

# Human Capital Is Dead; Long Live Human Capital Resources!

Robert E. Ployhart

*University of South Carolina*

Anthony J. Nyberg

*University of South Carolina*

Greg Reilly

*University of Connecticut*

Mark A. Maltarich

*University of South Carolina*

---

*This paper introduces a radically different conceptualization of human capital resources that runs counter to the individual-level approaches that have dominated human capital theory for the last 50 years. We leverage insights from economics, strategy, human resources, and psychology to develop an integrated and holistic framework that defines the structure, function, levels, and combinations of human capital resources. This multidisciplinary framework redefines human capital resources as individual or unit-level capacities based on individual knowledge, skills, abilities, and other characteristics (KSAOs) that are accessible for unit-relevant purposes. The framework and definition offer three broad contributions. First, multidisciplinary communication is facilitated by providing precise definitions and distinctions between individual differences, KSAOs, human capital, human capital resources, and strategic human capital resources. Second,*

---

*Acknowledgments: We sincerely thank the Action Editor, Russ Coff, and two anonymous reviewers for their guidance and suggestions. Their input dramatically improved this manuscript. This paper also benefitted from Pat Wright's advice, and we thank Donnie Hale for his assistance with references. Finally, we thank the doctoral students participating in our 2012 human capital seminar (Donnie Hale, Ray Kim, Matt Call, Michael Campion, and Mike Ulrich), who endured many discussions and conversations about this paper.*

*Corresponding author: Robert E. Ployhart, Management Department, Darla Moore School of Business, University of South Carolina, Columbia, SC 29208, USA.*

*E-mail: [ployhart@moore.sc.edu](mailto:ployhart@moore.sc.edu)*

*given that human capital resources originate in individuals' KSAOs, multiple distinct types of human capital resources exist at individual and collective levels, and these types are much more diverse than the historical generic-specific distinction. Third, the multiple types of human capital resources may be combined within and across levels, via processes of emergence and complementarity. Consequently, the locus of competitive advantage has less to do with whether human capital resources are generic or specific but instead occurs because nearly all human capital resource combinations are complex, are firm-specific, and lack strategic (or efficient) factor markets. Overall, the proposed multidisciplinary framework opens new avenues for future research that challenge the prevailing literature's treatment of human capital resources.*

**Keywords:** *human capital resources; human capital; human resources; strategy; organizational behavior; psychology*

---

As research from diverse disciplines, such as economics, strategy, human resources (HR), and psychology, converge on the study of how human capital resources are formed and influence unit-level<sup>1</sup> performance outcomes, their respective assumptions and levels of focus have created barriers to understanding. For example, B. A. Campbell, Coff, and Kryscynski (2012) use the term "human capital" as an employee investment, implicitly assuming that workers with human capital lead to some value for the unit. In contrast, Ployhart and Moliterno (2011) conceptualize human capital as a unit-level resource that emerges from the knowledge, skills, abilities, and other characteristics (KSAOs) of individual employees. More broadly, a review by Nyberg, Moliterno, Hale, and Lepak (in press) found that researchers frequently differ in their conceptualizations and operationalizations of human capital resources. The primary confusions appear to have arisen from an incomplete and perhaps inaccurate application of individual-level theories of human capital, to unit-level concerns for how human capital resources can affect unit-level outcomes.<sup>2</sup>

This lack of consensus about what human capital resources are, at what level they exist, and to what unit-level outcomes they are related creates roadblocks for integrating perspectives across disciplines and therefore prevents the systematic advancement of human capital resource research. It is not necessarily problematic that researchers from differing academic traditions have different views. Rather, the problem is that there is not a "Rosetta Stone" that translates the views of human capital resources from various research traditions into "robust categories that distill phenomena into sharp distinctions that are comprehensible to a community of researchers" (Suddaby, 2010: 346). Clearly, research on human capital resources that draws from and connects to diverse disciplines will benefit from an organizing framework that (a) distinguishes yet connects individual human capital and unit-level human capital resources, (b) clarifies the structure of what human capital resources "are" but also what they are not, (c) clarifies the function of human capital resources by relating them to performance outcomes (i.e., competitive parity or competitive advantage), and (d) does so in a manner that integrates diverse scholarship to generate new insights.

Our first contribution is to redefine human capital resources by proposing a unifying framework that is consistent with that definition. We leverage key insights from the micro-foundations literature (e.g., Coff & Kryscynski, 2011; Felin & Hesterly, 2007; Felin, Zenger, & Tomsik, 2009; Ployhart & Moliterno, 2011) to identify the individual-level KSAO

foundations and combinations that characterize human capital resources. We argue that existing scholarship has not devoted sufficient detail to describing the structure of human capital resources—what they are—as distinct from the functional consequences of human capital resources—what they do and how these structures and consequences exist across levels.

The second contribution stems from the implications of this framework and follows closely from recent work in microfoundations. Most prior research has treated human capital resources as either a single, overarching unit-level resource or at most two broad resources (generic and specific; Nyberg et al., *in press*). However, focusing purely on collective phenomena may obscure more than it explains, as Felin, Foss, Heimeriks, and Madsen (2012: 2) note: “An explanation of these collective phenomena requires consideration of lower-level entities, such as individuals or processes in units, and their interactions.” Indeed, examining the individual level leads to the recognition that individuals are endowed with multiple KSAOs (cf. B. A. Campbell, Coff, et al., 2012; Murphy, 2012). Having multiple KSAOs necessarily implies that multiple types of human capital resources can exist because the KSAOs may combine into different resources via interactions and contextual demands. The microfoundations perspective helps one view human capital resources simultaneously as unit-level capacities and the individual-level capacities based on KSAOs that constitute them. By integrating microfoundations perspectives with work on human capital complementarities (e.g., B. A. Campbell, Ganco, Franco, & Agarwal, 2012), we show that there are multiple theoretically distinct human capital resource combinations and that unit-level resources and their combinations may be different from the individual level due to complementarities and emergence. Further, we build on work exploring the performance consequences of human capital resource complementarities (e.g., Fang, 2011) by offering new insights into the impact of human capital resource combinations on performance indicative of both competitive parity and competitive advantage outcomes.

Finally, we use the definitions and resource combination framework to show how prior research has unnecessarily limited its conceptualization of human capital resources and how a broader view based on microfoundations opens several radically new research directions that challenge or contradict the extant human capital resource literature. Our framework makes a significant departure from prior work by distinguishing between human capital (i.e., an individual's KSAOs that are relevant for achieving economic outcomes) and human capital resources (i.e., individual or unit-level capacities based on individual KSAOs that are accessible for unit-relevant purposes). This approach both bounds and expands the domain of human capital resources by showing that only a subset of KSAOs comprise human capital resources but, at the same time, that multiple types of human capital resources may emerge from these KSAOs. This framework also addresses the problem of how one might conceptualize these multiple human capital resources and combine them in ways to enhance performance.

## **Human Capital Resources**

Most human capital scholars have focused on human capital from the perspective of individuals (e.g., Becker, 1964; Schultz, 1961). In contrast, recent work has begun to examine human capital as a unit's resource. A recent review by Nyberg et al. (*in press*) found that across studies, researchers differed widely with respect to how they conceptualized the level (firm, group, individual), content (skills, education, health), theoretical framework (resources,

KSAOs), and relationships with outcomes (e.g., value-creating) of human capital resources. Each conceptualization may be reasonable within a study, but the inconsistencies across studies thwart attempts to build a broader and more holistic science around human capital resources. For example, Table 1 presents a representative listing of human capital resource definitions that were used in resource-based theorizing from sources spanning macro and micro literatures.

The lack of consensus regarding precisely what human capital resources are, their role in contributing to unit performance, and at what level they exist creates roadblocks to integrating perspectives across disciplines and, therefore, slows the advancement of the human capital resource field and those research disciplines trying to leverage human capital resources. Because scientific advancement is largely a social, interactive, and iterative process that requires a common language and agreed-upon assumptions to adequately develop theory (Astley, 1985; Kuhn, 1962), a lack of construct clarity leads to crossed conversations (e.g., using the same label with different meanings), poor research foundations (e.g., borrowing terms inappropriately from other disciplines), and missed opportunities for development (e.g., duplication of theory or empirical research). This lack of construct clarity is a natural result of research interest in a common topic but approached from multiple disciplines, theoretical perspectives, and multiple levels. Unfortunately, the varying conceptualizations of human capital resources that currently exist across disciplines creates such a weak paradigm that the field is poorly equipped to build on prior work and hence unable to accurately impart lessons from one study to another. Recognizing these pitfalls, scholars have been calling for enhancing the construct clarity of human capital as a resource (e.g., Coff & Kryscynski, 2011; Wright & McMahan, 2011). However, despite these calls, little consensus exists about what human capital means from a resource perspective for the success of a unit.

The multilevel and microfoundational framework of human capital resources developed here is based on work spanning economics, strategy, HR, and psychology. It clarifies differences across levels and disciplines that have been either ignored or not fully appreciated. Specifically, we decompose human capital resources into three elements: their *structure* (what human capital resources “are”; their latent content), their *function* (what human capital resources “do”; their consequences), and the *level* at which they exist.<sup>3</sup>

## Definitions

Human capital resources are individual or unit-level capacities based on individual KSAOs that are accessible for unit-relevant purposes. Although perhaps a radical definition to some, it will be shown that this definition is a necessary step toward construct clarity because it establishes a common language that integrates prior work (Kuhn, 1962). Much of the confusion surrounding how human capital resources are useful for units arises from distinct languages and assumptions that exist within different research disciplines. We try to bridge some of these gaps by providing a formalized lexicon in the subsections that follow. Because the definitional framework integrates literature from economics, strategy, HR, and psychology, the assumptions that underlie this framework are formalized in the appendix. We distinguish between three defining elements of human capital resources—their structure, function, and level.

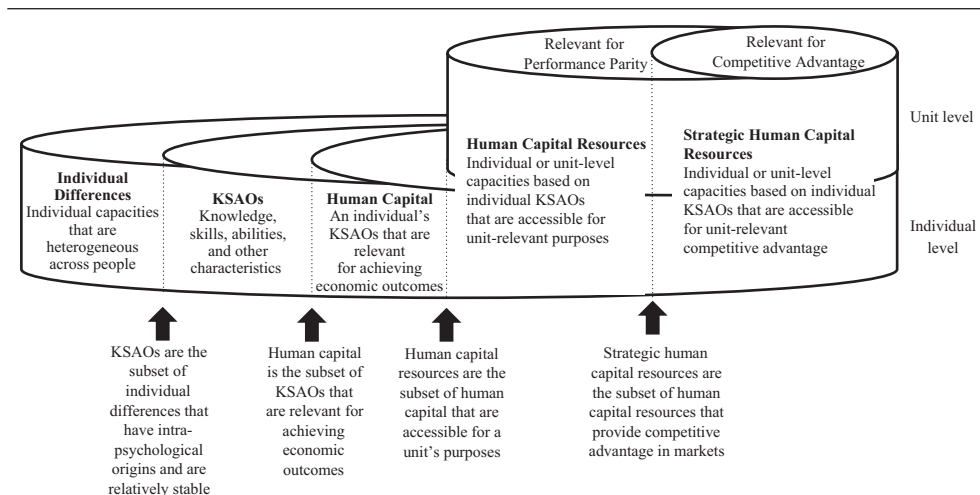
**Table 1**  
**Representative Definitions of Human Capital Resources**

Article	Definition	Level of Analysis	Disciplinary Origin
Becker (2002: 3)	"Human capital refers to the knowledge, information, ideas, skills, and health of individuals."	Individual	Economics
Coff and Kryscynski (2011: 1430)	Human Capital: "an individual's stock of knowledge, skills, and abilities (hereafter skills)."	Individual	Strategy/ Microfoundations
	Firm-level human assets: "firm-level aggregation of employee skills."	Firm	Strategy
Crook, Todd, Combs, Woehr, and Ketchen (2011: 444)	"The term <i>human capital</i> refers to the knowledge, skills and abilities (KSAs) embodied in people (Coff, 2002)."	Firm/Individual	Strategy
Hitt, Biermant, Shimizu, and Kochhar (2001: 14)	"Human capital attributes (including education, experience, and skills) ... of top managers affect firm outcomes."	Firm	Strategy
Huselid, Jackson, and Schuler (1997: 171)	"Employees' collective knowledge, skills, and abilities."	Firm	Strategic Human Resources Management
Kor and Leblebici (2005: 968)	"Firms' strategic human resources such as professionals with specialized knowledge and expertise."	Firm	Strategy
Ployhart and Moliterno (2011: 127-128)	"A unit level resource that is created from the emergence of individuals' knowledge, skills, abilities and other characteristics (KSAs)."	Unit	Psychology/Strategy
Somaya, Williamson, and Lorinkova (2008: 936)	"Defined broadly as the cumulative knowledge, skills, talent, and know-how of the firm's employees."	Firm	Strategy/Knowledge- Based View
Wright and McMahan (2011: 95)	"At the unit level, human capital can refer to the aggregate accumulation of individual human capital that can be combined in a way that creates value for the unit."	Unit	Strategic Human Resources Management
Youndt and Snell (2004: 338)	"Human capital simply refers to individual employees' knowledge, skills, and expertise."	Individual	Strategic Human Resources Management

### *Structures of Human Capital Resources*

The initial conditions, and in this case the origins, of human capital resources are *individual KSAs* (Ployhart & Moliterno, 2011). As implied by a microfoundations perspective (Barney & Felin, 2013), it is important to consider individuals to understand the structure of human capital resources. Figure 1 provides an overview of the structure of human capital resources. As the figure suggests, there are critical distinctions between individual differences, KSAs, human capital, human capital resources, and strategic human capital resources.

**Figure 1**  
**Distinctions Between Constructs**



*Note:* Each construct to the right is a subset of the construct to the left. The arrows define the boundaries between each subset. Text within the figure refers to each construct's definition.

*Differentiating KSAOs from individual differences.* Starting at the left of Figure 1, all humans are endowed with individual differences, which are simply individual capacities that are heterogeneous across people. These capacities include relatively stable cognitive (e.g., ability) and noncognitive (e.g., personality) constructs, relatively malleable and situationally induced constructs (e.g., motivation and attitudes), and genetic or physical characteristics (e.g., strength), as examples (Guion, 2011; Murphy, 2012). However, not all individual differences are KSAOs: attitudes, satisfaction, motivation, emotion, and related characteristics are not KSAOs because they are highly variable, more situationally specific, and situationally induced (Ackerman & Heggestad, 1997; Murphy, 2012). KSAOs are induced from primarily intrapsychological (as opposed to situational) origins and are relatively stable across a meaningful time frame. We use Noe, Hollenbeck, Gerhart, and Wright's (2006) and Schmitt and Chan's (1998) definitions of KSAOs. Specifically, *knowledge* is the declarative or procedural information necessary for performing a task and the foundation on which skills are developed (knowledge may apply to many jobs or only a single job), *skills* are the individual's level of proficiency and capabilities to perform specific tasks and can be improved with experience, *ability* is a more enduring capability that is applicable to a range of job-related tasks, and *other characteristics* refers to personality traits and related dispositional attributes that affect the individual's performance across a broad range of tasks. Multiple KSAOs exist for every person (Murphy, 2012), but the structures of KSAOs are hierarchical such that broad KSAOs (e.g., general mental ability; the Five Factor Model of personality) subsume more specific KSAOs (e.g., verbal and quantitative ability; self-discipline, responsibility).

*Differentiating human capital from KSAOs.* Human capital is an individual's KSAOs that are relevant for achieving economic outcomes. Capital is a stock of wealth that produces



a flow of income (Fisher, 1906). KSAOs may or may not be relevant for producing such economic outcomes. Becker (1964) pointed to a distinction between “material” (economic) effects of education in comparison to their cultural (or psychic) value. We use a similar boundary to differentiate KSAOs that are human capital from other KSAOs that are valuable, but not for economic purposes. Thus, human capital is a subset of those individuals’ KSAOs that are relevant for achieving economic outcomes.

*Differentiating human capital resources from human capital.* The distinction between human capital and human capital resources is important because these two terms are often inappropriately used interchangeably. This creates enormous communication problems, so we distinguish these two concepts in some detail. Some prior work (e.g., Nyberg et al., in press) has advocated a levels-based distinction where human capital exists only at the individual level and anything at a unit level is considered a human capital resource. While this distinction is conveniently simple, it obscures important theoretical issues. For example, there is a rich body of literature that focuses on “stars” (e.g., Rosen, 1981; Zucker & Darby, 1996), often defined as individuals who contribute disproportionately to unit outcomes (e.g., Groysberg & Lee, 2009; Hess & Rothaermel, 2011; Rothaermel & Hess, 2007). Similarly, there is a deep literature regarding CEOs and top management teams (e.g., Carpenter, Sanders, & Gregersen, 2001; Sanders & Hambrick, 2007) where individual differences and abilities are thought to meaningfully differentiate organizational performance. These two examples of well-established literatures clearly suggest human capital resources may exist at the individual level, and such individual resources should be incorporated to inform human capital resource research.

Here the microfoundations perspective becomes especially powerful because it emphasizes the inseparability and importance of both individual and collective human capital resources. The unit-level constructs are based on people—what they do, what they are, or what they know—and are a complex mix of individuals acting and interacting to produce outcomes (Felin et al., 2012). Yet for these same reasons, a unit-level focus is by itself insufficient, and by emphasizing the role of individual KSAOs the microfoundations perspective also recognizes the existence of individual-level human capital resources. Thus, we suggest that human capital resources can simultaneously consist of *individual or unit-level capacities*.

Note that the human capital resource definition focuses on *capacities* for producing outcomes rather than the KSAOs or resources themselves. We include the idea of capacities, the potential for action, to differentiate the potential from the action or consequence it may produce. This emphasis on a resource as a capacity for action builds from recent conceptualizations of resources developed by Kraaijenbrink (2011) and Kraaijenbrink, Spender, and Groen (2010) as well as the psychology literature more generally. A capacity is simply a reserve or supply, so resources are thus a reserve or supply for potential action directed toward a purpose.

The boundary condition that distinguishes human capital from human capital resources is that human capital resources must be *accessible for unit-relevant purposes*. This means that human capital resources exist as features of specific units and contribute to the pursuit of the unit’s purpose. The question of whether a skill is a human capital resource depends on the unit whose resource it might be. For example, a person’s skill in speaking Farsi as a second language would constitute a human capital resource for a specific unit that operates where translations to or from that language are relevant for the unit’s performance. In contrast, if the

same person worked for a different unit in which the ability to speak Farsi was not relevant to that unit's performance, the Farsi language skill would not be a human capital resource for that unit. Our definition highlights accessibility and relevance for a specific unit's purposes as key boundary conditions of human capital resources.

Including the term *accessibility* is necessary, but we do not mean to overstate the implication. By *accessible*, we only mean that the unit must be able to use the individual or unit-level capacity for it to be considered a human capital resource. For instance, a plumber's contract may limit the scope of the position to plumbing work alone, rendering that employee's carpentry skills inaccessible. However, we do not imply that every capacity that is accessible for the unit is understood or even recognized by the managers of that unit to be a valuable resource. For example, a firm may believe its compensation system is the source of its competitive advantage, when in fact it is the collective tacit knowledge that the system affords that is the real determinant. Hence, our use of the term *accessible* does not conflict with social complexity. We do not argue that managers are aware of the resource or how it can be leveraged, only that the resources can be or are applied to influence relevant unit outcomes.

As an aside, it is interesting to observe that the distinctions suggested in Figure 1 add another perspective into the nature of investments in human capital. Prior scholars (e.g., Coff & Kryscynski, 2011) have suggested that a classic motivational dilemma exists related to the question of how investments in human capital are made. Many have focused on the distinction between firm-specific and generic human capital and identified a potential unwillingness for firms to invest in generic human capital and individuals to invest in specific human capital. Our framework suggests a potential shift (or an additional dimension) in such investment decisions. First, accessibility for the unit's purposes, especially to the extent that they can be accessed for improving performance, is the most important criterion for determining who should invest in human capital. Firms may be willing to make investments in generic human capital to the extent that it benefits performance outcomes. Second, the framework suggests that firms have two distinct ways to invest in human capital. Firms may invest in building the human capital of individuals, or they may invest in the building of human capital resources. Indeed, there are some types of human capital that individuals cannot invest in (e.g., general mental ability), that can only be invested in by the firm via the accumulation of collective human capital resources (e.g., selection and pay policies that shape the accumulation of firm-level general mental ability).

*Human capital resource types.* Given that all humans are endowed with a multitude of KSAOs (see the appendix), and individual KSAOs are the microfoundations of human capital resources, we argue that there is likewise a multitude of different types of human capital resources. Thus, units can have many different types of human capital resources stemming from both the variety of individual capacities and the many ways in which these individual capacities combine to form unit-level capacities. For example, Figure 1 suggests that there are many different types of KSAOs. If one focused purely on the individual level, some, or perhaps many, of these KSAOs could constitute human capital resources for a given unit. However, at the collective level, the nature of interactions between people and corresponding task demands may result in the combination of these individual KSAOs into new, distinct, collective human capital resources that may bear little resemblance to their individual-level origins (Barney & Felin, 2013; Felin et al., 2009; Ployhart & Moliterno, 2011). Therefore, while the structure of human capital resources is capacities based on individual KSAOs, its



actual content may be multidimensional. This reinforces the idea that there are many different types of human capital resources present in each unit, not just a single, overarching resource at the firm level as has usually been conceptualized.

### *Functions of Human Capital Resources*

Broadly speaking, organizations exist to fulfill specific purposes via attainment of relevant outcomes. While specific purposes are idiosyncratic to individual units, most aim to create value for various stakeholders and in many cases by winning in competitive markets. In a general sense, these outcomes are characterized as performance. The HR management literature often considers operational improvement as a key performance outcome. In contrast, scholars examining competitive advantage often take a more narrow view of performance in which they view performance outcomes *in relation to* the outcomes of competitors. This view divides unit-relevant performance into performance that indicates a *competitive advantage*, defined as the ability of a unit “to create more economic value than the marginal (breakeven) competitor in its product market” (Peteraf & Barney, 2003: 314), and performance that indicates a *competitive parity*, defined as a “normal” level of performance (Barney & Wright, 1998), performance similar to other competitors (Powell, 2003) or (in contrast to the competitive advantage definition above) the ability of a unit to create economic value no greater than the marginal (breakeven) competitor in a market. Recognizing the importance of competitive advantage to strategy theory, our framework differentiates between performance in general (that results in competitive parity) and the subset of supranormal performance indicative of competitive advantage (Cockburn, Henderson, & Stern, 2000).

Business activities exist to the extent that they help maintain or improve performance outcomes of a unit (J. P. Campbell, 1990; Lepak, Liao, Chung, & Harden, 2006; Smith, 1976). These activities seek to maximize the productivity, efficiency, cost, and revenue for individuals and firms (e.g., Barney & Wright, 1998). While vitally important to the success of a unit, the majority of these operations, and the performance outcomes that result from them, contribute to a unit’s ability to achieve no more than competitive parity in the market. Research reflecting such performance often follows the “best practices” logic of the HR, organizational behavior, and psychology fields, where higher quality human capital resources should enhance unit-relevant performance (Crook et al., 2011).

In contrast, a small portion of activities related to unit purposes, and the performance outcomes that describe them, are central to achieving competitive advantage in a market (Porter, 1980). The distinction between these two types of outcomes is important for researchers because it helps to address a common misconception about the role and boundaries of human capital resources. While recognizing that human capital resources can be crucial to achieving sustainable competitive advantage in some cases, those who view their strategic distinctiveness—the extent that they are rare, inimitable, and nonsubstitutable—as a definitional boundary are inappropriately narrow in their conception of human capital resources. Therefore, our framework includes *strategic human capital resources* as an important category but also recognizes the role of nonstrategic human capital resources—those critical for delivering performance leading to competitive parity, but not competitive advantage (see Figure 1). Theoretical arguments based on resource-based theory (RBT) are relevant for understanding the role of strategic human capital resources that produce competitive advantage but are not necessarily relevant for understanding the role of human

capital resources linked with performance that achieves “only” competitive parity. Given that the latter group is significantly larger, we hope that our framework can help lead the field toward development of theory better suited to that category of human capital resources.

### *Levels of Human Capital Resources*

The definitional framework highlights distinctions between *individual* capacities that directly influence unit-relevant outcomes from *unit-level* capacities that directly influence unit-relevant outcomes. Examples of individual-level capacities influencing unit-relevant outcomes are replete in the stars literature (e.g., Groysberg & Lee, 2009; Hess & Rothaermel, 2011; Rosen, 1981; Zucker & Darby, 1996) and the CEO literature (e.g., Carpenter et al., 2001; Nyberg, Fulmer, Gerhart, & Carpenter, 2010; Wade, Porac, Pollock, & Graffin, 2006). Examples of unit-level capacities influencing unit-relevant outcomes are much more common in the strategic human capital literature (see Nyberg et al., in press, for a review). However, these literatures tend to exist mainly within either individual *or* unit levels. Human capital resource research that focuses on crossing levels is only starting to appear (Coff & Kryscynski, 2011; Ployhart & Moliterno, 2011; Wright & McMahan, 2011), yet the microfoundations literature suggests this is where most of the insight is likely to occur (Felin et al., 2009).

Hence, like the classic tension between collectives and individuals in the social sciences (see Barney & Felin, 2013, for a concise summary), a human capital resource framework must recognize the existence of resources across multiple levels. Considering multiple levels helps to exploit and integrate ideas from the literatures in strategy (e.g., Carpenter et al., 2001), organizational behavior (e.g., Ilgen, Hollenbeck, Johnson, & Jundt, 2005), and psychology (e.g., F. Schmidt & Hunter, 1998) as well as recent emphases on the microfoundations of human capital (Coff & Kryscynski, 2011) and its multilevel characteristics (Felin & Hesterly, 2007) and emergence (Ployhart & Moliterno, 2011). For present purposes we focus on two levels, the individual and the unit (or collective) level, because these capture the “endpoints” for most human capital resource scholarship.

### *Framework Implications*

Synthesizing across structure, function, and levels provides an integrated definitional framework for human capital resources. This framework, shown in Table 2, provides a label and operational definition for four types of human capital resources based on level and functional outcome. In the table, each cell provides a label (in bold), a definition, and examples of specific studies that have examined these human capital resources.

Overall, the human capital resource framework addresses the key elements noted by Suddaby (2010). First, it uses precise definitions for human capital resources. Such precision clarifies the study of human capital resources by allowing researchers to communicate more clearly and to more effectively link their scholarship across disciplines. Second, it specifies clear boundary conditions by defining the construct as unit relevant. Third, it demonstrates semantic relationships to other constructs by clarifying similarities and differences across resources and levels. Finally, it creates consistency across levels and outcomes, providing “sharp distinctions that are comprehensible to a community of researchers” (Suddaby, 2010: 346).

**Table 2**  
**A Multilevel Structure-Function Framework of Human Capital Resources**

Level	Function (Unit Relevance)	
	Competitive Parity “Pursuit of Best Practices”	Competitive Advantage “Pursuit of Differentiation”
Unit	<b>Human Capital Resources</b> <i>Unit capacities based on individual KSAOs that are accessible for unit-relevant performance.</i> [Strategic Human Resources, Groups and Teams, e.g., Crook, Todd, Combs, Woehr, & Ketchen, 2011; Ployhart, Van Iddekinge, & MacKenzie, 2011]	<b>Strategic Human Capital Resources</b> <i>Unit capacities based on individual KSAOs that are accessible for unit-relevant competitive advantage.</i> [Human Capital in Strategy/RBT, Top Management Teams, e.g., Kor & Leblebici, 2005; Carpenter, Geletkanycz, & Sanders, 2004]
Individual	<b>Human Capital Resources</b> <i>Individual capacities based on the person’s KSAOs that are accessible for unit-relevant performance.</i> [Personnel Selection, Training, CEO, e.g., Nyberg, Fulmer, Gerhart, & Carpenter, 2010]	<b>Strategic Human Capital Resources</b> <i>Individual capacities based on the person’s KSAOs that are accessible for unit-relevant competitive advantage.</i> [Stars/Professional Service Partners, e.g., Hitt, Biermant, Shimizu, & Kochhar, 2001]

*Note:* Each cell lists the label (in bold), definition (in italics), and representative research examples of human capital resources (in block parentheses). The *level* part of each definition is identified by the terms *collective* or *individual*. The *structural* part of each definition is noted by “capacities based on individual KSAOs that are accessible.” The *function* part of each definition is noted by either “unit-relevant competitive advantage” or “unit-relevant performance.” KSAOs = knowledge, skills, abilities, and other characteristics.

The proposed human capital resource framework is based on the integration of theories of resources from multiple disciplines and levels and has four major implications. First, only those KSAOs that are accessible and relevant for the purposes of a unit are human capital resources. Second, human capital resources exist at multiple levels, but these resources always originate from the KSAOs of individuals. Third, individuals simultaneously contain a multitude of cognitive and noncognitive KSAOs. Fourth, and consequently, multiple types of human capital resources may exist at individual and collective levels. This latter point raises several additional questions that challenge assumptions in current theory. We show in the next section that most research on human capital resources, because it focuses on only a single resource, is unnecessarily limited and ignores important ways that human capital resources create value. To elaborate on this, we integrate research on emergence and complementarities to develop illustrations of a variety of alternatives for thinking about combining human capital resources.

## Human Capital Resource Combinations

Recognizing that unit-level constructs derived from individuals are created from a multitude of interactions among them (e.g., Felin et al., 2012; Kozlowski & Chao, 2012) makes it clear that the predominant focus on a single human capital resource is inappropriately narrow. Unfortunately, existing scholarship has not yet embraced the challenge of examining multiple types of human capital resources and the ways they combine to affect outcomes. Evidence of this missed opportunity can be found in the recent review (Nyberg et al., in

press) of 92 empirical human capital resource–focused articles. We also reviewed each of these 92 articles and found that the vast majority (76 articles) examined only a single human capital resource. Thirty-seven articles did not identify a specific KSAO underlying the human capital resource. Of the 55 articles that did identify an underlying KSAO, 34 measured tenure or experience, 27 measured education, and 10 measured knowledge (a few studies included multiple KSAOs, and 5 used contextually relevant experience). Very few studies examined multiple KSAO types that compose a single human capital resource, and even fewer studies considered multiple human capital resources (and these only differentiated between generic and firm-specific resources).<sup>4</sup>

In contrast, we draw on insights from the definitional framework and the microfoundations literature to argue for the study of *human capital resource combinations*, which are the theoretical and empirical ways KSAOs or human capital resources work interdependently at the same level or across levels to produce outcomes. An understanding of these resource combinations is important for at least two reasons. First, the definition framework suggests that multiple types of KSAOs exist within individuals, and these types may be reflected in numerous types of human capital resources both within a person and between people as they interact and coordinate. Second, failure to understand human capital resource combinations obscures, and effectively undervalues, how human capital resources may contribute to achieving performance parity or competitive advantage. In comparison to a single human capital resource, combinations of human capital resources are likely to be more valuable, rare, and inimitable and thus are more likely to generate sustainable value (e.g., Dierickx & Cool, 1989; Maritan & Peteraf, 2011). Synergies between resources may also exist that enhance their ability to generate competitive advantage (e.g., Adegbesan, 2009; Ennen & Richter, 2010; J. Schmidt & Keil, 2013). In sum, exploring different human capital resource combinations offers new insights into the nature of human capital resources and how they contribute to competitive advantage.

One illustration of the potential for greater understanding of human capital resources through insight into their combinations is provided by B. A. Campbell, Coff, et al. (2012). They noted that generic human capital resources may underlie competitive advantage if they are combined with complementary assets, suggesting that the classic strategic factor markets logic does not apply as strongly when generic human capital resources are bundled. Stated another way, human capital resource combinations are essentially “complex resources,” while single or stand-alone resources are essentially “commodity resources” (Denrell, Fang, & Winter, 2003). Commodity resources are relatively homogeneous with reasonably well-defined and efficient factor markets. In contrast, complex resources are more heterogeneous, are based on combinations of commodity resources, and do not have well-defined markets. Since, as Denrell et al. (2003: 980) noted, “markets are more dramatically lacking for ... the innumerable types of complex resources that could be created out of existing resources,” there are either very thin or nonexistent strategic factor markets for complex resources. Additionally, a combination of human capital resources is unlikely to be transferrable or tradable (Maritan & Peteraf, 2011). One response to efficient factor markets is investment in complementary resources. To this point, Stieglitz and Heine (2007) argued that firms will invest in complementary assets that bind key employees to the firm. Thus, human capital resource combinations can distinguish competitors and obfuscate strategic factor markets.<sup>5</sup>

### *Exemplars of Human Capital Resource Combinations*

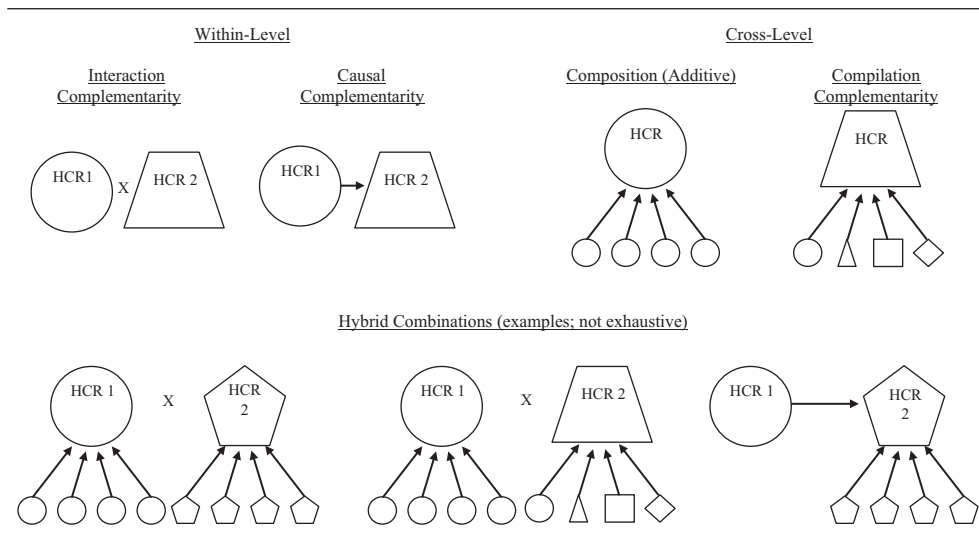
Human capital resource combinations can be created via their underlying KSAOs or stand-alone human capital resources. These combinations can occur either at the same level or at different levels. Different literatures have considered human capital resource combinations in different ways; macro scholarship tends to conceptualize them as complementarities while micro scholarship tends to conceptualize them as forms of emergence. We integrate these perspectives shortly but first clarify the meaning of complementarity and emergence. In the macro literature, resource combinations are usually viewed in terms of complementarities. Ennen and Richter (2010: 207) define complementarities as “the beneficial interplay of the elements of a system where the presence of one element increases the value of others.” Human capital resources can be one such element, and their review underscored the idea that if a combination of people has an “interactive” impact, then that combination can be a complementarity. In the micro literature, resource combinations are usually viewed in terms of emergence. Emergence is the theoretical explanation for aggregation: a process that unfolds over time, is shaped simultaneously by contextual and individual factors, and ultimately occurs through interaction and interdependence (Felin, 2012; Kozlowski & Chao, 2012). Emergence is a combination of individual KSAOs that creates a distinct unit-level resource. The concept of emergence applies to microfoundations in that it is both an explanation for the existence of a unit-level human capital resource and a description of how it arises from the combination of a specific set of individual-level capacities.

Complementarities and emergence should be viewed as related processes underlying human capital resource combinations. Complementary combinations may occur within or across levels, whereas emergence only refers to cross-level combinations. Multiple types of resources may be combined, and there are no limits on the number of resources that may be combined (i.e., combinations may be complex and based on more than two resources or KSAOs). In the sections that follow, we first consider within-level and then cross-level combinations. In doing so, we integrate literatures on resource complementarities with microfoundation and multilevel literatures on emergence. We present these combinations as exemplars in a stylized manner, recognizing that many more types are possible. For example, we only present or discuss combinations based on two resources, but clearly many more resources could be combined. Exemplars of these combinations are illustrated in Figure 2.

*Within-level combinations.* Strategy research has extensively addressed combinations of complementary resources (Adegbesan, 2009; Denrell et al., 2003; Ennen & Richter, 2010). The broader RBT literature, for example, recognizes that the value of specific resources is attributed to their value in conjunction with other available resources (e.g., J. Schmidt & Keil, 2013). We suggest that the macro literature on complementarities can be integrated with the micro literature on individual differences to generate new insights into how KSAOs or stand-alone human capital resources may be combined.

The definitional framework notes that individuals have multiple KSAOs. Micro theory suggests that these KSAOs are interrelated and combine in various ways to achieve different purposes, as dictated by task demands (Murphy, 2012). Multiple complementary KSAOs are needed to accomplish most tasks. There are two main types of complementarities. First, KSAOs may be related *interactively*, such as when conscientiousness and agreeableness interact to influence performance (e.g., Witt, Burke, Barrick, & Mount, 2002). The interaction

**Figure 2**  
**Exemplars of Human Capital Resource Combinations**



*Note:* The shapes represent human capital resources, with different shapes indicating different types of resources. Vertical arrows represent the crossing of organizational levels. HCR = human capital resource.

between KSAOs creates a synergy that is greater than either component individually. Second, KSAOs may be *causally* related, such as when highly stable KSAOs (e.g., cognitive ability) influence the development of more malleable KSAOs (e.g., job knowledge) (Hunter, 1983; Jensen, 1998). The development of one KSAO is dependent on the levels of another KSAO. Thus, KSAOs are connected via a web of relationships, and it is this combination that generates performance.

Likewise, human capital resources may be combined interactively or causally. *Interaction* complementarities represent a process through which human capital resources augment the value of other human capital resources (see the top left of Figure 2). Interaction complementarities occur when two or more human capital resources are combined, and the result is a performance outcome that is different than if the two human capital resources were used independently (Adegbesan, 2009). This is akin to a statistical interaction, so these combinations are referred to as “interactional” (Ennen & Richter, 2010). Interactions among unit-level human capital resources may make even a generic resource a source of competitive advantage (see B. A. Campbell, Coff, et al., 2012; Denrell et al., 2003). For example, a credit card company may invest in hiring people with strong problem-solving skills to create a unit-level capacity for problem solving. It may also hire a different cadre of workers with high levels of emotional intelligence to create a capacity for customer service. The combination of these two unit-level human capital resources has the potential to create a synergy for the unit to help it more effectively resolve customer disputes.

Alternatively, *causal* complementarities represent a process through which a human capital resource contributes to the development or acquisition of another human capital resource (see the top and middle-left section of Figure 2). This relationship can also be reciprocal,



such that combinations of resources spiral up or down over time. Causal complementarities are relatively neglected within the complementarity literature (Ennen & Richter, 2010) even though there is a substantial amount of theory that emphasizes their existence. Dierickx and Cool (1989) referred to this type of combination as “asset interconnectedness” in the service of resource accumulation. Maritan and Peteraf (2011) discuss the interconnection between resource acquisition and resource accumulation as well as how the former may drive the latter (i.e., “buy to build”). Ployhart et al. (2011) demonstrated how generic human capital resources can influence the accumulation of specific human capital resources, which in turn influence performance. Thus, even though the generic human capital resource is transferrable and has a corresponding factor market, the fact that it shapes the development of other (more unit-specific) resources enables it to be a source of competitive advantage (see B. A. Campbell, Coff, et al., 2012).

These arguments suggest that human capital resources based on interactive or causal complementarities have greater opportunities for enhancing performance and generating competitive advantage than resources in isolation (Dierickx & Cool, 1989; J. Schmidt & Keil, 2013). Complementarities imply combination through resource interrelationships, which serve to isolate resources from mobility, imitability, or transferability. Further, the more connections between resources, the less likely there is a corresponding strategic factor market for the combination (Denrell et al., 2003). This is true regardless of whether the human capital resources are generic or specific (B. A. Campbell, Coff, et al., 2012). The locus of human capital resource-based competitive advantage in complementarity combinations is not the type of resource but rather their interrelationships. While many of these arguments are recognized within the broader strategy literature, their application to human capital resources has scarcely been considered, especially for the causal form of complementarity.

*Cross-level combinations.* Human capital resources may also combine across levels to create different types of collective human capital resource combinations (Ployhart & Moliterno, 2011). But in contrast to the way emergence is often treated in the literature, the primacy is not on the collective but rather on the nature of the relationships and interactions that give rise to the collective (Felin et al., 2012; Kozlowski & Chao, 2012).

Microfoundations research has incorporated this view in examining aggregation and emergence (Barney & Felin, 2013), which requires the study of interactions and relationships (Felin et al., 2012; Felin & Hesterly, 2007). The emphasis on interactions and relationships is crucial because the capacities within a system combine in different ways depending on the interactions and interdependencies among them, as required by the broader context and situation (Kozlowski & Chao, 2012). That is, the same set of individual-level KSAOs may create different types of human capital resources if the nature of interdependence requires members to interact in different ways or with different members (Ployhart & Moliterno, 2011). Therefore, the nature of the relationships and interactions between people is necessary to understand how a set of individual-level KSAOs leads to collective human capital resource combinations.

Disparate strands of theory converge around the idea that relationships among people lead to combinations of individual-level KSAOs that may contribute to human capital resources that are very different from their individual-level origins. First, microfoundations research on routines suggests that through emergence, the combinations and coordination of individuals

may create collective constructs that are distinct from their individual origins (Felin et al., 2012; Felin & Hesterly, 2007; Felin et al., 2009). Second, multilevel theory and emergence processes suggest that individual-level capacities get “amplified” and “transformed” through member interactions to create a collective construct that is only partially isomorphic with its lower level origins (Kozlowski & Chao, 2012; Ployhart & Moliterno, 2011). Finally, social-psychological theories of interdependence (e.g., Kelley & Thibaut 1978; Rusbult & Van Lange, 2003, 2008) shift the focus from the individual to the relationship and interdependencies among people, such that an interaction is a function of multiple persons, how they react to each other, and the structure of the situation within which they interact. It is the connections among people—their *relationships or interactions*—that is the focal level of analysis (Kelley, 1991).

Relationships thus shape the nature of human capital resource emergence and, consequently, the types of human capital resource combinations. Yet context shapes the nature of these relationships. The importance of the context in shaping interaction and relationships is known by a variety of names and studied in a variety of literatures, and they all share common key features. On the one hand, when people hold the same individual-level capacities based on KSAOs, but the context or task requires the sum of these capacities (e.g., a group lifting a heavy weight), then a simple form of emergence takes place. This simple form of emergence is the sum of KSAOs of the same type. On the other hand, when people have different KSAOs, and the context or task requires the combination of these KSAOs (e.g., a surgery team with distributed expertise), then a complex form of emergence occurs (this particular type of emergence, where the resulting human capital resource is composed of heterogeneous resources, is often referred to as a form of complementarity in the macro literature). This complex form of emergence is based on interdependencies, interaction, and relationships among the individual members. This simple-complex continuum can be observed in the literatures from microfoundations (additive-complex; Barney & Felin, 2013), multilevel theory (composition-compilation; Kozlowski & Klein, 2000), strategy (stand-alone-complementary resources; Adegbesan, 2009), human capital resource emergence (simple-complex; Ployhart & Moliterno, 2011), and task coordination (pooled-intensive; Van de Ven, 1976), to illustrate just a few.

Thus, individuals have a variety of capacities based on their KSAOs, the type of relational situation or context affords different types of KSAOs to be manifested, these manifestations lead to the creation of different combinations of interconnected human capital resources, and these resource combinations may occur within and across levels. Consequently, human capital resource scholarship must expand to recognize that multiple types of human capital resources may exist through emergence processes that are shaped by interdependence. Accordingly, drawing from the human capital definition framework presented earlier, and assuming that employee interactions and relationships shape the types of individual-level capacities manifested (Rusbult & Van Lange, 2008), we posit that there are multiple ways that human capital resources emerge and are thus combined into different types.

*Composition.* Composition is the simplest form of cross-level emergence (Chan, 1998; Kozlowski & Klein, 2000). Here, the individuals have the same types of individual-level KSAOs, and the situation requires combining these capacities in a summative manner (e.g., the top middle-right section of Figure 2). With this type of emergence, it does not matter

much whether members stay or leave, as only one type of KSAO is needed, and thus relationships with different people will not matter so long as all members have the KSAO. Thus, higher level human capital resources emerge due to homogeneity among lower level KSAOs. This is the type of emergence that dominates the psychological and organizational behavior literatures (Kozlowski & Chao, 2012). For example, Schneider (1987) argues that over time, organizations become more homogeneous in their KSAOs as units attract, select, and retain employees whose characteristics fit the unit.

However, even with this simple form of emergence, the emergence process is largely unit specific (Ployhart & Moliterno, 2011). This higher level resource is more inimitable, less transferrable, and more removed from strategic factor markets (i.e., complex resources) than the lower level resource focused on individuals' capacities. For example, individuals within a unit bring different capacities of general cognitive ability, which is a generic resource and has reasonably (but not perfectly) efficient labor markets. The value that units should acquire from hiring individuals with higher ability should be reasonably offset by their acquisition costs. However, to the extent these individuals' ability KSAOs are combined via an emergence-enabling process, thereby creating synergies and greater unit-level capacity, the *higher level* human capital resource becomes less transferrable or mobile (notwithstanding an acquisition).

*Compilation complementarities.* More complex forms of cross-level emergence occur when interdependencies require relationships that combine distinct KSAOs (Barney & Felin, 2013; Ployhart & Moliterno, 2011). In multilevel theory this is also known as a *compilation* form of emergence because it is based on the cross-level combination of different types of human capital resources. It describes how a combination of individual-level capacities becomes a unit-level resource (see the top right of Figure 2). It is also a complementarity because the constituent elements are different but, through interrelationships, create a meaningful unit-level resource.

These KSAOs or human capital resources are combined via the emergence process into a single higher level human capital resource that is heterogeneous in its content. Any one of the individual-level capacities may be transferrable or traded on a factor market, but in combination, the unit-level aspects of the human capital resource are not mobile (outside of acquisitions) and may not have a corresponding strategic factor market (Denrell et al., 2003). For example, a top management team may be effective because it has members who work well together and complement each other in terms of their functional knowledge and expertise (e.g., a finance expert, a marketing expert, and an HR expert). The value of any of these individuals may be offset by his or her acquisition costs in a labor market, but the fact that their combination produces a synergy greater than any one of their specific skill sets means the higher level resource is more inimitable, less transferrable, and less mobile. On the other hand, removing or adding a member will change the nature of the human capital resource, sometimes dramatically. Groysberg, Lee, and Nanda (2008), for instance, documented that the performance of star financial analysts declined more when they switched firms alone than with team members.

Note that in contrast to composition forms of emergence, here different relationships with specific people may change the nature of the human capital resource. Because each person has different sets of KSAOs (e.g., unique kinds of knowledge), including or excluding certain

individuals from social interactions will result in more or less of that person's KSAOs' being part of the emergent human capital resource. Indeed, employee mobility may change the nature of the collective construct (Felin et al., 2009; Nyberg & Ployhart, 2013). Yet at the same time, if the situation and nature of interdependence changes to afford some individual-level KSAOs to be more unit relevant than others, then the content of the human capital resource will also look very different even when membership is constant (Rusbult & Van Lange, 2008).

Together, these arguments lead to the conclusion that human capital resources based on emergence processes have greater opportunities for enhancing performance and generating competitive advantage than their lower level origins. The aggregation process is an isolating mechanism that protects higher level human capital resources from mobility, imitability, or transferability. Further, the more "collective" a human capital resource is, the less likely there is a corresponding strategic factor market for the resource (as implied by Denrell et al., 2003). Higher level collectives require more aggregation and combination, thereby making them more inimitable (see Zenger, 1994). This is true regardless of whether the individual-level KSAOs are based on generic or specific KSAOs. The locus of human capital resource-based competitive advantage in emergence combinations is not the type of resource but the aggregation process.

*Hybrid combinations (within- and cross-level).* We have described human capital resource combinations separately within and across levels, but these types may themselves be combined into a variety of hybrid combinations that imply even more complex resources. The bottom of Figure 2 illustrates exemplars of hybrid combinations. The bottom-left section shows an interactive complementarity between two different types of human capital resources that are each based on composition emergence processes. The bottom-middle section shows an interactive complementarity between two human capital resources, where the first is based on composition and the second is based on compilation complementarities. The bottom-right section shows a causal complementarity, but only the second resource is based on a composition-emergence combination. For example, the human capital resources of a CEO (HCR1) may influence the emergence of human capital resources for the unit (HCR2).

These illustrations are not exhaustive; theory specific to the types of human capital resources, outcomes, contexts, and purposes of a particular study are needed to specify the appropriate combination (we emphasize this shortly as a direction for future research). Rather, we present examples to stimulate future research because to date such research is lacking. For instance, there have been far more studies using the composition framework (e.g., Hitt et al., 2001; Miller & Shamsie, 1996) than a compilation framework (see Kozlowski & Chao, 2012), which has most frequently been in the form of diversity measures such as functional diversity (e.g., Hayton, 2005). Further, there have been few studies combining multiple human capital resources in an interactive manner (e.g., Hatch & Dyer, 2004) and even fewer that have examined causal combinations (e.g., Ployhart et al., 2011).

An unfortunate by-product of previous literature that emphasized a single human capital resource is that it has tended to treat the resource as a commodity with a well-defined factor market. In contrast, human capital resource combinations are complex resources with a thin or possibly even no strategic factor market (Denrell et al., 2003). As the number of combinations among human capital resources increases, there is a reduction in the likelihood of a

corresponding factor market (see Denrell et al., 2003: 980). Consequently, and in contrast to the received literature but extending B. A. Campbell, Coff, et al. (2012), the primary locus of competitive advantage is human capital resource combinations, not whether these resources are generic or specific. More combinations among human capital resources necessarily make them more firm specific. Further, this thinking affects the logic of human capital investment decisions by both units and individuals. It leads to the conclusion that the distinction between generic and firm specific may be far less important to a firm's considering a human capital investment than the combinations of human capital capabilities the investment is expected to create.

### **Implications and Avenues for Future Research**

This manuscript's definition framework for human capital resources, and their resulting combinations, presents many implications for understanding past research and stimulating future research. For example, the definition framework broadens the view of human capital resources from the narrow individual-level prescriptions of human capital theory (Becker, 1964). Additionally, it broadens the locus of unit-relevant performance and competitive advantage by recognizing that human capital resources may exist at multiple levels. It also broadens the view of human capital resource combinations, and in turn, these combinations offer insights for understanding human capital resource-based value creation and competitive advantage. It also clarifies the relationship between emergence and complementarities, thus bridging micro and macro literatures. Finally, through this new human capital resource definition and framework, this manuscript presents a lexicon that spans micro and macro literatures. Such an agreed-upon lexicon should facilitate greater communication and increase learning opportunities across research domains (e.g., bridging the language divide too often prevalent between strategy researchers and HR researchers). Overall, this study joins recent scholarship (e.g., B. A. Campbell, Coff, et al., 2012; Felin & Hesterly, 2007; Ployhart & Moliterno, 2011) to make a dramatic break from past human capital resource discussions. However, the key directions listed below are only a start, and future theoretical analysis and empirical testing will be needed.

#### *Consequences of a Holistic Human Capital Resource Definition Framework*

One vital area of research that has been neglected is the consideration of the structure of human capital resources. Individuals are endowed with multiple KSAOs, so it becomes incumbent on future research to explore the consequences of these endowments. We noted how most human capital resource research fails to recognize this fact and instead focuses on a single overarching resource or (occasionally) generic and specific resources. Human capital theory (in contrast to the human capital resource considerations discussed throughout this manuscript) was never intended to reflect the variety of KSAOs that individuals are endowed with. Human capital theory instead emphasized the study of investments in a narrow set of KSAOs, such as skill or knowledge acquired through education. This emphasis was appropriate given that theory's purpose, but it becomes overly restrictive and limiting when thinking about the *resources* that underlie performance or competitive advantage. Our multilevel framework demonstrates the advantages of a more manifold approach, as a portfolio of

KSAOs contributes to a portfolio of human capital resources that are more likely to contribute to performance parity and competitive advantage than an isolated resource. Thus, researchers need to move from studying “the” human capital resource to studying human capital resources and their combinations—a radical new direction for scholarship in this area.<sup>6</sup>

Even while creating a broader definition in some ways, our definition framework places much needed boundaries on the nature and structure of human capital resources that are currently missing, helping to clarify which KSAOs may become human capital resources and which may not (see Figure 1). In particular, using relevance to a unit to determine whether KSAOs are human capital resources may seem obvious, but it clarifies a widespread source of confusion in the literature. For example, it clarifies that the terms *human capital* and *human capital resources* do not reference the same construct. Both are based on KSAOs, but human capital resources are individual or unit-level capacities based on individual KSAOs that are accessible for unit-relevant purposes, whereas human capital is an individual’s KSAOs that are relevant for achieving economic outcomes. This distinction becomes even more necessary when one considers the role of strategic factor markets, as human capital may have efficient factor markets but human capital resources may not. More broadly, the framework clarifies that constructs like attitudes, motivation, and health may comprise resources, but they are not *human capital resources* because they are not based on KSAOs (see Figure 1).

The importance of unit relevance highlights another implication of the framework: the nature of outcomes matter in terms of which KSAOs and human capital resources are relevant. In the framework presented here, human capital resources are only resources to the extent they are unit relevant, and the extent to which they are unit relevant is determined by the performance outcome. For example, a study seeking to understand the determinants of productivity may identify different human capital resources than a study seeking to understand the determinants of organizational innovation. Further, a study seeking to identify the determinants of competitive advantage may identify different human capital resources than a study seeking to identify the determinants of competitive parity. Such expectations are in line with an old truism in the micro literature: Predictors derive their importance from outcomes (Wallace, 1965). At the same time, the definitional framework is careful not to confound resource structure with resource function. Human capital resources are capacities for action, but they are not the action itself. Therefore, studies that define human capital in terms of employee performance behaviors are not studying human capital resources but rather the results or outcomes of such resources.

The definition framework also facilitates the transfer of theory, empirical findings, and conversations across levels and disciplines. We suggest that editors, reviewers, and authors use the labels and proposed definitions in this framework. If adopted, then authors could more easily convey the study’s disciplinary and theoretical underpinnings. Imagine, for example, a paper that started by noting, “This study examines firm-level strategic human capital resources originating in employee experience.” In this manner, editors and reviewers would instantly know what the authors were studying, at what level, and for what purpose. Likewise, editors may have an easier task picking reviewers who are experts in that particular type of human capital resource. Indeed, enhancing communication is one of the main benefits of construct clarity (Osigweh, 1989).

Thus, human capital resources are distinct from human capital. Human capital resources can be housed across all levels of an organization. There is a difference between strategic



human capital resources that are relevant for competitive advantage and fit the RBT framework and human capital resources that can be beneficial for unit performance at all levels.

### *The Implications of Human Capital Resources Across Levels*

The definition framework suggests that strategic human capital resources can exist at all levels. Therefore, the level where competitive advantage originates may exist at business, group, or individual levels. This is recognized within specific literatures, such as that on top management teams, stars, or CEOs, but has not been more broadly accepted within the human capital resource or RBT literatures. Interestingly, scholars advancing the upper echelons perspective (e.g., Carpenter et al., 2004) may have provided an early roadmap for how to connect individual human capital resources to strategic firm outcomes. Within the framework we are advancing, we expect future scholars to be better able to construct more fully developed theory describing how a strategic business group's human capital resource, such as a team of all-star designers, provides a firm-level competitive advantage.

The multilevel nature of human capital resources also raises questions of whether a particular level should be privileged among human capital resource scholars. Our response is no. Human capital resources may exist at any level, and it is the nature of member interactions and the broader context within which they interact that contributes to the formation of human capital resources from individual KSAOs (Coff & Kryscynski, 2011; Felin & Hesterly, 2007; Ployhart & Moliterno, 2011). Individuals may comprise the initial conditions for human capital resources, but a singular focus on the individual level can be no more (or less) informative than a singular focus on the collective level. Echoing Felin (2012) and Barney and Felin (2013), we note that most research has not considered the types of relationship processes and interactions contributing to emergence. Therefore, we suggest this meso level should be the focus of future research.

In developing the definitions, we have also drawn a clear distinction between individual and unit levels. This distinction is essential because of the differences in relationships when moving from a smaller group level to a larger firm or organization level—the most critical factor being group size. Relationships change as units get larger due to diseconomies of scale (Zenger, 1994), including higher measurement costs (Stigler, 1962), inability to establish perceptions of fairness in effort and pay (Milgrom & Roberts, 1988), and difficulties integrating new activities (Brahm & Tarziján, 2012), among others. Our discussion of combinations suggests future opportunities to explore this dynamic. While we have focused on the cross-level relationship in the emergence process between individual and unit-level human capital resource creation, an additional cross-level relationship that should be considered is the combination of small-unit human capital resources emerging into large-unit human capital resources.

### *Microfoundations and Human Capital Resource–Based Competitive Advantage*

Human capital resources are central to the conversations in the strategic microfoundations literature, and our definition, framework, and treatment of resource combinations contributes to this conversation. Consideration of human capital resource microfoundations offers new

insights into their relationships with competitive advantage. For example, most prior theory and research predicts that generic human capital resources cannot be a source of competitive advantage because they are mobile, transferrable, and imitable (Barney, 1991). In contrast, specific human capital resources can underlie competitive advantage because they are immobile, nontransferrable, and inimitable. In this manner, the locus of human capital resource-based competitive advantage is whether the content of the human capital resources is transferrable. However, the points developed in this manuscript diverge from the prior reasoning when multiple strategic human capital resources are considered. The locus of strategic human capital resource-based competitive advantage is not the content of the resources but the degree to which they are interconnected. It is the interconnections among resources that make the resources immobile and difficult to imitate (not to mention hard to value given the lack of efficient strategic factor markets). Interconnections increase the social complexity, causal ambiguity, and path dependency of strategic human capital resources. Thus, in accordance with B. A. Campbell, Coff, et al. (2012), it is more realistic to expect generic human capital resources to provide the potential for competitive advantage than prior theory recognizes. There may be some benefits of firm-specific resources over generic resources (e.g., more strongly related to operational performance; Crook et al., 2011), but competitive advantage is not necessarily one of them.

Interdependence theory (Kelley & Thibaut 1978; Rusbult & Van Lange, 2003, 2008) offers one means for understanding these potential interactions and relationships. Barney and Felin (2013) note that most prior research has taken a dyadic view of individuals and units. Such a dyadic view has been ingrained since at least Lewin (1936), who argued behavior was a function of the person and situation, where the situation is often the social context such as an organizational setting. In contrast, interdependence theory shifts the focus from the individual to the relationships and interdependences among people, such that interactions are a function of multiple persons, how they react to each other, and the structure of the situation within which they interact. Yet the situation is crucial in this model; it dictates not only the nature of the interdependencies but also which KSAOs are relevant (see also Mischel & Shoda, 1995; Tett & Burnett, 2003; Tett & Guterman, 2000, for similar arguments). Rusbult and Van Lange (2008: 2052) argue, "Situation structure matters because it is the interpersonal reality within which motives are activated, toward which cognition is oriented, and around which interaction unfolds." Thus, interdependence theory shifts the analysis from *intrapersonal* KSAOs to *interpersonal* relationships among people with different KSAOs.

Even when individuals may carry the same KSAOs, the pattern of their relationships with other people will result in different types of human capital resources emerging (see Ployhart & Moliterno, 2011). These effects can be observed through the lens of employee mobility. For example, Felin et al. (2009: 564) suggest, "Interest and self-selection also provide key mechanisms for thinking about social interaction and associated knowledge creation." Employee mobility suggests that collective human capital resources can change dramatically even with modest changes in unit membership and even when the KSAOs of those members who remain or leave do not themselves change (Nyberg & Ployhart, 2013).

### *The Role of Strategic Factor Markets*

To date, most of the literature has treated strategic human capital resources in isolation and, when discussing the competitive ramifications, employed strategic factor market logics

that are consistent with commodity resources (Denrell et al., 2003). When considering only a single resource, or isolated resources, the traditional factor market logic underlying generic or specific human capital resources is reasonable. However, as noted by B. A. Campbell, Coff, et al. (2012), this logic holds only under a very specific set of conditions. One of these conditions relates to portfolios of KSAOs and human capital resources. We extended their arguments (and those of Denrell et al., 2003) to argue that strategic human capital resource combinations represent complex resources while the lower level resources represent commodity resources. An implication, and one that deserves future research, is the extent to which strategic factor markets exist for these complex strategic human capital resource combinations.

A particularly controversial prediction resulting from this definitional framework is that there are no well-defined or efficient factor markets for human capital resource combinations. For example, any collective resource can be firm specific because it is based on an emergence-enabling process (Ployhart & Moliterno, 2011) and combinations of lower level commodity resources (Denrell et al., 2003). If there are no (or thin) factor markets for human capital resource combinations, prior theory that invokes efficient market logics is not as directly relevant for human capital resources. Further, if all human capital resources originate in KSAOs, and all collective human capital resources are based on aggregations of individual KSAOs, then the most radical prediction is that there is no factor market for unit-level human capital resources!

### *Valuing Strategic Human Capital Resources*

Recent RBT developments focus greater attention on how human capital resources are valued, *ex ante* (e.g., Maritan & Peteraf, 2011; J. Schmidt & Keil, 2013). It is increasingly recognized that the valuation of resources that are traded or acquired within factor markets is not as efficient as classic treatments have argued (Barney, 1986). Rather, recent theory argues that the valuation of resources is more frequently subjective, based on manager cognitive resources, the firm's market position, and the firm's existing resources (e.g., J. Schmidt & Keil, 2013).

Recognizing that multiple strategic human capital resources may be combined in multiple ways offers insight into the ways that "commodity" human capital resources may be valued. The various strategic human capital resource combinations each represent a distinct means through which complementarities may be created. The broader point is that there are many different types of combinations that are possible, and these combinations may be unique to a given unit. In this manner, knowing the types of combinations that are possible allows managers to more precisely anticipate the value of strategic human capital resources within both their own firm and those of their competitors. Indeed, when discussing how managers evaluate resources from the view of their firm, Denrell et al. (2003: 978) noted, "The more distinctive the view, the more likely that such a view can encompass valuable opportunities not similarly visible to other firms." Thus, the more knowledge one has about the potential distinct combinations of strategic human capital resources, the more valuable opportunities for utilizing those resources might be envisioned.

Future research ought to explore these possibilities and examine whether strategic human capital resources produce different perceived or actual value depending on the manner in which they are combined. For example, is the same human capital resource more or less

valuable in one type of resource combination than another? How do perceptions of resource value fit with social complexity theory? Does understanding different human capital resource combinations reduce causal ambiguity, and if so, do the benefits of one offset the losses of the other?

## Conclusion

This paper synthesizes theory from multiple disciplines to propose a human capital resource framework that defines the structure, function, and levels of human capital resources. This framework leads to the conclusion that there is not just one human capital resource but rather multiple resources that may be combined in a number of theoretically distinctive ways. These arguments lead to several insights, including that multiple human capital resources exist, and these resources are not limited to generic and specific types. We also conclude that the locus of competitive advantage exists primarily with combinations of human capital resources, even when they originate in simple, imitable, or tradable resources. This is so because human capital resource combinations are complex and nearly all such combinations are firm specific. Finally, we conclude that strategic factor markets often do not exist for human capital resource combinations. These predictions challenge the core of human capital scholarship developed over the last 50 years. While we do not literally believe that human capital is (or should be) dead, it is time to embrace a broader and more inclusive point of view. Long live human capital resources!

## Appendix

### *Widely Held Premises Underlying the Human Capital Resource Definition Framework*

#### *Premises From Micro Research*

- Individuals have a range of unique characteristics including knowledge, skills, abilities, and other characteristics (KSAOs); beliefs; feelings; psychological states and traits; and physical characteristics (Guion, 2011; Murphy, 2012).
- Heterogeneity in KSAOs contributes to heterogeneity in organizationally relevant outcomes across levels (Guion, 2011; Ployhart, 2004).
- Capital is a stock of wealth that can produce a flow of income. It is (a) productive, (b) different from income, (c) a provision for the future, and (d) a reserve (e.g., Fisher, 1906; Schultz, 1961).
- Human capital is based on an individual's KSAOs, often resulting from an individual's investment into personal characteristics that can be used productively for achieving economic outcomes (e.g., Becker, 2002).
- Human capital resides only within individuals (Becker, 2002).

#### *Premises From Macro Research*

- "The individual is always the basic strategic factor of organization" (Barnard, 1938: 139).
- "'Organizational' action, behavior, and outcomes are really proxies for interacting individuals who take action, behave, and create the overall, emergent outcomes" (Felin & Foss, 2009: 165).

- Performance outcomes can be strategic or nonstrategic. Strategic performance outcomes impact competitive advantage. Nonstrategic performance outcomes impact competitive parity (Varadarajan, 1985).
- Resources that enable competitive advantage are more valuable than those that enable competitive parity (Barney & Wright, 1998).
- Competitive advantage can only be pursued or achieved by an entity competing in a market, but its source may exist at individual or collective levels (Porter, 1980).
- Heterogeneity in resources contributes to heterogeneity in organizationally relevant outcomes across levels (Barney, Ketchen, & Wright, 2011; Peteraf, 1993).

## Notes

1. We use the term *unit* to signify collective levels of employees (e.g., groups, departments, organizations).
2. The title of this manuscript is not meant to literally imply that scholarship on human capital is dead or irrelevant. Rather, it is meant to strongly emphasize that research needs to move past traditional and fairly restrictive interpretations of human capital theory, to fully embrace the modern scholarship on human capital resources.
3. We are not proposing a multilevel theory, but we are integrating numerous theoretical observations (see the appendix) to construct a holistic framework that provides an internally consistent set of human capital resource definitions.
4. Note the totals can sum to more than 92 because a few studies report more than one human capital resource.
5. A possible exception involves acquisitions (e.g., one firm buying another, one firm poaching another firm's star team or employee). While important, such acquisitions are a special case that we do not consider here.
6. The framework presented here and illustrated in Figure 1 also suggests alternative ways to think about these human capital investments, who makes them (individual or firm), and at what level. It is beyond the scope of this paper to develop these insights, but we suspect they may offer several interesting implications that deserve further research.

## References

- Ackerman, P. L., & Heggestad, E. D. 1997. Intelligence, personality, and interests: Evidence for overlapping traits. *Psychological Bulletin*, 121: 219-245.
- Adegbesan, J. A. 2009. On the origins of competitive advantage: Strategic factor markets and heterogeneous resource complementarity. *Academy of Management Review*, 34: 463-475.
- Astley, W. G. 1985. Administrative science as socially constructed truth. *Administrative Science Quarterly*, 30: 497-513.
- Barnard, C. I. 1938. *The functions of the executive*. Cambridge, MA: Harvard University Press.
- Barney, J., & Felin, T. 2013. What are microfoundations? *Academy of Management Perspectives*, 27: 120-137.
- Barney, J. B. 1986. Strategic factor markets: Expectations, luck, and business strategy. *Management Science*, 32: 1231-1241.
- Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99-120.
- Barney, J. B., Ketchen, D. J., & Wright, M. 2011. The future of resource-based theory revitalization or decline? *Journal of Management*, 37, 1299-1315.
- Barney, J. B., & Wright, P. M. 1998. On becoming a strategic partner: The role of human resources in gaining competitive advantage. *Human Resource Management*, 37: 31-46.
- Becker, G. S. 1964. *Human capital*. New York, NY: Columbia University Press.
- Becker, G. S. 2002. The age of human capital. In E. P. Lazear (Ed.), *Education in the twenty-first century*: 3-8. Palo Alto, CA: Hoover Institution Press.
- Brahm, F., & Tarziján, M. J. 2012. The impact of complexity and managerial diseconomies on hierarchical governance. *Journal of Economic Behavior & Organization*, 84: 586-599.
- Campbell, B. A., Coff, R., & Kryscynski, D. 2012. Rethinking sustained competitive advantage from human capital. *Academy of Management Review*, 37: 376-395.

- Campbell, B. A., Ganco, M., Franco, A. M., & Agarwal, R. 2012. Who leaves, where to, and why worry? Employee mobility, entrepreneurship and effects on source firm performance. *Strategic Management Journal*, 33: 65-87.
- Campbell, J. P. 1990. Modeling the performance prediction problem in industrial and organizational psychology. In M. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed.): Vol.1, 687-732. Palo Alto, CA: Consulting Psychologists Press.
- Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. 2004. The upper echelons revisited: The antecedents, elements, and consequences of TMT composition. *Journal of Management*, 30: 749-778.
- Carpenter, M. A., Sanders, W. G., & Gregersen, H. B. 2001. Bundling human capital with organizational context: The impact of international assignment experience on multinational firm performance and CEO pay. *Academy of Management Journal*, 44: 493-511.
- Chan, D. 1998. Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 93: 234-246.
- Cockburn, I., Henderson, R., & Stern, S. 2000. Untangling the origins of competitive advantage. *Strategic Management Journal*, 21: 1123-1145.
- Coff, R. W. 2002. Human capital, shared expertise, and the likelihood of impasse in corporate acquisitions. *Journal of Management*, 28: 107-128.
- Coff, R. W., & Kryscynski, D. 2011. Drilling for micro-foundations of human capital-based competitive advantages. *Journal of Management*, 37: 1429-1443.
- Crook, T. R., Todd, S. Y., Combs, J. G., Woehr, D. J., & Ketchen, D. J., Jr. 2011. Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology*, 96: 443-456.
- Denrell, J., Fang, C., & Winter, S. G. 2003. The economics of strategic opportunity. *Strategic Management Journal*, 24: 977-990.
- Dierickx, I., & Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35: 1504-1511.
- Ennen, E., & Richter, A. 2010. The whole is more than the sum of its parts—Or is it? A review of the empirical literature on complementarities in organizations. *Journal of Management*, 36: 207-233.
- Fang, E. E. 2011. The effect of strategic alliance knowledge complementarity on new product innovativeness in China. *Organization Science*, 22: 158-172.
- Felin T. 2012. Cosmologies of capability, markets and wisdom of crowds: Introduction and comparative agenda. *Management and Decision Economics*, 33: 283-294.
- Felin, T., & Foss, N. J. (2009). Organizational routines and capabilities: Historical drift and a course-correction toward microfoundations. *Scandinavian Journal of Management*, 25: 157-167.
- Felin, T., Foss, N. J., Heimeriks, K. H., & Madsen, T. L. 2012. Microfoundations of routines and capabilities: Individuals, processes, and structure. *Journal of Management Studies*, 49: 1351-1374.
- Felin, T., & Hesterly, W. S. 2007. The knowledge-based view, nested heterogeneity, and new value creation: Philosophical considerations on the locus of knowledge. *Academy of Management Review*, 32: 195-218.
- Felin, T., Zenger, T. R., & Tomsik, J. 2009. The knowledge economy: Emerging organizational forms, missing microfoundations, and key considerations for managing human capital. *Human Resource Management*, 48: 555-570.
- Fisher, I. 1906. *The nature of capital and income*. New York, NY: Macmillan.
- Groysberg, B., & Lee, L. E. 2009. Hiring stars and their colleagues: Exploration and exploitation in professional service firms. *Organization Science*, 20: 740-758.
- Groysberg, B., Lee, L. E., & Nanda, A. 2008. Can they take it with them? The portability of star knowledge workers' performance. *Management Science*, 54: 1213-1230.
- Guion, R. M. 2011. *Assessment, measurement, and prediction for personnel decisions*. New York, NY: Routledge.
- Hatch, N. W., & Dyer, J. H. 2004. Human capital and learning as a source of sustainable competitive advantage. *Strategic Management Journal*, 25: 1155-1178.
- Hayton, J. C. 2005. Competing in the new economy: The effect of intellectual capital on corporate entrepreneurship in high-technology new ventures. *R&D Management*, 35: 137-155.
- Hess, A. M., & Rothaermel, F. T. 2011. When are assets complementary? Star scientists, strategic alliances, and innovation in the pharmaceutical industry. *Strategic Management Journal*, 32: 895-909.
- Hitt, M. A., Biermant, L., Shimizu, K., & Kochhar, R. 2001. Direct and moderating effects of human capital on strategy and performance in professional service firms: A resource-based perspective. *Academy of Management Journal*, 44: 13-28.



- Hunter, J. E. 1983. A causal analysis of cognitive ability, job knowledge, job performance, and supervisory ratings. In F. Landy, S. Zedeck, & J. Cleveland (Eds.), *Performance measurement and theory*: 257-266. Hillsdale, NJ: Lawrence Erlbaum.
- Huselid, M. A., Jackson, S. E., & Schuler, R. S. 1997. Technical and strategic human resources management effectiveness as determinants of firm performance. *Academy of Management Journal*, 40: 171-188.
- Ilgel, D. R., Hollenbeck, J. R., Johnson, M. D., & Jundt, D. K. 2005. Teams in organizations: From input-process-output models to IMO models. *Annual Review of Psychology*, 56: 517-543.
- Jensen, A. R. 1998. *The g factor*. Westport, CT: Praeger.
- Kelley, H. H. 1991. Lewin, situations, and interdependence. *Journal of Social Issues*, 47: 211-233.
- Kelley, H. H., & Thibaut, J. W. 1978. *Interpersonal relationships: A theory of interdependence*. New York, NY: John Wiley.
- Kor, Y. Y., & Leblebici, H. 2005. How do interdependencies among human-capital deployment, development, and diversification strategies affect firms' financial performance? *Strategic Management Journal*, 26: 967-985.
- Kozlowski, S. W. J., & Chao, G. T. 2012. The dynamics of emergence: Cognition and cohesion in work teams. *Managerial and Decision Economics*, 33: 335-354. doi:10.1002/mde.2552
- Kozlowski, S. W. J., & Klein, K. J. 2000. A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions*: 3-90. San Francisco, CA: Jossey-Bass.
- Kraaijenbrink, J. 2011. Human capital in the resource-based view. In A. Burton-Jones & J. C. Spender (Eds.), *The Oxford handbook of human capital*: 218-237. Oxford, UK: Oxford University Press.
- Kraaijenbrink, J., Spender, J. C., & Groen, A. J. 2010. The resource-based view: A review and assessment of its critiques. *Journal of Management*, 36: 349-372.
- Kuhn, T. S. 1962. *The structure of scientific revolutions*. Chicago, IL: University of Chicago Press.
- Lepak, D. P., Liao, H., Chung, Y., & Harden, E. E. 2006. A conceptual review of human resource management systems in strategic human resource management research. *Research in Personnel and Human Resources Management*, 25: 217-271.
- Lewin, K. 1936. *Principles of topological psychology*. New York, NY: McGraw-Hill.
- Maritan, C. A., & Peteraf, M. A. 2011. Building a bridge between resource acquisitions and resource accumulation. *Journal of Management*, 37: 1374-1389.
- Milgrom, P., & Roberts, J. 1988. An economic approach to influence activities in organizations. *American Journal of Sociology*, 94: S154-S179.
- Miller, D., & Shamsie, J. 1996. The resource-based view of the firm in two environments: The Hollywood film studios from 1936 to 1965. *Academy of Management Journal*, 39: 519-543.
- Mischel, W., & Shoda, Y. 1995. A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102: 246-268.
- Murphy, K. R. 2012. Individual differences. In N. Schmitt (Ed.), *The Oxford handbook of personnel assessment and selection*: 31-47. Oxford, UK: Oxford University Press.
- Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. 2006. *Human resource management: Gaining a competitive advantage* (5th ed.). New York, NY: McGraw-Hill/Irwin.
- Nyberg, A. J., Fulmer, I. S., Gerhart, B., & Carpenter, M. A. 2010. Agency theory revisited: CEO return and shareholder interest alignment. *Academy of Management Journal*, 53: 1029-1049.
- Nyberg, A. J., Moliterno, T. P., Hale, D., & Lepak, D. P. In press. Resource-based perspectives on unit-level human capital: A review and integration. *Journal of Management*.
- Nyberg, A. J., & Ployhart, R. E. 2013. Context-emergent turnover (CET) theory: A theory of collective turnover. *Academy of Management Review*, 38: 109-131.
- Osigweh, C. A. B. 1989. Concept fallibility in organizational science. *Academy of Management Review*, 14: 579-594.
- Peteraf, M. A. 1993. The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14 (3): 179-191.
- Peteraf, M. A., & Barney, J. B. 2003. Unraveling the resource-based tangle. *Managerial & Decision Economics*, 24: 309-323.
- Ployhart, R., Van Iddekinge, C. H., & MacKenzie, W. 2011. Acquiring and developing human capital for sustained competitive advantage: The interconnectedness of generic and specific human capital resources. *Academy of Management Journal*, 54: 353-368.

- Ployhart, R. E. 2004. Organizational staffing: A multilevel review, synthesis, and model. In J. Martocchio (Ed.), *Research in personnel and human resource management*: Vol. 23, 121-176. Oxford, UK: Elsevier.
- Ployhart, R. E., & Moliterno, T. P. 2011. Emergence of the human capital resource: A multilevel model. *Academy of Management Review*, 36: 127-150.
- Porter, M. E. 1980. *Competitive strategy: Techniques for analyzing industries and competitors*. New York, NY: Free Press.
- Powell, T. C. 2003. Varieties of competitive parity. *Strategic Management Journal*, 24: 61-86.
- Rosen, S. 1981. The economics of superstars. *American Economic Review*, 71: 845-858.
- Rothaermel, F. T., & Hess, A. M. 2007. Building dynamic capabilities: Innovation driven by individual-, firm-, and network-level effects. *Organization Science*, 18: 898-921.
- Rusbult, C. E., & Van Lange, P. A. 2003. Interdependence, interaction, and relationships. *Annual Review of Psychology*, 54: 351-375.
- Rusbult, C. E., & Van Lange, P. A. 2008. Why we need interdependence theory. *Social and Personality Psychology Compass*, 2: 2049-2070.
- Sanders, W., & Hambrick, D. 2007. Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *Academy of Management Journal*, 50: 1055-1078.
- Schmidt, F., & Hunter, J. 1998. The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin*, 124: 262-274.
- Schmidt, J., & Keil, T. 2013. What makes a resource valuable? Identifying the drivers of firm-idiosyncratic resource value. *Academy of Management Review*, 38: 206-228.
- Schmitt, N., & Chan, D. 1998. *Personnel selection: A theoretical approach*. Thousand Oaks, CA: Sage.
- Schneider, B. 1987. The people make the place. *Personnel Psychology*, 40: 437-453.
- Schultz, T. W. 1961. Investment in human capital. *American Economic Review*, 51: 1-17.
- Smith, P. C. 1976. Behaviors, results, and organizational effectiveness: The problem of criteria. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*: 745-776. Chicago, IL: Rand McNally.
- Somaya, D., Williamson, I. O., & Lorinkova, N. 2008. Gone but not lost: The different performance impacts of employee mobility between cooperators versus competitors. *Academy of Management Journal*, 51: 936-953.
- Stieglitz, N., & Heine, K. 2007. Innovations and the role of complementarities in a strategic theory of the firm. *Strategic Management Journal*, 28: 1-15.
- Stigler, G. J. 1962. Information in the labor market. *Journal of Political Economy*, 70: 94-105.
- Suddaby, R. 2010. Editor's comments: Construct clarity in theories of management and organization. *Academy of Management Review*, 35: 346-357.
- Tett, R. P., & Burnett, D. D. 2003. A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, 88: 500.
- Tett, R. P., & Guterman, H. A. 2000. Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality*, 34: 397-423.
- Van de Ven, A. H. 1976. On the nature, formation, and maintenance of relations among organizations. *Academy of Management Review*, 1: 24-36.
- Varadarajan, P. R. 1985. A two-factor classification of competitive strategy variables. *Strategic Management Journal*, 6: 357-375.
- Wade, J. B., Porac, J. F., Pollock, T. G., & Graffin, S. D. 2006. The burden of celebrity: The impact of CEO certification contests on CEO pay and performance. *Academy of Management Journal*, 49: 643-660.
- Wallace, S. R. 1965. Criteria for what? *American Psychologist*, 20: 411-417.
- Witt, L. A., Burke, L. A., Barrick, M. R., & Mount, M. K. 2002. The interactive effects of conscientiousness and agreeableness on job performance. *Journal of Applied Psychology*, 87: 161-169.
- Wright, P. M., & McMahan, G. C. 2011. Exploring human capital: Putting human back into strategic human resource management. *Human Resource Management Journal*, 21: 93-104.
- Youndt, M. A., & Snell, S. A. 2004. Human resource configurations, intellectual capital, and organizational performance. *Journal of Managerial Issues*, 16: 337-360.
- Zenger, T. R. 1994. Explaining organizational diseconomies of scale in R&D: Agency problems and the allocation of engineering talent, ideas, and effort by firm size. *Management Science*, 40: 708-729.
- Zucker, L. G., & Darby, M. R. 1996. Star scientists and institutional transformation: Patterns of invention and innovation in the formation of the biotechnology industry. *Proceedings of the National Academy of Sciences of the United States of America*, 93: 12709-12716.