



The information processing foundations of human capital resources: Leveraging insights from information processing approaches to intelligence



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ABSTRACT

This paper considers how information processing approaches to intelligence may offer implications for the study of human capital resources within organizations. We first provide a brief overview of human capital research that summarizes its evolution and current areas of emphasis. This review notes that most of the research on human capital has ignored key developments in the psychological study of intelligence. We then review contemporary approaches to studying intelligence as information processing. We conclude by proposing a broad agenda for integrating research on human capital resources with information processing approaches to intelligence.

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1. Introduction

Intelligence plays a vital role in the success of individuals, organizations, and societies. In various forms, intelligence has been examined within multiple disciplines (e.g., economics, psychology, sociology), levels of analysis (e.g., individual, firm), and theoretical perspectives (e.g., individual differences; firm level resources). For example, psychologists tend to emphasize the relationships between intelligence and individual outcomes (e.g., Schmidt & Hunter, 2004), economists often study proxies of intelligence and wages (e.g., Becker, 1964), and management strategy scholars tend to focus on relationships between human capital resources (aggregates of individual differences) and firm competitive advantage (e.g., Hitt, Biermant, Shimizu, & Kochhar, 2001). Such breadth speaks to the importance of intelligence in science and practice. These different disciplinary perspectives each offer unique insights, but the research has tended to be more *multidisciplinary* than *interdisciplinary* (Ployhart & Hale, 2014). That is, intelligence is not conceptualized, operationalized, or understood the same way within psychology, economics, and strategic management, and each field remains fairly independent of the others (Ployhart, Nyberg, Reilly, & Maltrich, 2014). This is particularly troubling because research on human capital has the opportunity to illuminate how individual differences such as intelligence influence the performance of firms and even societies.

The purpose of this article is to consider how recent findings based on an information processing approach to intelligence can inform the study of human capital resources in organizations. We focus primarily on how theory and research in cognition and psychometrics can enhance understanding human capital and talent management. The article will focus on what human capital and management professionals need to know about what determines achievement, and emphasizes three key points. First, achievement is based, in large part, on what we know and how much we know. Second, what we know is a product of how well we process information and on the information we have been given to process. Third, some of the information that we process that is important for achievement has to do with what we believe about our ability to achieve our goals by our own efforts. That belief is called

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self-control. Thus, understanding the information processing foundations of intelligence may offer insight into how firms can use intelligence as a valuable human capital resource for generating competitive advantage in a globally diverse world.

In the section that follows, we first provide a brief summary and review of human capital within organizations. Our focus is mainly on human capital resources at the firm level, although we do occasionally consider human capital from the perspective of economics. We then turn to a consideration of information processing perspectives on intelligence, and finally summarize an empirical study that illustrates the flavor of this kind of research. A summary of key implications of the information processing view of intelligence is provided, and we conclude with a broader research agenda for connecting human capital research with information processing research on intelligence.

2. Intelligence, human capital, and competitive advantage

Early civilizations such as the Chinese and Greeks realized that intelligence, along with other individual difference constructs, could be leveraged to enhance performance on tasks and jobs. Yet it was not until Adam Smith's (1776) treatise on "the wealth of nations" that such intellectual capacities became a more prominent part of economic thought. It would then take another 175 years before these intellectual capacities were more formally integrated into economics via the introduction of human capital theory (Becker, 1964; Schultz, 1961). The contemporary study of human capital originated in economics during the late 1950s, with an early emphasis on understanding individual wage differentials due to differences in education and tenure. Although many of the early economists who developed human capital theory would ultimately receive Nobel Prizes, at the time it was a fairly radical idea to conceptualize human intellectual capabilities as a form of capital.

Strategic management interest in human capital became more widespread in the 1990s because it appeared that human capital could be a firm-level resource capable of enhancing competitive advantage. This research proceeded to conceptualize human capital within the lens of resource-based theory (RBT; Barney, 1991; Barney & Wright, 1998; Wernerfelt, 1984). RBT holds that firms are heterogeneous in their endowment of resources, and these resource endowments contribute to variability in organizational performance and competitive advantage. For our purposes, competitive advantage is generally defined in terms of achieving above-normal returns relative to competitors (Peteraf & Barney, 2003). Competitive advantage is thus an issue of differentiation, not simply "more is better." Resources that contribute to competitive advantage are valuable and rare, and such advantages may be sustainable if the resources are also inimitable and nonsubstitutable (Barney, 1991). From even the beginning of RBT, it was suspected that human capital resources have the potential to underlie sustained competitive advantage because they have these four characteristics. Human capital is not something that can be "owned" by the organization (Coff, 1997), and hence firms must deploy Human Resource (HR) policies and practices that can accumulate (through employee selection) and develop (through training) it. The accumulation and development processes are socially complex, causally ambiguous, and path dependent, thus making human capital difficult to imitate.

The economic human capital theory (Becker, 1964) is primarily focused on the individual level, while RBT is primarily focused on the firm level. Yet both of these theoretical frameworks emphasized individual difference constructs among people. What is surprising, however, is that the RBT-based research on human capital was derived from the economics approach. In turn, the economics approach emphasized the study of education and experience to examine how these characteristics helped explain wage differentials over time (see Becker, 2011). Human capital theory further focused on two main types of individual characteristics that were important for the purposes of the theory: generic human capital that could be applied to any firm and context, and specific human capital which was only applicable to a particular firm. This distinction was important for explaining wage differentials within the lens of human capital theory, but strategy scholars took this distinction and applied it to competitive advantage. Specifically, generic human capital resources could not be a source of competitive advantage because the value that they produce corresponds to the costs of acquiring them (they were also imitable and mobile); specific human capital resources could be a source of competitive advantage because there is no corresponding labor market where they can be acquired (Barney, 1986).

Clearly, the prior research on human capital theory and human capital resources ignored the nearly 100 years of research on individual differences in psychology. It is perhaps no surprise, then, that the predictions from those fields collide with the scholarship in psychology and individual differences. In psychology, "generic" individual differences such as intelligence, personality, and values, have been shown to be related to the most important occupational and personal outcomes (Jensen, 1998; Schmidt & Hunter, 1998, 2004). What one might call "specific" individual differences are those that are more contextually-bound, such as specific forms of knowledge and skill. The fascination of individual differences within the psychological research has been on "generic" individual differences precisely because they are important across multiple contexts.

Of the various generic individual difference constructs that exist, intelligence is one of the most enduring. This is not surprising given that intelligence predicts nearly all major life and work outcomes, at least at the individual level. Those with greater intelligence have greater individual job performance (Schmidt & Hunter, 2004), and the importance of intelligence increases as the complexity of the job increases (see Schmidt, 2002). Intelligence is positively related to a number of other important individual outcomes, including educational attainment, educational performance, income, occupation, psychological adjustment, and health; and negatively related to workplace accidents, delinquency, and disciplinary problems (see Gottfredson, 1997; Herrnstein & Murray, 1994; Jensen, 1998; Lubinski & Humphreys, 1997; Schmidt, 2002). Yet notice that this research is nearly universally conducted at the individual level and linked to individual level outcomes. It is less clear whether intelligence contributes to the formation of human capital resources that contribute to competitive advantage.

More contemporary human capital research is starting to recognize the psychological "microfoundations" of human capital resources (see Barney & Felin, 2013; Coff & Kryscynski, 2011; Wright & McMahan, 2011). That is, rather than relying on human capital theory conceptualizations of individual differences, the emphasis is becoming more of one that connects RBT to psychology (Ployhart & Hale, 2014).

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