% difference in performance between the two units to the detriment of the unit with greater breadth. Further, in terms of external social capital, it would take an additional 66 contacts on average to relate to a 1% increase in performance. Through this approach, we can interpret these results in a more meaningful way by comparing the implication of these independent variables relative to the dependent variable in light of economic significance.

In summary, although the structural model does not yield the anticipated results based on the theory in Chapter 3, the supplementary regression analysis does provide insights into the direct associations between the constructs of human and social capital

with realized performance outcomes. This is particularly important with respect to the hypotheses on the association between human capital depth, breadth, and external social capital to potential and realized absorptive capacity (Hypotheses 4-7). Although the hypotheses are broken out where human and social capital relate to potential absorptive capacity, which in turn is theorized to relate to realized absorptive capacity in a separate hypothesis, there is evidence in the supplemental analysis that suggests that the hypothesized associations are present, albeit with the presumed theoretical mechanism of potential absorptive capacity underlying these relations. For example, human capital depth does have a positive curvilinear relationship to performance that turns negative after a point in time, whereas human capital breadth has a contradicting association to performance where more variety can decrease performance after a point. Further, external social capital was found to positively associate with performance and the association between internal social capital and performance is complex with more variation in norms and overlapping tenure relating to increased performance. Overall, some results do suggest support for theorized associations from the theoretical model, although the empirical methods did not allow for full testing of the previously hypothesized relationships. I discuss potential alternative explanations, implications, and future avenues for exploration in the next chapter.

## **CHAPTER 6**

### **DISCUSSION AND CONCLUSION**

In the previous chapter I detailed the results of the empirical analysis that tested the theory outlined in Chapter 3. In this final chapter, I re-examine my proposed theory in light of the findings. As such, I first review my theoretical model in regards to empirical support from the analysis in terms of what was supported. In particular, I discuss implications of the results from the originally proposed structural equation modeling (SEM) and the supplementary regression analysis. Overall, the theory introduced in this dissertation, as well as the empirical analysis, has led to many unanswered questions as to how human capital, social capital, and absorptive capacity relate to one another in addition to question on the most appropriate methodological approaches to investigate the emergent human capital resource. However, my results do start to unpack some of these associations and show support for the notion that variation in human capital depth, breadth, and social capital differentially relate to unit-level realized performance. Therefore, I also discuss the contribution of these findings. Lastly, I discuss potential limitations and conclusions from the analysis.

#### **Discussion**

The model proposed in Chapter 3 outlined how the emergent unit-level human capital resource encompasses the individually-rooted components of human capital depth and breadth, in addition to external social capital, while simultaneously being categorized by the collective resources and capabilities of internal social capital and potential absorptive capacity. Specifically, I argued that variation in the human and social capital of individuals leads to variation in the unit-level resource, however, it is not always a

simple association to performance as the emergent resource has its own idiosyncratic internal social capital and potential absorptive capacity that can impact how human capital is deployed. I based these arguments on multi-level human capital theory that posits the collective resource is rooted in individual KSAOs (Ployhart & Moliterno, 2011), social capital research that delineates between internal and external, as well as individual and unit-level access to resources through relationships (Payne et al., 2010), and the extant work on absorptive capacity regarding the collective ability to internalize and leverage knowledge, particularly recent calls to better understand microfoundational antecedents (Volberda et al., 2011). I developed hypotheses regarding how human capital breadth, depth, and social capital each differentially relate to both internal social capital and potential absorptive capacity, which in turn impact realized absorptive capacity of the emergent, unit-level resource.

In the results chapter, I detailed the supplemental analysis that was necessary to test several notions embedded in my theory. The fact that the SEM model did not come to fruition limits my ability to make any conclusions directly concerning potential absorptive capacity as a latent construct. However, the poor model fit in SEM is interesting in that it shows how challenging it can be to empirically investigate latent constructs affiliated with intangible resources. Further, the supplemental regression analysis does offer insight to the association between human and social capital to realized performance outcomes. In this way, potential absorptive capacity is the underlying theoretical mechanism, however direct findings on this latent component of the model remain inconclusive.

As outlined in the previous chapter, not all hypotheses were fully testable or supported. However, there were some interesting and statistically significant findings in the supplemental analysis. The chapter on theory development outlined several hypotheses, the first concerned human capital depth, breadth, and external social capital and the association to internal social capital (Hypotheses 1-3). The second set of hypotheses concerned human capital depth, breadth, and external social capital and the association to potential absorptive capacity (Hypotheses 4-6). Finally the last set concerned the association between internal social capital and potential absorptive capacity to realized absorptive capacity (Hypothesis 7). Since the supplemental analysis performed with regression was not able to include the latent variables from SEM, I instead tested the direct relationships between human capital depth, breadth, and social capital to realized absorptive capacity, captured as unit-level performance to investigate the proposed theory. In this way the underlying theory of the hypotheses remains similar, however the latent constructs are not included in the supplementary analysis.

First, I find that human capital depth in the unit, as measured by occupational experience, relates positively and significantly to unit-level realized absorptive capacity. However, it is interesting to note that this relationship is curvilinear (as depicted in Figure 5) in that after a certain amount of time of average experience in the emergent human capital resource, the association turns negative. Next, I find that human capital breadth, as measured by variety of task, is negatively and significantly associated with unit-level realized absorptive capacity. This relationship is also non-linear (as depicted in Figure 6), although in a downward direction where performance declines as additional variation in task experience, measured as industries covered, increases. Further, I find partial

support that more human capital depth and breadth is associated with higher levels of internal variation in norms and overlap while the relationship between external and internal social capital is more complex warranting further analysis. These findings, with regard to human capital depth and breadth, contribute to our understanding of how combining different facets of knowledge, skills, and abilities in the emergent unit-level resource may have differential impact on realized performance outcomes.

The findings support the theory that components of the emergent resource, namely human capital depth and breadth, indeed relate to realized absorptive capacity in multifaceted ways. For example, Hypotheses 1 and 5 posited that more depth would enhance both latent constructs of internal social capital and potential absorptive capacity but that there could be a decline at very high levels of depth on outcomes. In that human capital depth relates to unit-level realized absorptive capacity in a positive (then negative) curvilinear association there is support for the notion that increased levels of depth enhance the capabilities of the emergent resource up to a point. Similarly, Hypotheses 2 and 4 posited that the impact from breadth would generally be negative on internal social capital or be positive at lower levels while turning negative at higher levels on potential absorptive capacity. In that human capital breadth relates to unit-level performance in a way that more task variety is negatively associated with unit-level performance, there is support for the notion that increased breadth can hinder capability development in the unit. As such, these findings provide partial support for the hypothesized associations presented in Chapter 3. Furthermore, in viewing human capital in terms of depth of occupation and breadth of task, the conversation is refocused on unit-relevant knowledge,

skills, and abilities, regardless of whether they were honed in the focal current firm or more broadly in the industry.

Additionally, I find that external social capital, as measured by degree centrality, is positively and significantly related to unit-level performance. This supports the theory that access to resources through relationships, such as external knowledge via contact in the industry, may enhance the emergent human capital resource's level of potential absorptive capacity. Hypothesis 6 concerned external social capital positively impacting potential absorptive capacity. This finding, that external social capital is positively associated with performance, helps shed light on the integration of resources accessed through relationships to the emergent unit-level resource.

Lastly, these findings, along with the findings related to internal social capital, are in large part consistent with the arguments presented in the final set of hypotheses (H7) regarding the complex influence of potential absorptive capacity on realized absorptive capacity in light of internal social capital. As explained previously, internal social capital in this study has two separate components. The first, concerning shared norms, as captured by similarity in forecasting, is positively and significantly associated with unit-level performance. The second, concerning overlapping tenure, is also positively and significantly associated with unit-level performance. These findings, taken together provide support for the notion that the internal ties embedded in the emergent unit-level human capital resource are related to performance. However, it is important to note that while the association to overlapping tenure suggests that increased time together helps performance, perhaps due to familiarity, the association to norms of similarity in forecasting suggests that more variation in norms helps performance. Alternatively, this



could be interpreted as the worst performance coming from those units where all analysts are similar in having high levels of boldness. This is particularly interesting in light of the theory for Hypothesis 7 that discusses the complex relation between social integration and realized outcomes. Particularly, overlapping tenure does not necessarily imply cohesion but it may imply familiarity that eases the deployment of human capital in realizing absorptive capacity. Similarly, variation in norms, while contrary to the notion of benefits from sharing similar task processes, may instead impact performance through variation that guards against groupthink. Alternatively, in units where the coefficient of variation of boldness is higher, with a corresponding high mean and low variance, there could be limits to having shared norms in that performance could suffer. Indeed, these findings shed light on the theoretical model outlined in this dissertation as to the antecedents of absorptive capacity and the outcomes of human and social capital.

While the current findings help us to better understand the theory presented in Chapter 3, they also raise additional questions regarding more multifaceted associations not fully captured here. First, through including additional contextual constraints on emergence, particularly the consideration of task environment with respect to complexity or interdependence, there could be a more complete view of the emergent human capital resource. For example, results in this context may be different for those units that include star knowledge workers or perhaps for those where the task of earnings per share forecasting is focused on firms with varying levels of research and development or mergers and acquisitions activities. Not only would the inclusion of additional contextual constraints build on the results of the current study, but it could also open up deeper inquiry into complementary and substitutive resources. Second, along the same lines,

more can be done to discover at what point there may be negative complementarities or benefits from substitutive resources. For example, investigations as to how a reduction in one component of the emergent resource relates to variation in impact from another component and how there may be optimal levels of social or human capital under different conditions would be insightful. Third, and relatedly, there could be conditions under which human and social capital are destroyed which could be associated with absorptive capacity. For example, social capital could be stifled internally in the case of silos or externally in the case of the competitive landscape. Similarly, limited need for absorptive capacity by the firm could lessen the need for those in the unit to practice certain skills or abilities, and as such destroy human capital.

Apart from those outlined above, this study raises several questions specifically regarding social capital. For example, the measure of external social capital used in this study, degree centrality, could be enhanced through a more advanced, yet technically complicated measure such as eigenvector centrality (Bonacich, 1987) which would capture the exponential power of well-connected ties. However, both of these measures may similarly indicate the advantage of being associated with one of the larger investment banks. In this way, there are limits to studying external social capital in terms of ties exclusively within the industry. Regardless of which of these measures is more meaningful in this context, there remains the question of whether using centrality calculations are appropriate for two-mode affiliation data such as that in this sample (Borgatti & Halgin, 2011, Grund & Hedstrom, 2015). Contrary to one-mode social network analysis, in which research focuses on ties reported among individuals (i.e. organized in an adjacency matrix), the data in this study is two-mode in that individuals

are linked to other individuals only through affiliation with firms (i.e. organized in an affiliation matrix). As such, it should be considered whether the notion of affiliation networks in which two people have merely attended the same event is similarly as valuable as a self-report advice network in which two people are known to share resources. Separately, internal social capital in the form of overlapping tenure may have different issues in that it could be confounded with longer tenure as an analyst in general, or that it could indicate familiarity as opposed to actual bonding. Likewise, internal social capital in the form of shared norms in forecasting could have complications in that it could relate to an individual outlook or risk preference as opposed to following the same practices and procedures. In sum, in terms of social capital in general, both external and internal, it is often difficult to determine if individual actors do indeed share valuable resources to enhance performance.

Lastly, in theorizing about human capital and absorptive capacity there could be an alternative theoretical and modeling approach, touched upon in the discussion around modeling constructs as formative or reflective in the results section on structural equation model. Indeed, an alternative explanation is that instead of human and social capital impacting absorptive capacity, that absorptive capacity shapes human and social capital. There are likely to be some reciprocal influences with bottom-up and top-down effects present in a more intricate model, but further research is necessary to explore these complex relationships and current methods are limited. Relatedly, there could be additional exogenous factors that could impact human capital, social capital, and absorptive capacity. As such, future research should further explore these questions.

## **Limitations**

Potential limitations of this dissertation, in addition to those already discussed above with respect to future research, include generalizability to other industry settings or task contexts as well as complications in the measurement of intangible and complexly bundled resources and capabilities. While I have tested my theory in a knowledge intensive setting that seemingly relies on human and social capital in realizing performance, there are nonetheless idiosyncrasies to the environment in which the sell side security analysts operate in. For example, another industry could experience evolving regulations or varying reliance on outside and changing knowledge. Further, other occupations may experience varying levels of task interdependence or lower or higher levels of task complexity that could impact results. Moreover, measurement through the use of proxies and archival data lends itself to additional limitations. Several concerns regarding constructs were detailed above in that it is often difficult to detect if the measures based on archival data are reliable, especially in the case of attempting to capture latent construct such as those affiliated with social capital or absorptive capacity. Additionally, clearly partitioning out where human capital and social capital each begin and end can be a challenge. It would be worthwhile to investigate whether these measures would equate to those captured via other means such as through surveys or interviews. More direct measurement of components of the emergent human capital resource could provide clarity and complement the current findings. In summary, studying other types of firms or industries as well as leveraging different methods or measurements may yield additional insights on the emergent unit-level human capital resource.

## **Conclusion**

In conclusion, this dissertation highlights the role of human and social capital in realizing unit-level performance outcomes. The purpose of this dissertation was to investigate the associations between the emergent unit-level human capital resource and realized absorptive capacity. I have aimed to shed light on how potential absorptive capacity is the underlying theoretical mechanism that ties human and social capital to realized performance, yet the relationships within the emergent human capital resource are complex. In this way, I have laid out theory as to how human and social capital founded at the individual level are component to the unit-level resource which is in turn characterized at a collective level by internal social capital and the potential for realizing outcomes. While the idea to integrate human and social capital is not new, this dissertation takes a step in the direction of better understanding the connections, both theoretically and empirically. Further, in linking human capital to absorptive capacity, the work presented here leverages learning theories and continues to build on multi-level human and social capital theories.

The results reveal that there is a complex association among these constructs and more work can be done to understand how human and social capital relate to one another and to performance outcomes as a result of absorptive capacity. This dissertation has sought to explicate the components of the emergent unit-level human capital resource while also investigating the antecedents to collective level resources and capabilities. Examining human capital depth and breadth steers the conversation away from the firm-specific versus generic resources and instead focuses on how attributes embedded in individual resources work together to impact collective performance. Additionally,

examining social capital in the form of external bridging to resources as well as internal variation in norms and overlapping tenure showcases the complexity of deploying resources embedded in people that the firm does not always have control over. Further, in integrating these lower-level constructs with the collective capability of absorptive capacity, there is a step towards reconciling where new and external information comes from and how it is acclimated, assimilated, and realized into the firm for productive purposes. Much motivation for future research comes out of this study and it is my hope that these findings will inspire greater examination of these ideas. In sum, studying the emergent unit-level human capital resource, as well as those components that shape it and those capabilities that characterize it, is a promising area of research in strategy that can provide explanations for variation in performance outcomes.

**Table 1: Descriptive Statistics**

	mean	sd	min	max	kurtosis	skewness
HC Depth	18.66	10.26	1.00	90.50	9.89	1.70
HC Breadth	3.07	1.22	1.00	9.00	5.58	1.10
External SC	70.29	62.20	1.00	392.50	4.95	1.39
Internal SC Norms	76.82	16.06	7.20	244.95	11.85	1.39
Internal SC Overlap	5.06	5.78	1.00	76.00	59.13	6.30
Firm Size	17.19	20.96	2.00	142.00	8.17	2.24
Frequency	10.68	5.31	2.00	51.25	5.98	1.01
Timeliness	0.20	0.09	0.00	0.82	5.08	0.78
Realized AC	59.48	6.69	11.67	100.00	8.35	-0.78
<i>N</i>	5,813					

**Table 2: Correlation of Variables**

	1	2	3	4	5	6	7	8	9
1. HC Depth	1.00								
2. HC Breadth	0.36	1.00							
3. External SC	0.41	-0.05	1.00						
4. Internal SC Norms	-0.03	0.06	-0.04	1.00					
5. Internal SC Overlap	0.59	0.19	-0.04	-0.01	1.00				
6. Firm Size	0.10	-0.14	0.73	0.00	-0.04	1.00			
7. Frequency	0.33	0.06	0.37	-0.20	0.15	0.30	1.00		
8. Timeliness	-0.03	0.08	0.04	0.04	0.00	0.14	0.02	1.00	
9. Realized AC	0.04	-0.16	0.15	0.23	-0.01	0.10	0.13	-0.17	1.00

**Table 3: Random Effects Regression of Unit-level Performance**

	Model 1 Controls	Model 2 HC Only	Model 3 All	Model 4 Squared
Firm Size	0.065*** (0.021)	0.061*** (0.021)	0.074*** (0.020)	0.072*** (0.020)
Frequency	0.071*** (0.027)	0.070** (0.028)	0.148*** (0.027)	0.142*** (0.027)
Timeliness	-7.572*** (1.131)	-7.518*** (1.130)	-6.092*** (1.064)	-6.003*** (1.062)
HC Depth		0.047*** (0.017)	-0.020 (0.021)	0.078** (0.033)
HC Depth Squared				-0.002*** (0.000)
HC Breadth		-0.481*** (0.146)	-0.596*** (0.139)	-1.605*** (0.404)
HC Breadth Squared				0.119** (0.049)
External SC			0.015*** (0.004)	0.015*** (0.004)
Internal SC Overlap			0.082*** (0.029)	0.096*** (0.029)
Internal SC Norms			0.138*** (0.005)	0.138*** (0.005)
Constant	59.987*** (0.534)	60.898*** (0.645)	49.820*** (0.732)	50.781*** (0.922)
Observations	5,813	5,813	5,813	5,813
$R^2$	0.0682	0.0881	0.1571	0.1648
Adjusted $R^2$	0.0676	0.0872	0.1569	0.1639

Standard errors in parentheses

Random effects regression results. Data is from I/B/E/S, CRSP, and COMPUSTAT,

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



## APPENDICES

### APPENDIX A: COMMONLY USED TERMS

**Absorptive capacity** - Ability to identify, internalize, and apply new and external information, can be broken down into potential and realized components (Cohen & Levinthal, 1990; Zahra & George, 2002)

**Breadth of human capital** - Diversity in exposure to experiences; strategically related knowledge, skills, and abilities

**Complementary resources** - Strategically synergistic assets (Adegbesan, 2009; Hess & Rothaermel, 2011)

**Depth of human capital** - Expertise from experience; directly relevant and narrow set of knowledge, skills, and abilities

**Emergence** - The actions and interactions of individuals in a unit (Kozlowski & Klein, 2000; Kozlowski et al., 2013)

**External social capital** – The “bridging” component of social capital that links those within the firm to those outside the firm and the respective resources that may be accessed via the relationship (Burt, 1997; Payne et al., 2011)

**Firm specific human capital** - Those knowledge, skills, and abilities that are applicable to a focal firm (Becker, 1964)

**General human capital** - Those knowledge, skills, and abilities that are applicable across a range of firms; may include task, occupation, or industry specializations (Becker, 1964; Coff & Kryscynski, 2011)

**Human capital** - The knowledge, skills, abilities, and other characteristics embedded in individuals that may be firm specific or general in nature (Becker, 1964; Ployhart & Moliterno, 2011)

**Internal social capital** – The “bonding” component of social capital that links those inside the firm to one another and provides access to resources, may be expressed in similar norms and values (Coleman, 1988; Payne et al., 2011)

**Microfoundations** - Focus on the individual as the source of knowledge and firm level advantages (Felin & Foss, 2005; Barney & Felin, 2013)

**Potential absorptive capacity** – The component of absorptive capacity that refers to the acquisition and assimilation of outside knowledge (Zahra & George, 2002)

**Realized absorptive capacity** - The component of absorptive capacity that refers to the transformation and exploitation of outside knowledge (Zahra & George, 2002)

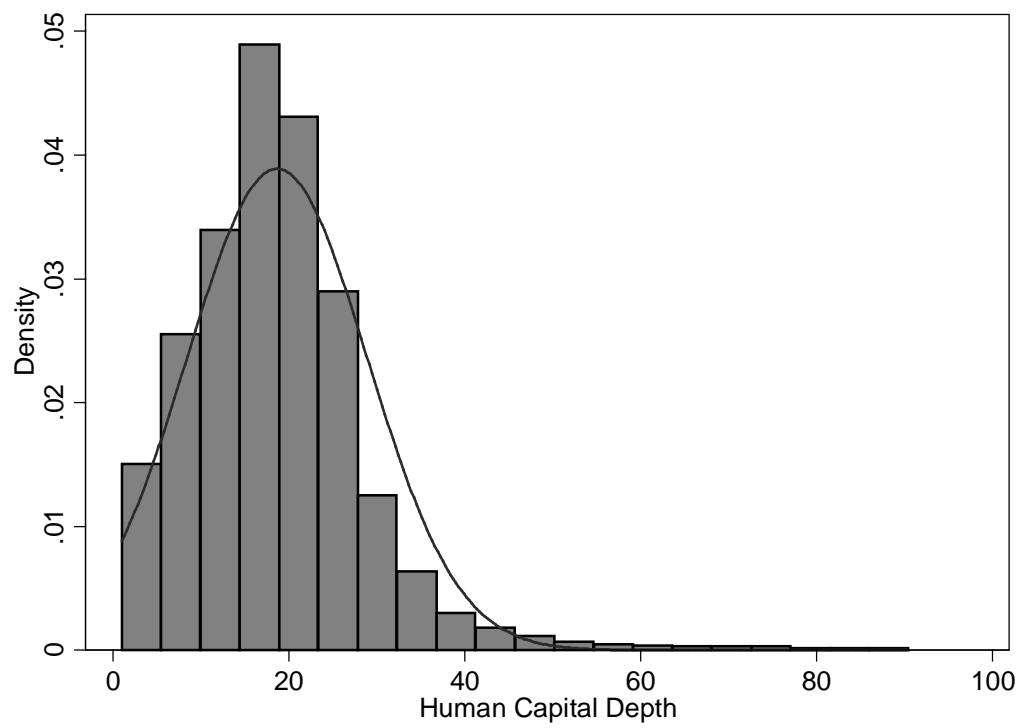
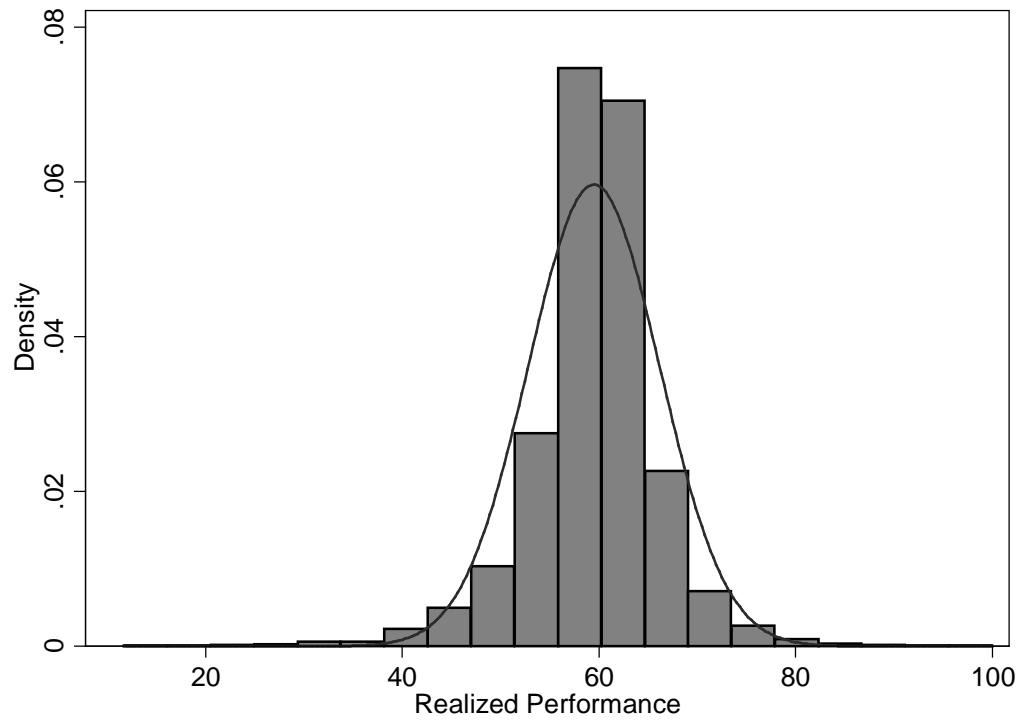
**Social capital** - Access to resources through relationships, may take on the form of external or internal and be at an individual or collective level (Coleman, 1988; Lin, 2001; Adler & Kwon, 2002; Payne et al., 2011)

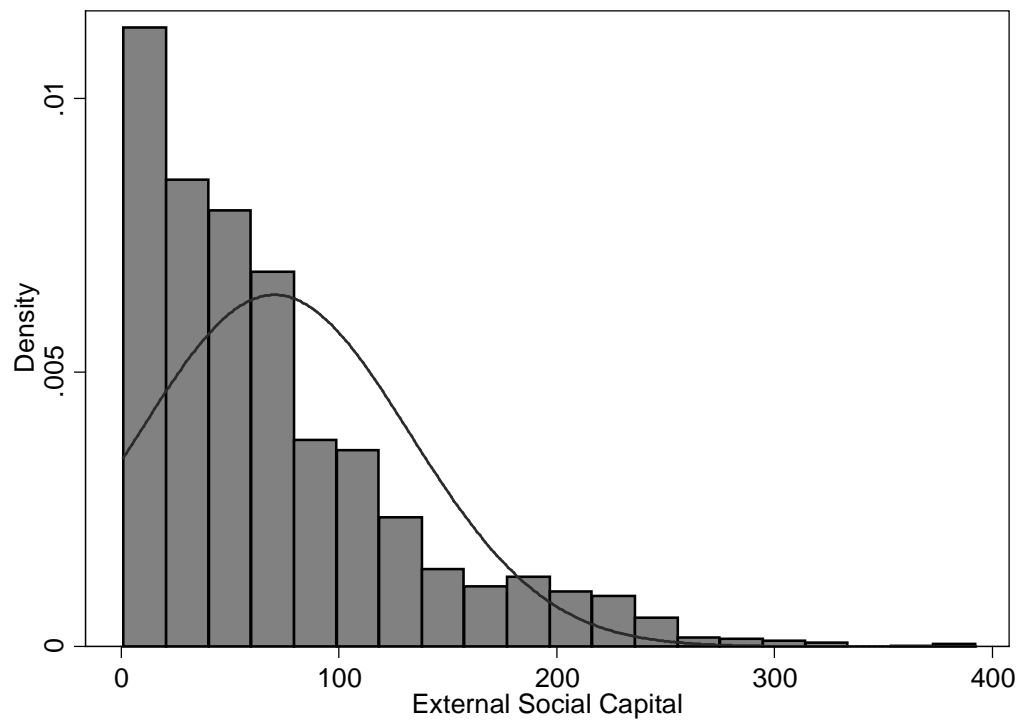
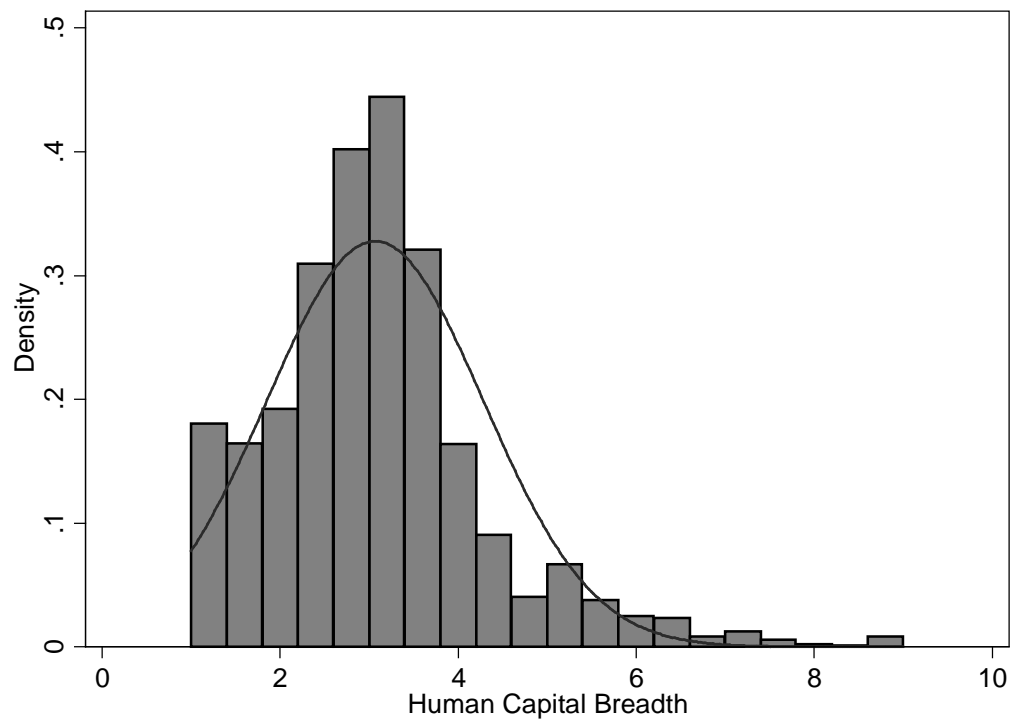
**Substitutive resources** - Strategically redundant assets (Hess & Rothaermel, 2011)

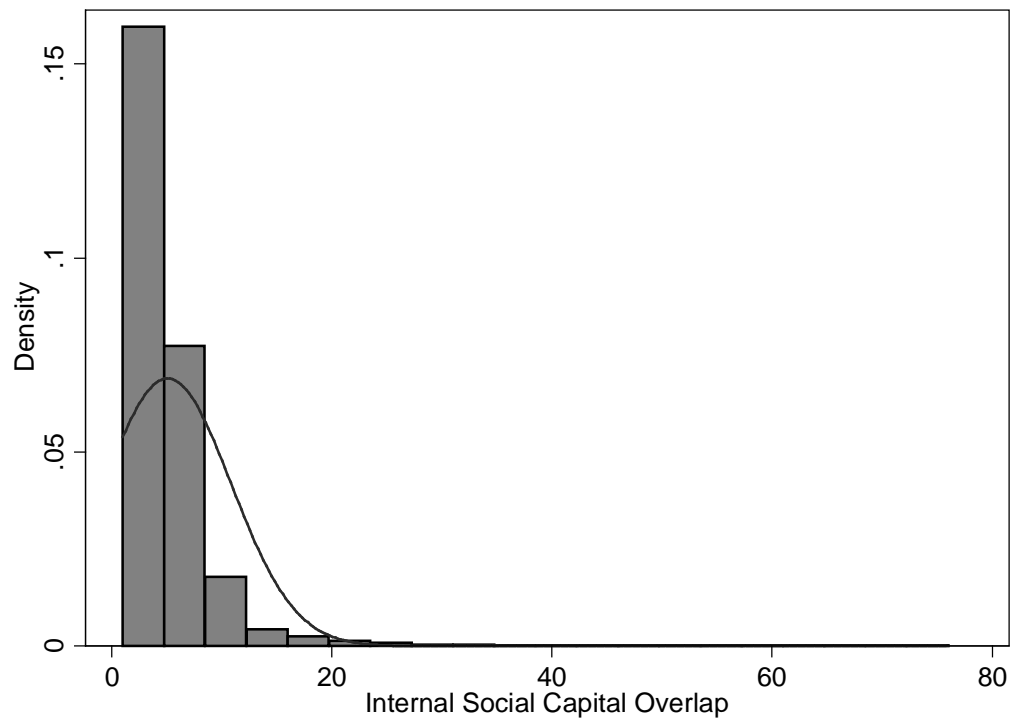
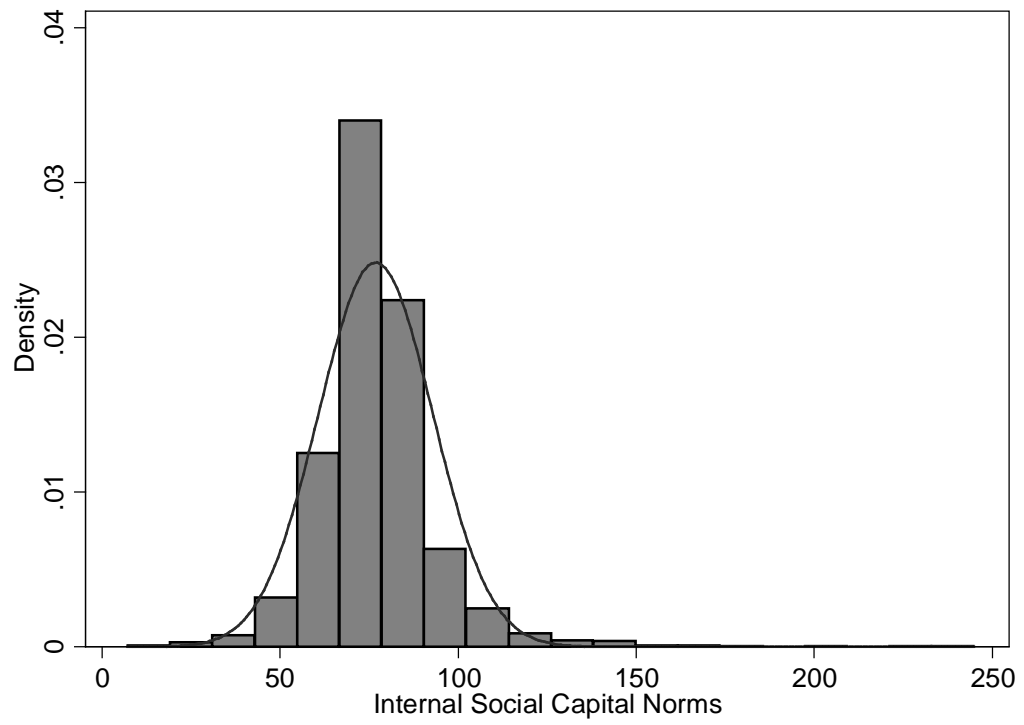
**APPENDIX B:**  
**FAMA AND FRENCH CLASSIFICATION AND STANDARD INDUSTRY**  
**CLASSIFICATION CODES**

<b>Fama and French Industry Group</b>	<b>Standard Industry Classification Codes</b>
Consumer Non Durables – Food, Tobacco, Textiles, Apparel, Leather, Toys	0100-0999, 2000-2399, 2700-2749, 2770-2799, 3100-3199, 3940-3989
Consumer Durables – Cars, TV's, Furniture, Household Appliances	2500-2519, 2590-2599, 3630-3659, 3710-3711, 3714-3714, 3716-3716, 3750-3751, 3792-3792, 3900-3939, 3990-3999
Manufacturing – Machinery, Trucks, Planes, Office Furniture, Paper, Com Printing	2520-2589, 2600-2699, 2750-2769, 3000-3099, 3200-3569, 3580-3629, 3700-3709, 3712-3713, 3715-3715, 3717-3749, 3752-3791, 3793-3799, 3830-3839, 3860-3899
Energy – Oil, Gas, and Coal Extraction and Products	1200-1399, 2900-2999
Chemicals – Chemicals and Allied Products	2800-2829, 2840-2899
Business Equipment – Computers, Software, and Electronic Equipment	3570-3579, 3660-3692, 3694-3699, 3810-3829, 7370-7379
Telecom – Telephone and Television Transmission	4800-4899
Utilities – Utilities	4900-4949
Shops – Wholesale, Retail, and Some Services (Laundries, Repair Shops)	5000-5999, 7200-7299, 7600-7699
Health – Healthcare, Medical Equipment, and Drugs	2830-2839, 3693-3693, 3840-3859, 8000-8099
Money – Finance	6000-6999
Other – Mines, Construction, BldMt, Trans, Hotels, Bus Services, Entertainment	All other codes

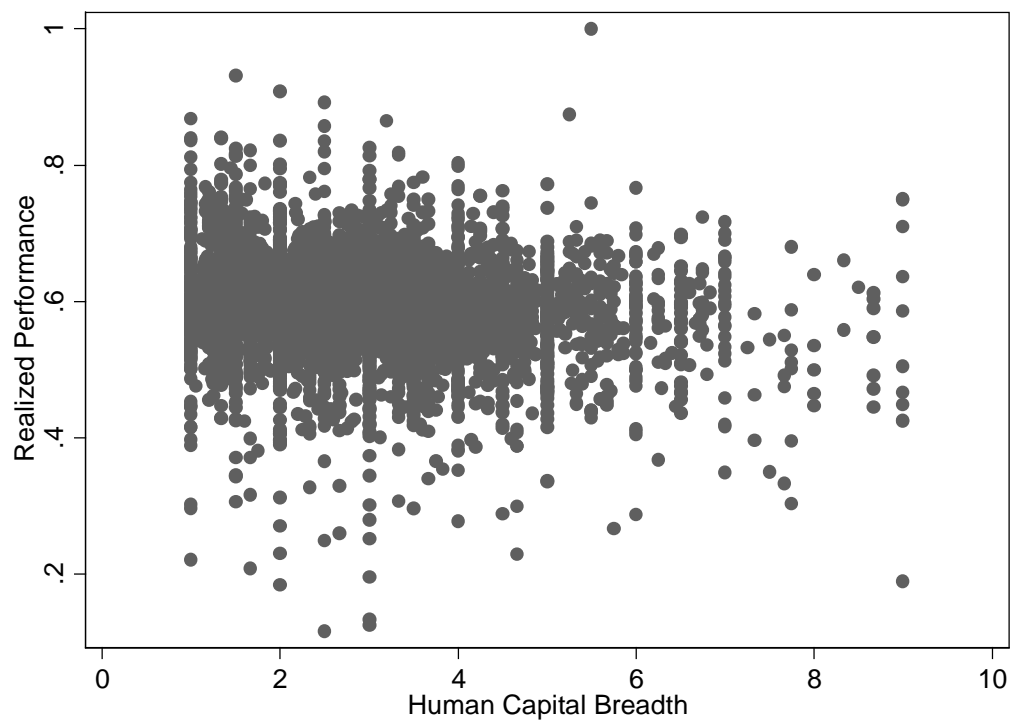
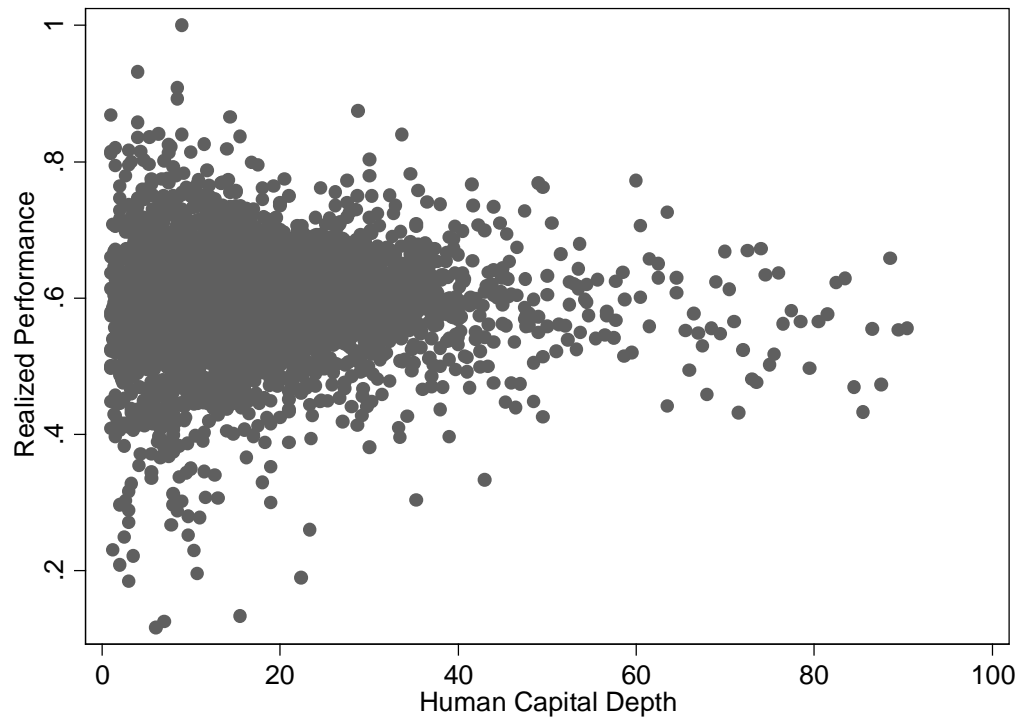
## APPENDIX C: HISTOGRAMS

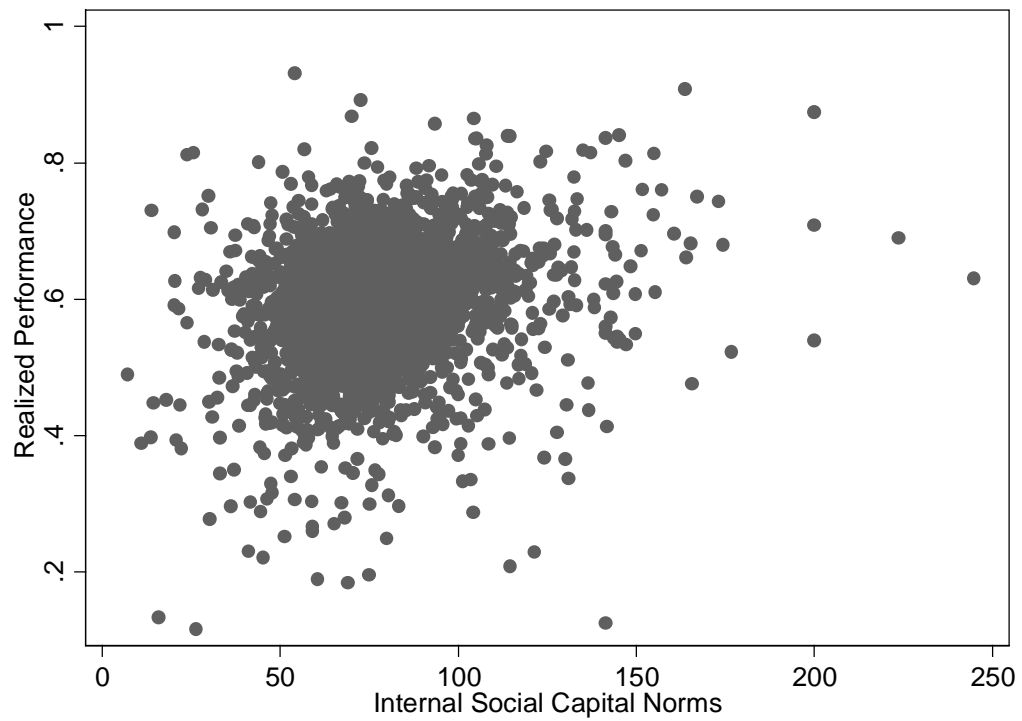
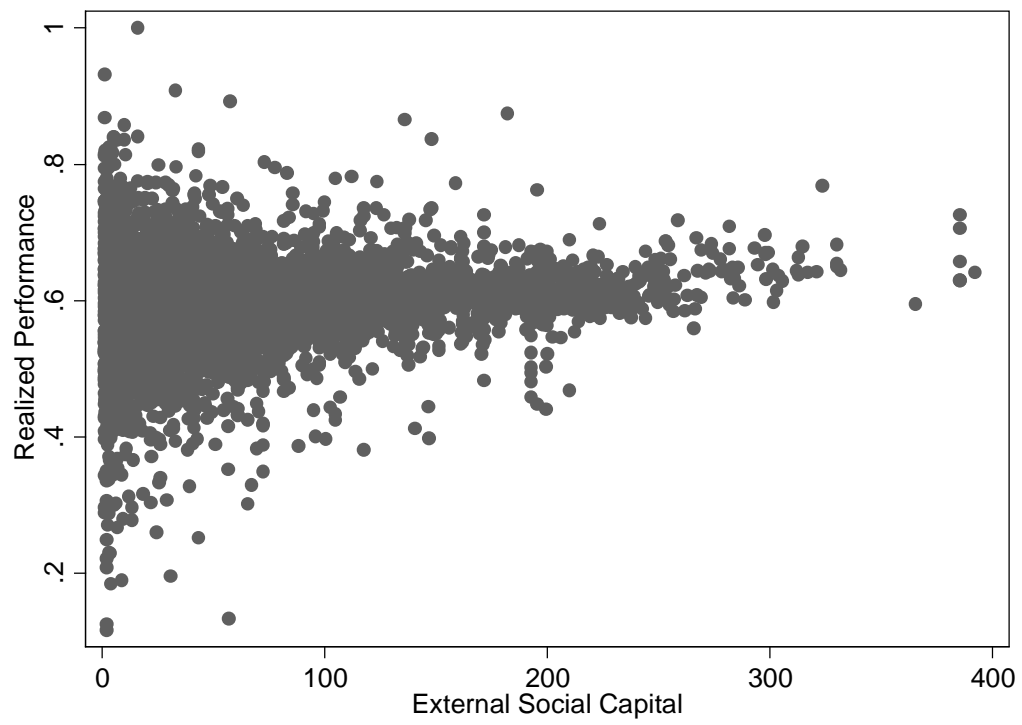




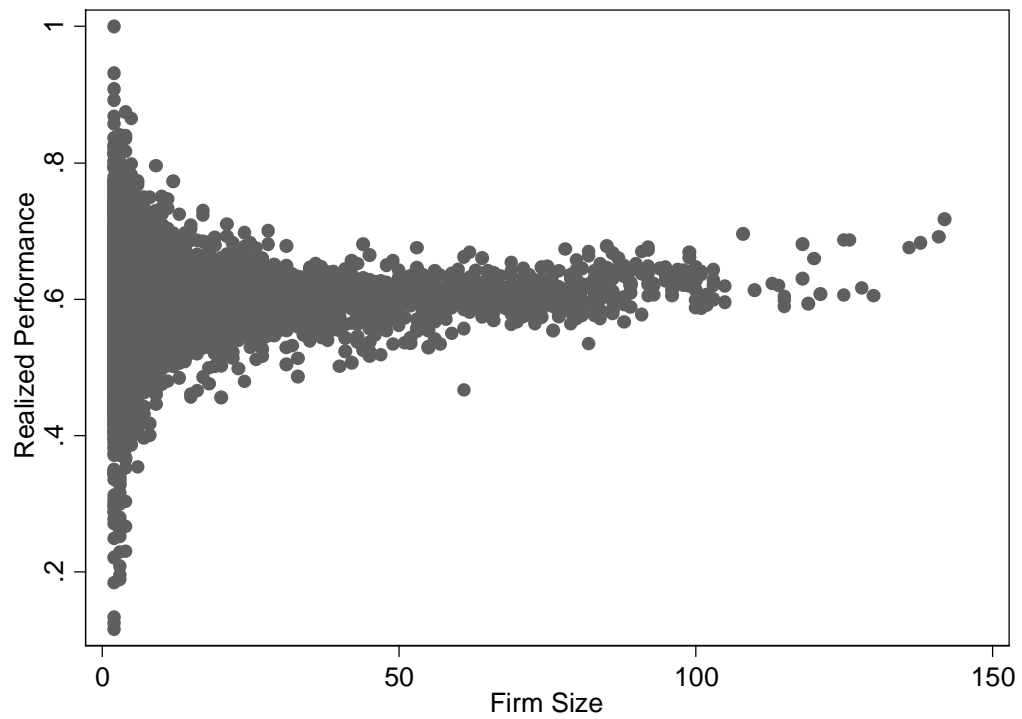
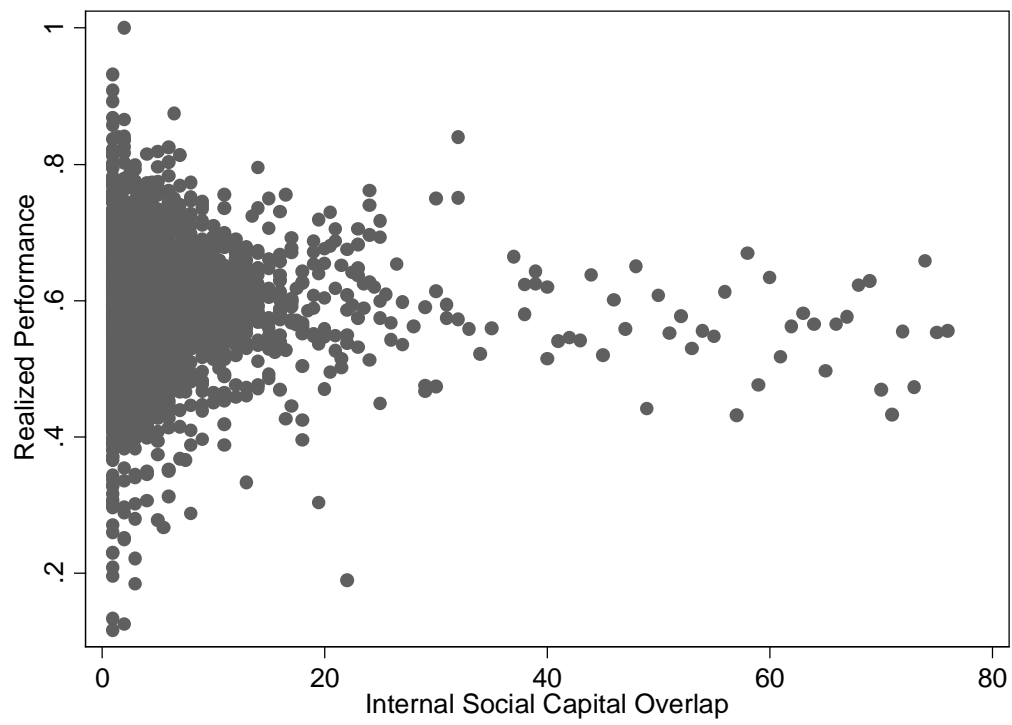


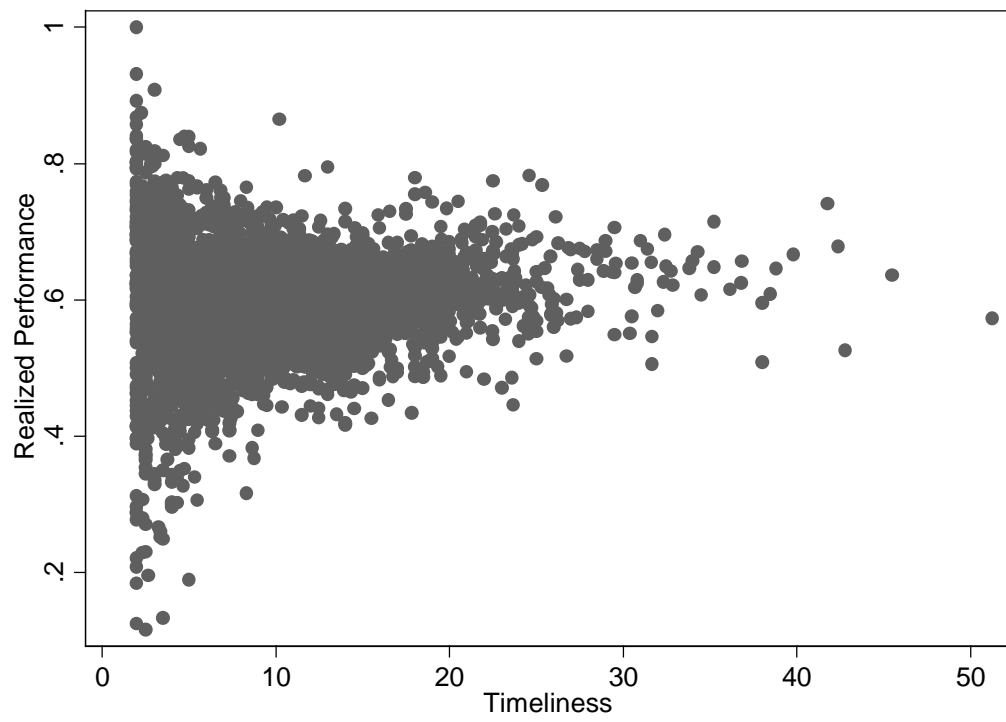
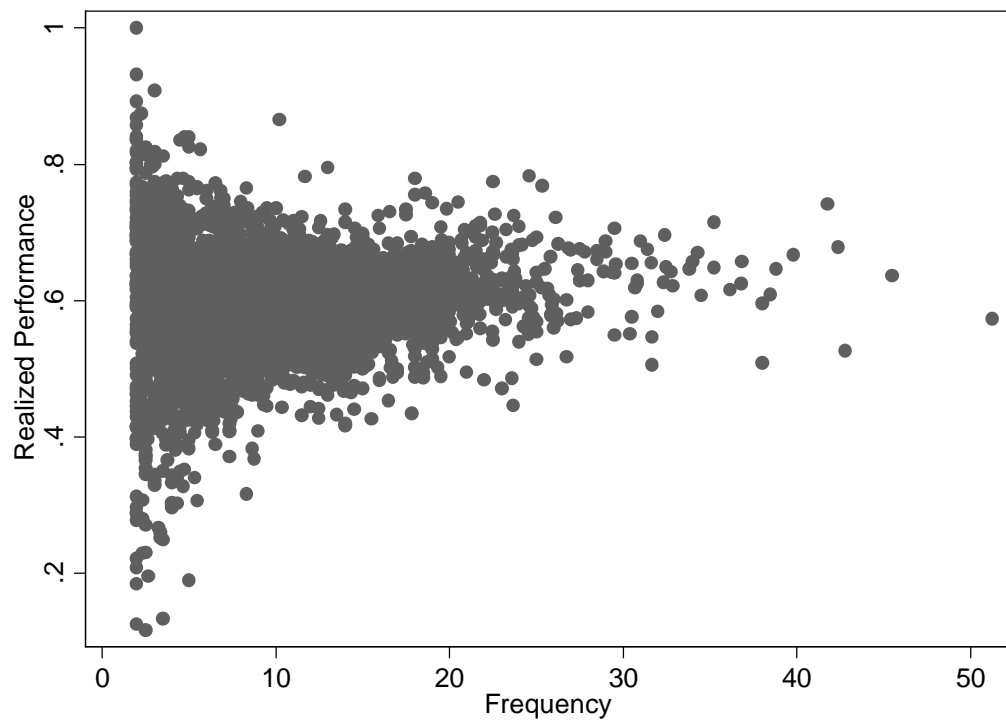
## APPENDIX D: SCATTERPLOTS











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