

# “Our Most Important Asset”: A Multidisciplinary/ Multilevel Review of Human Capital Valuation for Research and Practice

Ingrid Smithey Fulmer

*Rutgers University*

Robert E. Ployhart

*University of South Carolina*

---

*Despite managers' claims that their organization's human capital is their "most important asset," few can confidently state the financial value of that resource or quantify in financial terms how changes in management practices, culture, or workforce composition affect the value of that resource. Scholars of strategic human capital and strategic human resource management face a similar situation, relying more on inferences about human capital resource value than on empirical measures of it. In an effort to explicate the challenges associated with financial valuation so that scholars can begin to move past them, we provide a multidisciplinary review of existing work that has been concerned with the estimation, disclosure, and management of the financial value associated with an organization's human capital resources. We propose a multi-level organizing framework to facilitate the linkage between the financial valuation issues highlighted in our review and the recent literature on strategic human capital/strategic human resource management. Based on the insights drawn from this review, we then propose a series of next steps or "action items" to stimulate future research that holds promise for yielding both new theoretical insights and important practical implications for organizations.*

**Keywords:** *human capital; human capital resource; human capital financial value; human capital financial valuation; strategic human resource management*

---

---

*Acknowledgments: The authors would like to thank the Action Editor, Fred Oswald, and two anonymous reviewers for their helpful feedback. We would also like to acknowledge the capable research assistance of Donald Hale, Jr. and Matthew L. Call.*

*Corresponding author: Ingrid Smithey Fulmer, School of Management and Labor Relations, Rutgers University, 215B Janice H. Levin Building, Piscataway, NJ 08854, USA.*

*E-mail: ifulmer@smlr.rutgers.edu*

Our 73,000 team members are the heart and soul of our company, and our “not-so-secret” sauce.

—Whole Foods Market, 2012 letter to stakeholders

Your employees are your best asset. Happy employees make for happy customers.

—Richard Branson, founder and chairman of Virgin Group

Organizational leaders often endorse the view that “[o]ur employees are our most important asset” (Guest, 2001). Implicit in this characterization is the idea that collective human capital embodied in the workforce represents an economic resource of the organization in the sense that it is expected to generate future income streams (Flamholtz, 1999). This perspective is echoed in a growing body of scholarly work in strategy and strategic human resource management that examines firm-level human capital as a type of resource from which firms can potentially derive competitive advantage (Barney, 1991; Becker & Gerhart, 1996; Lado & Wilson, 1994).

Characterizing collective human capital (i.e., at the firm or unit level) as an economic resource suggests that its expected future financial benefits can potentially be estimated at a point in time. In turn, this estimate can be used as one way of describing the human capital resource for business purposes such as financial reporting, fiscal management, and managerial decision making. This information is also likely useful for some academic research purposes. As we use the term in this context, financial valuation simply means the systematic process of conceptualizing and denominating in monetary terms the expected economic benefits to be provided by human capital resources, something organizations routinely do with other economic resources such as bank accounts, investments, land, and equipment.

However, unlike other economic resources, in the United States and many other countries generally accepted accounting principles (GAAP) that govern the reporting of financial information to external stakeholders (investors, creditors) prohibit firms from recording the financial value of human capital resources as an asset on balance sheets prepared for those external users (we discuss the reasons for this later). Instead, companies record human capital expenditures as annual expenses on the income statement. These rules do not prohibit organizations from estimating and monitoring the financial value of their human capital resources for internal management purposes, but in the absence of an external requirement there is considerable inconsistency in whether and how organizations do so. As a consequence, few organizations can state with any certainty what their “most important asset” is actually worth in financial terms, much less how the value of that asset changes from one year to the next and why (Likert, 1967; Litan & Wallison, 2003). Resources not formally valued and monitored in some way, at least for internal purposes, are likely less salient in the minds of organizational decision makers (Likert, 1979) and subject to greater risk of neglect or underutilization as compared to other assets formally recognized and reported as such.

Cognizant of this potential problem, many scholars and managers have pursued the dual aims of developing human capital financial valuation approaches for internal management and/or supplemental disclosure purposes and of developing alternative (often nonfinancial) measures of firms’ human capital attributes and outcomes (e.g., employee engagement or turnover rates) that are thought to relate to human capital value. In addition, a variety of tools has been adopted by management accountants and HR professionals for evaluating the net

present value (NPV), return on investment (ROI), or effectiveness of particular HR interventions and for estimating costs associated with turnover, absenteeism, and so forth (e.g., Cascio & Boudreau, 2010; Director, 2012). While these tools may incorporate financial calculations, their scope is limited to evaluating the effects of particular interventions or events within a set of simplifying assumptions. These decision tools can be quite useful for the specific purpose at hand (e.g., choosing among different selection measures), but provide only a partial picture of the overall value of human capital to an organization and how it changes over time.

These various approaches to understanding and managing the financial value of firms' human capital resources focus on different but interrelated aspects of financial value that are relevant both for organizational managers and for scholars of organizations, and for this reason we consider each of them in this review. Financial measures of overall resource value at various levels of aggregation (e.g., firm, business unit, group/team, or even individual level) are desirable for planning purposes as they help managers gauge the relative levels of various resources available to pursue strategic goals. Such measures are also useful for fiscal stewardship and monitoring of resources, as changes in financial value from one period to the next can be detected and investigated. Conversely, understanding how nonfinancial characteristics of the workforce (e.g., attitudes, turnover) relate to the financial value of human capital resources is of interest both to scholars who study the effects of interventions (e.g., HR or other management practices) on human resource value across organizations as well as to organizational leaders charged with monitoring human capital resource value within their own organizations. Decision tools (such as utility analysis and ROI analysis) are particularly useful for helping managers choose among and then evaluate the effectiveness of particular intervention options available to them.

Attention to scholarship on these various aspects of human capital resource financial valuation holds promise as a launching point for advancing future empirical research in several areas, including strategic human resource management (HRM). Empirical strategic HRM research finds that certain HR systems can have an effect on firm performance, which is typically operationalized as relatively short-term performance (see Combs, Liu, Hall, & Ketchen, 2006; Jiang, Lepak, Hu, & Baer, 2012; Rabl, Jayasinghe, Gerhart, & Kuehlmann, 2011; Subramony, 2009). From those observations and from resource-based theory, scholars infer that this is due to the effects that HR systems have on organizations' human capital. Some scholars do test this, utilizing measures of the underlying human capital construct (for a review, see Nyberg, Moliterno, Hale, & Lepak, 2014); such measures include managers' ratings of the collective human capital of workers in a unit (e.g., Takeuchi, Lepak, Wang, & Takeuchi, 2007), aggregated measures of individuals' knowledge, skills, abilities, and other characteristics (KSAOs; e.g., Ployhart, Weekley, & Ramsey, 2009), or indices of tenure, education, or skill (e.g., Hitt, Bierman, Shimizu, & Kochhar, 2001). These measures represent a step forward in operationalizing this fundamental construct, but we do not know how these measures compare to more direct financial valuations of human capital resources. An obvious next step in this research would be to assess how much HR systems and other predictors affect the human capital resource (e.g., through how they lead to the accumulation of KSAOs or affect the social and task context) and how the resulting changes to the nature of the resource then relate to changes in the financial value of that resource. A financial measure of human capital resource value that is comparable to financial measures of other

organizational assets could then also facilitate research that examines the relative contributions of various firm resources to outcomes such as annual operating performance, stock market performance, and/or long-term survival of the organization. As scholars in this area increasingly probe the mechanisms by which HR systems contribute to competitive advantage, and as they seek to communicate the practical implications of their work to bottom-line-oriented managers, the need for better ways of operationalizing firm- and unit-level human capital has become critical (Nyberg et al., 2014). The financial valuation of human capital resources represents a logical next step.

It is interesting to observe how long this notion of financial valuation has been around. As one of the early proponents of prudent fiscal management of human capital, management scholar Rensis Likert was confident about the prospects for the adoption of human capital valuation approaches in organizations:

In my judgment it is highly likely that, within a decade, the Current Value method of HRA [human resource accounting] will become an accepted part of standard business accounting procedures. . . . When boards of directors and shareholders learn that the methodology is available and can be applied to their firm, they will demand that it be done. To permit a sizable proportion of a firm's assets to be under no surveillance or control is financially and morally irresponsible. (Likert, 1979: 155)

Despite this optimism, over three decades later we still do not have a conceptual framework for managing the financial value of human capital that is widely accepted, either for management practice or for management research. Why this is the case is something of a puzzle (Gröjer & Johanson, 1998), but one that we explore and hope to move beyond with this review.

Specifically, the purpose of this article is to review and offer new insights into the financial valuation of unit/firm-level human capital resources. Our article differs from other, related reviews (Nyberg et al., 2014; Steffy & Maurer, 1988) in three key ways. First, the focus of our review is somewhat different from Steffy and Maurer's review, which highlighted the then-current state of various approaches for evaluating the effectiveness of human resource activities and concluded by highlighting directions for future research that largely focused on fine-tuning various aspects of those existing approaches. In contrast, we focus on the financial valuation of firms' human capital resources more broadly, acknowledging that it may be affected by other influences besides HR practices (e.g., managerial practices, competitive and strategic positioning). Second, financial valuation of the human capital resource has not been considered in other recent reviews of the strategic human capital and strategic HRM literature. One recent review observed that when scholars directly measure human capital, they have focused on measures that represent the human capital construct itself (e.g., aggregate KSAOs; Nyberg et al., 2014); these measures have not included financial valuations. Even research on strategic management, which often considers issues such as value creation or appropriation (e.g., Coff, 1997, 1999), has for the most part not directly addressed the issue of providing financial valuation estimates of human capital resources. Third, our review is organized in such a way that it specifically incorporates the contemporary theoretical view that firm- or unit-level human capital is a phenomenon spanning multiple organizational levels (Coff & Kryscynski, 2011; Nyberg et al., 2014; Ployhart & Moliterno, 2011; Wright & McMahan, 2011), and we consider how existing financial valuation approaches

have also wrestled with this levels issue. It is our hope that this approach to structuring the review will facilitate the linkage between the scholarly work on financial valuation and the recent literature on strategic human capital/strategic HRM, which is strong on multilevel theory and conceptualization about human capital resources, but is largely silent on the actual operationalization of financial value.

With this review we offer three main contributions to the management literature. First, we provide a multidisciplinary review of the scholarly literature that has proposed theory and methods for generating financial information about organizational human resources. We update previous reviews (e.g., Steffy & Maurer, 1988) and bring together academic work from several fields (e.g., accounting, finance, management, psychology), offering a significant resource for scholars seeking to advance the knowledge base in this area. Second, in comparing, contrasting, and integrating existing scholarship within a multilevel measurement framework, we are able to identify where the “gaps” truly are in this literature, why these gaps may exist, and where additional theoretical and empirical work should be focused. Finally, in hopes of rekindling scholars’ efforts, we offer a number of action items that emerge from the review and that highlight areas where future work would be particularly valuable. For example, we focus on particular aspects of the multilevel view of human capital, such as the emergence process, that need to be better conceptualized and incorporated in future financial valuation models of human capital resources. We also focus on issues of feasibility in developing financial valuation approaches. Overall, our hope is that this article ignites scholarly interest in this important topic by making connections across disciplinary boundaries and levels.

## **Focus and Organization of the Review**

We begin with a definition of human capital resources that encompasses its multilevel nature, and then move on to issues of financial valuation.

### *Human Capital Resources—A Multilevel Conceptualization*

Human capital has been defined and studied from a variety of theoretical perspectives, and at multiple organizational levels. While research in economics and psychology has focused on human capital at the individual level (Becker, 1964; Schmidt & Hunter, 1998; Schultz, 1961), strategic management research has focused on firm-level human capital resources from the lens of the resource-based view (Barney, 1991). More recent research has begun to recognize that human capital is inherently a multilevel phenomenon (e.g., Coff & Kryscynski, 2011). Human capital is embodied within the KSAOs of individuals, but unit-level human capital resources are embodied within the collective unit-level KSAOs. Ployhart and Moliterno (2011) proposed a multilevel model of human capital resources that suggests individual KSAOs comprise collective human capital resources through a process known as emergence. Kozlowski and Klein (2000: 55) define an emergent phenomenon as one that “originates in the cognition, affect, behaviors, or other characteristics of individuals, is amplified by their interactions, and manifests as a higher-level, collective phenomenon.”

Ployhart and Moliterno (2011) propose an emergence-enabling process that consists of two parts. First, the complexity of the task environment has a fundamental influence on how

human capital resource emergence occurs (Kozlowski & Bell, 2003). As the task environment requires greater interaction and coordination among individuals, both the nature of the human capital resource and its relationships with performance outcomes will differ more dramatically from its lower-level KSAO origins. Second, supportive psychosocial emergence-enabling states are required to facilitate the emergence of human capital resources (Marks, Mathieu, & Zaccaro, 2001). These emergence-enabling states include the shared behavioral (e.g., coordination), cognitive (e.g., shared knowledge), and affective (e.g., cohesion, trust) states that support resource emergence. The demands of the task environment and the degree of support provided by the emergence-enabling states jointly determine the extent to which individual KSAOs become human capital resources. It is these intermediate processes that explain why human capital resource may be more or less than the sum of the individual KSAOs, and hence why individual KSAOs and unit-level human capital resources are only partially isomorphic. For example, collective synergies can occur when the unit members are aligned and committed to performance (e.g., Tziner & Eden, 1985). Alternatively, there can also be collective losses (e.g., social loafing), whereby the whole is less than the sum of the parts.

Thus far we have focused on conceptualizing the multilevel nature of the human capital resource itself. However, there are many contexts where it is useful to describe human capital resources in financial terms. That is, there is an important and useful distinction between nonfinancial operationalizations (e.g., aggregate KSAOs or indices of tenure; see Nyberg et al., 2014, for a review) and financial operationalizations of human capital resources. For example, organizations commonly describe their activities and resources in dollar terms to provide a common metric for discussion and comparison (e.g., in financial statements, one would describe property, plant, and equipment with an asset value of \$10 million instead of describing it as 1,000 acres and two factories). For management purposes, it is important to monitor both the underlying asset and also its financial value as there may be factors that affect one but not the other. Thus, even though most research has examined nonfinancial operationalizations of human capital resources (Nyberg et al., 2014), there are important theoretical and practical reasons for developing financial valuation estimates as well.

Economically speaking, the *financial value* of the aggregate human capital resource conceptually represents the “present value of the portion of the firm’s future earnings attributable to the firm’s human resources” (Brummet, Flamholtz, & Pyle, 1968: 222). Human capital resources are also sometimes referred to colloquially as “assets,” but as we shall see when discussing issues of financial valuation that include financial statement reporting, these terms are somewhat distinct.

Although most of the financial valuation research predates contemporary multilevel theorizing in the management literature, some (though not all) scholars seem to have had an implicit sense that financial valuation methodologies might be informed by attention to levels issues. In order to see how their work maps on to current conceptualizations of human capital resources, we borrow concepts from multilevel frameworks to organize our review of the valuation research. Consistent with prior research (e.g., Ployhart & Moliterno, 2011), when it is important to distinguish between organizational levels, we use the term *human capital* to reference the individual level and *human capital resource(s)* or, where necessary for clarity, *unit- or firm-level human capital resource(s)* to reference the aggregate level. Also note that in the interest of maintaining focus, we have excluded literatures that are related but somewhat tangential. For example, social capital is based on the nature and value of social



relationships among employees, customers, and other people (Nahapiet & Ghoshal, 1998); while it is an important organizational resource in its own right, an in-depth discussion of the valuation and measurement of social capital is beyond the scope of this review.

### *Human Capital Resource Valuation—Multilevel Financial Measurement Framework*

Recognizing that human capital is a multilevel phenomenon, we next consider its financial measurement through the lens of a corresponding multilevel organizing framework. We compare and contrast prior research according to several key measurement/valuation dimensions (see Table 1).

First, the financial measurement approaches used for assigning values to items for accounting purposes provide a useful starting point for thinking about how collective human capital can be valued, with five measurement approaches or “attributes” in common use (Financial Accounting Standards Board, 2008a). Two of these relate to actual costs. *Historical cost* is what was originally paid to acquire an asset; this recorded value may be adjusted later to reflect actual or estimated depreciation of the asset over time if appropriate. *Current cost* is what it would cost to replace the asset now. When a ready market exists where one could theoretically sell an asset under normal arm’s-length conditions, one can identify a *market value*. The remaining two approaches are future-oriented. *Net realizable value* is the amount of money expected to be received when an asset is converted to cash in the future (e.g., accounts receivable from customers that are expected to be collected). *Present value* (or discounted value) of cash flows represents an estimate of value that embodies the aggregate of all future streams of income from the asset. The choice of the most appropriate attribute to use for a particular object of valuation depends on the nature of the asset itself and the decision relevance and reliability of the resulting measure (Financial Accounting Standards Board, 2008a).

The present value approach is most similar to the conceptual definition of the unit- or firm-level human capital resource. Ideally one could identify the specific future income streams attributable to that human capital resource and then determine the present value of those, or else allocate some portion of the total future income streams of the organization to what was generated by human capital. However, this requires the ability to project future income and to be able to feasibly allocate income to the human capital resource, which can be difficult because of the myriad other factors that contribute to an organization’s future performance (Steffy & Maurer, 1988). For this reason, some human capital valuation approaches effectively assume that the relative value of the human capital resource is reflected in the costs paid for it today (i.e., using historical or current costs such as wages or HR expenditures; Steffy & Maurer, 1988). The market value approach does not appear in any of the valuation models in Table 1, most likely because the situations that give rise to it are relatively unusual and do not occur in all organizations. It would theoretically apply when a workforce was purchased intact in an arm’s-length transaction, such as when one firm (A) acquires another (B) and pays more for it than the “book” (financial statement) value of B’s recorded assets. This excess is recorded by A as an asset called “goodwill” and is usually assumed to be attributable to resources of the organization that are not formally recorded as assets (e.g., intangibles). For U.S. financial reporting purposes, accounting rules generally prohibit the allocation of goodwill to assign a financial value to acquired human capital for

**Table 1**  
**Characteristics of Existing Human Capital Resource (HCR) Financial Valuation and Information Approaches**

Valuation Approach	Financial Measurement Attribute	Primary Level of Financial Measurement	Uncertainty/Risk Considered?
Approaches relevant to the valuation of unit- or firm-level human capital resource			
Financial statement perspective (U.S. GAAP)	N/A (no balance sheet value allowed to be recognized for HCR)	N/A	Uncertainty related to employee exit is a key reason why financial value of HCR is not recorded on external financial statements
Financial market perspective (e.g., residual income valuation; Ballester et al., 2002)	Present value (proportion of total market capitalization allocable to HCR; assumes stock price represents expected present value of future cash flows)	Regression estimates using firm-level data across multiple firms	Turnover modeled as "depreciation" of the asset. In robustness checks, industry competition and uncertainty are modeled.
Unrecognized goodwill method (Hermanson, 1964)	Various. Above-average net income used to infer/compute value of intangible assets based on relationship between income and recognized assets; recognized assets valued using a variety of financial attributes.	Firm level (computed from net income and assets)	No
Adjusted present value method (Hermanson, 1964)	Historical/current cost (discounted value of future wages to be paid)	Firm level (from total wages)	No
Likert (1967)	No financial attribute associated with overall HC at the individual or unit level. (Main focus was on nonfinancial measures, namely correlations between variables.) Speculated that unit-level changes in income could be predicted by changes in predictors correlated with income and that these changes could be capitalized. Capitalization of historical or current cost of long-lived investments in human capital (e.g., training)	For correlations, N/A (correlations are not financial measures). For proposed prediction of changes in income/loss, unit level. Individual and unit levels	Considered factors related to emergence (e.g., climate, group processes).
Likert and Pyle (1971); Pyle (1970)	Capitalization of historical or current cost of long-lived investments in human capital (e.g., training)	Individual and unit levels	Turnover used to adjust value of recorded human capital resource
Ogan, 1976a, 1976b	Present value of future income streams (e.g., billings)	Individual aggregated to the unit level	Turnover risk is considered

*(continued)*



**Table 1 (continued)**

Valuation Approach	Financial Measurement Attribute	Primary Level of Financial Measurement	Uncertainty/Risk Considered?
Flamholtz (1971, 1972a, 1972c, 1999)	Present value of future income streams preferred, current cost or compensation may be substituted	Individual (no specific aggregation to the unit level proposed)	Turnover risk is considered. Emergence risk is indirectly considered; an individual's value is contingent on the role in which she or he is embedded.
Jaggi and Lau (1974)	Present value of future income streams	Job role ("rank"), weighted by proportion of employees in the role and aggregated to unit	Turnover risk is considered. Emergence risk is indirectly considered; an individual's value is contingent on the role in which she or he is embedded.
Lev and Schwartz (1971)	Historical/current cost (discounted value of future wages to be paid)	Individual, summed to unit	No
Modified Lev/Schwartz model (GIST-HCX model as reported in Infosys annual report supplemental information)	Historical/current cost (discounted value of future wages to be paid)	Individual, summed to unit	Turnover risk is considered
Approaches relevant to evaluating effects of interventions on human capital resource value			
Utility analysis	Change in cost or in present value of future services	Individual, then usually aggregated to unit	Turnover is sometimes considered
ROI, cost-benefit analysis, NPV	Cost or present value	Individual (aggregated to unit) or firm level	Possible to incorporate turnover risk, emergence risk, and other types of risk, if included in model
Measures of managerial/firm effectiveness in stewardship of human capital resource			
Balanced scorecard approaches, value chain models, other nonfinancial measures	Various: Historical/current cost may be used. Nonfinancial measures common.	Financial measures: Individual and unit level. Nonfinancial measures: N/A.	Turnover rate may be a measure used. Other risks may be considered depending on choice of balanced scorecard or nonfinancial metrics selected.

*Note:* GAAP = generally accepted accounting principles; HC = human capital; NPV = net present value; ROI = return on investment.

purposes of external financial reporting (e.g., annual report; Financial Accounting Standards Board, 2010). Organizations could theoretically attempt to make such an allocation to use for internal management purposes, if they were able to determine what part of goodwill was attributable to human capital versus other intangible assets. The other valuation approach described above, net realizable value, also does not typically appear as a financial attribute in valuation models in Table 1 and is less relevant in this context, as it is mostly used for financial assets that are readily convertible to cash (e.g., loans or accounts receivable).

A second, multilevel consideration has to do with the level of measurement (Kozlowski & Klein, 2000). One could focus on *direct valuation of the firm-level human capital resource* itself. This might entail allocating a portion of a firm's market capitalization (a measure of its overall value) to the human capital resource. A similar scenario arises in the acquisition example mentioned previously. Goodwill is typically attributable to multiple intangible assets, but if there were a justifiable basis for allocation, a portion of goodwill might theoretically be allocated to firm-level human capital. An indirect method of deriving a firm-level value focuses on the net income generated by the firm relative to its financial statement assets; "abnormal" levels of income (i.e., above average return on assets [ROA]) may be inferred to be due to intangible/unrecorded assets, and then used to estimate the approximate value of those assets (Hermanson, 1964). The primary measurement challenge when using any of these firm-level approaches relates to identifying and separating the value of the human capital resource from other assets of the organization. Alternatively, a *bottom-up approach* would determine the value of the lower level pieces that make up the aggregate construct (e.g., revenue to be generated by each employee) and then combine them to derive an aggregate value. An example of this approach is utility analysis. Bottom-up approaches have the advantage that they do not have to be at the firm level, as the aggregation can be done at any level that makes conceptual sense (e.g., work team, business unit, division, etc.). Measurement challenges when using a bottom-up approach include correctly identifying and valuing the pieces and then determining the proper approach for combining them to ensure the resource's full value is accounted for.

A final measurement issue that is highly relevant in the case of human capital valuation is related to the consideration of uncertainty and risk. Valuation approaches can allow for the explicit consideration and quantification of risk, defined as "a state of uncertainty where some of the possibilities involve a loss, catastrophe, or other undesirable outcome" (Hubbard, 2007: 46). Some sources of uncertainty and risk that can affect the value of the human capital resource from one period to the next include the net effects of turnover (uncertainty about how human capital is affected by exit and replacement), the emergence process and complementarities with other resources in the organization, and external competitive conditions and organizations' strategic choices that affect future revenues that may be generated by the resource. As we will observe, human capital valuation approaches have varied in the degree to which these and other forms of risk have been considered.

### *Organization of Review*

It is our aim to identify existing financial valuation and measurement techniques, and consider them through a multilevel lens (Table 1). In addition, we further orient our review around some financial information needs and key questions about human capital resources

that external and internal stakeholders are likely to have, surveying the existing research in a variety of disciplines that addresses each of the following issues:

- What is the financial value of human capital resources to an organization at a given point in time?
- What is the net effect of planned interventions (e.g., specific management practices, HR interventions) on human capital resource financial value?
- How can organizations measure the effectiveness of managers in managing the financial value of human capital resources within an organization? How can external stakeholders compare the stewardship of human capital resources across companies?

## **What Is the Financial Value of an Organization's Human Capital Resources?**

### *Financial Accounting (GAAP) Perspective*

Accounting conventions and assumptions play a significant role in determining what data an organization generates and how organizations think about economic reality (Miller & Power, 2013). As a professional field, accounting concerns itself with the provision of information about the resources and activities of an organization. Financial information provided by management to external stakeholders of publicly traded companies such as investors and creditors (e.g., in the annual report or other financial statements) is regulated because it is the primary source of information available to them and because of the potential conflicts of interest that management has in its presentation of this information. Managers (including HR decision makers) use externally reported financial information for internal decision making (e.g., budgeting, computing bonuses, etc.), but also have access to other internally generated information. The term *financial accounting* describes the activities that ultimately result in the production of financial statements for external use, whereas *managerial accounting* includes other activities that support internal decision making.

In the United States, accounting rules developed by the Financial Accounting Standards Board (FASB) and other regulatory bodies define the requirements that must be met for financial information to be reported in external financial statements (e.g., annual report/Form 10-K). GAAP rules aim to provide consistency in reporting across organizations and to protect the external users of financial information from material misstatement of that information by management.

As a matter of convenience and cost-efficiency, organizations often use the same GAAP rules for external reporting and internal management purposes. However, for internal decision making, managers can draw on other sources of information as well, such as information about human capital or about customers, even though for various reasons that information might not meet GAAP requirements for external reporting. Organizations vary in the degree to which they choose to develop separate systems to monitor and manage these kinds of resources outside of their normal financial accounting systems.

A question often asked is, "Why aren't human capital resources recognized as assets under U.S. GAAP?" The short answer has to do with the conservative way that assets are defined for financial statement purposes, which requires, among other things, that the future benefits of a resource be under the control of the organization and that they be reliably measureable

(FASB, 2008a, 2008b). For an item to be recognized and reported as an asset in external financial statements, it must meet the definition of an asset, which is “probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events” (FASB, 2008b: 12). Current accounting standards come down on the side of not recognizing the value of human capital as a financial statement asset. The primary concern involves the issue of whether the organization has sufficient control over the resource, which in turn also affects the degree to which the resource can be reliably measured (Upton, 2001). The academic fields of organizational behavior, human resource management, and strategic management are all predicated on understanding how to manage and derive value from resources an organization does not necessarily formally control, so this hurdle does not perhaps seem so high from where we stand. From a financial accounting standpoint, however, the control issue is critical: “In the past, accountants and others have concluded that customer satisfaction, workforce, and the like fail the control test. While the entity may reap economic benefits from happy customers and workers, it cannot deny others the ability to entice away customers or employees” (Upton, 2001: 71). Given that recognition and reporting of human capital as a financial statement asset are generally precluded, there has been little effort to develop a formal GAAP accounting standard that speaks specifically to the question of how it should be measured in terms of a financial valuation.

Over the years, the conservative position taken by accounting standard setters has been criticized by those who have pointed out the information vacuum and income statement distortions that arise as a consequence of excluding intangible assets such as human capital from organizations’ balance sheets (Flamholtz, 1999; Upton, 2001). In response to a wave of criticism that grew particularly strong in the midst of the “dot com”/“new economy” bubble of the 1990s, the FASB considered alternatives (e.g., Upton, 2001), but in the end remained steadfast in its position with respect to GAAP reporting. Frankly, we are not optimistic that this situation will change any time soon.

*Summary.* Because organizations are precluded from including any value for human capital resources on the balance sheet, financial accounting standards skirt the issue of human capital measurement and valuation. As Table 1 notes, since financial statement reporting is not allowed, GAAP rules do not elaborate on how it is to be measured. Without guidance on such basic issues as the most appropriate measurement attribute or level of measurement, for example, managers of organizations must use their own discretion in choosing whether and how to measure and manage this resource internally. External stakeholders (investors and creditors) and scholars are also forced to rely on other sources of information about the likely value of the resource and its contribution to the value of the overall organization.

The absence of an institutionalized logic for the financial measurement of human capital allows for the proliferation of valuation methodologies that meet the needs and match the data available to managers, but complicates the process of comparability across organizations. It is a difficult balancing act, and one that portends the situation where the financial valuation of human capital increasingly becomes an idiosyncratic process, tailored for maximum usefulness to managers within a particular firm. This is not necessarily a bad thing from a management standpoint and indeed may reflect strategic reality (i.e., a resource may have more or less value to a firm as a function of complementarities with other resources so a

one-size-fits-all approach may not be the most accurate). However, an idiosyncratic approach may render these valuations less comparable across firms, affecting their usefulness for external stakeholders and some researchers.

### *Financial Market Perspective*

The fact that financial reporting rules preclude the recognition of most intangible assets (including human resources) on corporate balance sheets does not mean that they actually have zero value as resources. One reason we infer this is because the stock market's valuation of a publicly traded company is often higher than the book value of a company as shown on its financial statements. The stock price represents its value as traded in the market, which reflects collective expectations about the *present value* of expected future cash flows (Brealey, Myers, & Allen, 2008). This difference is attributable both to differences in market and book value of recognized assets as well as to resources not included on the financial statements that are known to exist and are valued by the market (Fama, 1970). As has been noted in prior management research, "Because investors are motivated to consider all available information and are not restricted to what is reported in financial statements, the stock market's valuation of a company theoretically includes the value of all expected income streams, including those from intangible assets about which the market has information" (Fulmer, Gerhart, & Scott, 2003: 969). Market-based measures (e.g., market capitalization, which is stock price times shares outstanding; the ratio of market to book value of equity) are informative for gauging the economic value of the enterprise as a whole, but less useful if the goal is to try to separate out the contribution of particular resources. For example, from the market to book value of equity ratio we do not specifically know how much of the difference between market value and the financial statement book value of a firm is due to the human capital resource and how much is allocable to other intangible resources.

Economic models have been utilized to attempt to get at a more specific answer to the question of how much of firms' value is due to intangible resources. For example, the residual income valuation approach (Ohlson, 1995) has been applied to organizational brands and research and development (R&D) investments (Barth, Clement, Fester, & Kasznik, 1998; Sougiannis, 1994), and one study that we are aware of has applied it to human capital resources (Ballester, Livnat, & Sinha, 2002). In a limited sample of firms from 1978 to 1997, Ballester et al. (2002) concluded that on average about 5% of total firm value was due to the human capital resource, with industry competition and environmental uncertainty associated with higher ratios. Despite early enthusiasm about its potential, however, Ohlson's residual income valuation approach has been criticized due to ambiguous empirical support for it (e.g., it underestimates market values) and problems with some of its fundamental conceptual and technical assumptions (e.g., Dechow, Hutton, & Sloan, 1999; Ohlson, 2009; Qi, Wu, & Xiang, 2000).

*Summary.* The residual income approach attempts to derive the value of intangible resources such as human capital resources as a proportion of the firm's market capitalization. As such, it is a firm-level *ex ante* approach that shares some similarities with the economic conceptual definition of the human capital resource; since stock price represents investors' collective expectations about future cash flows of the firm (Brealey et al., 2008), the pro-

portion theoretically allocable to human capital resources would reflect the present value of future cash flows attributable to human capital. This approach focuses on human capital resource value at a given point in time with changes to that value assumed to be reflected in changes in the stock price. It is important to note, however, that stock price (and hence human capital resource value) is derived from *investor* expectations of the present value of future income streams. The validity of the resulting valuation thus depends on two key factors: (a) that investors have sufficient information about the collective KSAOs in the organization, about emergence processes, and about resource complementarities within the firm, as well as about internal and strategic influences on them, to properly incorporate human capital resource value in their estimates of overall firm value, and (b) the validity of the empirical modeling technique for identifying and allocating that portion of firm value back to human capital.

As a practical matter, the residual income valuation modeling technique as applied in the Ballester et al. (2002) study is not particularly useful as a tool for the managers of an individual firm wishing to monitor the human capital resource. First, it is estimated using data on multiple firms' wages and other employee costs across many years, making it more useful as a method for looking at the behavior of firms on average rather than individually. Second, as firms are not required by GAAP to break labor costs out separately from other expenses in publicly available financial information, the required data from other firms would be difficult to obtain (i.e., the Ballester et al., 2002, study utilized a limited sample for this reason).

### *Human Resource Accounting Perspectives*

This section summarizes a variety of valuation approaches that have been proposed by scholars of human resource accounting. Given many of these researchers' strong desire to see human capital recorded in financial statements as part of conventional GAAP (e.g., Likert, 1979), their models tend to align with the definitions and conventions of financial accounting and strive to satisfy the information needs of both managers and external stakeholders.

Early models of human capital resource valuation proposed by Hermanson (1964) were fairly crude attempts at firm-level valuation. The basic logic of the "unrecognized goodwill approach" was that a firm with persistent above-average net income as a percentage of assets (i.e., ROA) must have unmeasured operational assets (assumed to be human capital) generating it; given information about income, measured assets, and average ROA in the sector, a very rough estimate of "human capital" could be derived. Under another technique known as the "adjusted present value" method, human capital was valued using the adjusted discounted present value of 5 years' future wages.

Rensis Likert, a psychologist devoted to the study of management systems, was a proponent of responsible fiscal management of the human assets of an organization (Likert, 1967, 1979; Likert & Bowers, 1969). Likert was interested in correlational relationships among certain internal influences (e.g., leadership), aspects of employees' future service potential (e.g., attitudes), and emergence-enabling systems (e.g., group process and climate), and in how those might then relate to changes in outcomes such as productivity (Likert & Bowers, 1973). He speculated that with enough units where people do very similar work and turnover is low or enough periods of data within one unit, an organization might be able to use these relationships to predict "savings or loss due to changes in productivity capability of the



human organization” (Likert & Bowers, 1973: 21), and capitalize this as an asset. He also suggested that future changes in income streams due, for example, to changes in climate could be projected and used to estimate the present value of the human capital resource (Likert, 1967). While he proposed these relationships might exist, his work focused more on measuring predictors like job satisfaction and on identifying correlational relationships, and not on developing a formal human capital valuation model. Some have also pointed out that his reliance on correlations limits the applicability of his methodology to understanding *changes in the value* of human capital, rather than estimating the value of the human capital resource at a point in time (Flamholtz, 1999). Likert and his colleague William Pyle also discussed a second, more direct approach to human resource valuation: the application of historical or replacement cost, where the organization capitalizes (records and treats as assets) certain employee costs expected to result in future benefits like hiring and training costs (Likert & Pyle, 1971; Pyle, 1970). Human capital resource value at any point at time would be estimated by the value of capitalized investments to date as adjusted for increases or decreases in resource value due to changes in productivity or turnover.

The next wave of researchers sought to get away from using costs, developing more sophisticated models that incorporated the present value of individuals’ future revenue potential that could be aggregated to derive a valuation for unit- or firm-level human capital. For example, Ogan’s model (1976a, 1976b) proposed that an individual’s “certainty-equivalent net benefits” (1976b: 310) to an organization included net costs and benefits (e.g., billings in a professional firm setting) associated with that person’s employment together with the likelihood of turnover and of survival (i.e., nondeath). Flamholtz proposed and tested a stochastic rewards model to estimate the present value of future income streams generated for the organization as the employee occupies different roles over time with differing revenue potential (“service states”), taking into account the probability of turnover and movement between roles (Flamholtz, 1971, 1972a, 1972c, 1999; Flamholtz, Searfoss, & Coff, 1988). In his view, this approach to modeling turnover addresses the issue of “control” that concerns the FASB, as it models control as a probabilistic process (Flamholtz, Bullen, & Hua, 2002). It is noteworthy that Flamholtz primarily focused on the individual level of valuation and did not recommend a specific aggregation approach or formulate a group-level model, suggesting instead that the method of aggregating individual value to the unit level would differ from organization to organization (Flamholtz, 1974). That said, group-level variants of Flamholtz’s approach have been proposed by other scholars (Jaggi & Lau, 1974).

Lev and Schwartz (1971) proposed a model more similar in spirit to Hermanson’s (1964) adjusted present value method that used employee salaries to compute the valuation. They operationalized the firm-level resource as the sum of the individuals’ present value of future wages (estimated through retirement/death). In addition to concerns about using future costs (wages) to compute asset value rather than future revenues, the original Lev and Schwartz (1971) model has also been critiqued for the lack of attention to intrafirm mobility and to turnover for reasons other than retirement or death (Flamholtz, 1972b, 1999). The Lev and Schwartz model has been applied in several organizations. For example, a modified version that takes turnover into account was reportedly used to value the human resources of Infosys as reported in supplemental disclosures that accompanied the company’s 2011-2012 annual report (e.g., Infosys, [http://www.infosys.com/investors/reports-filings/annual-report/annual/Documents/AR-2012/PDFs/Additional\\_Information\\_12.pdf](http://www.infosys.com/investors/reports-filings/annual-report/annual/Documents/AR-2012/PDFs/Additional_Information_12.pdf), accessed February 6, 2013).

*Summary.* As we have seen, scholars have expended considerable effort to develop and test valuation models, but without a consensus model emerging and achieving widespread acceptance. Flamholtz has noted that research on human resource accounting had slowed at various points in the past (e.g., in the late 1970s) because the field had reached the stage where the easier work had been done and more complex issues remained (Flamholtz et al., 2002). The 1980s and the dot-com era of the 1990s saw a resurgence in interest among practitioners in the topic in light of the heightened awareness of the importance of intangible assets in creating organizational value. Even so, however, there was still not much in the way of new theoretical or empirical development. The reasons for this are complex, but we suspect that they may be boiled down to a few core issues.

First, early proponents of human resource accounting seemed to develop their models with the hope that accounting regulators would eventually yield on the issue of inclusion of human capital on the balance sheet. When it became clear that even the strong pressure exerted upon the FASB during the dot-com era (e.g., Upton, 2001) was not sufficient to result in a change, it may be that the motivation of these researchers to continue to wrestle with complex issues of valuation dried up.

Second, we believe that a lack of theory may have contributed to the slowdown in this research. As scholars advanced further along the path toward valuation of firm-level human capital, they came upon conceptual issues that they were likely not prepared to deal with. In essence, we would argue that they needed a multilevel theory explaining how individuals translate into an organizational resource that they simply did not have at the time. They had individual-level theory about human capital (Becker, 1964; Schultz, 1961) and the economic notion of a resource as something that will generate future benefits, but little in the way of theory linking the two. They focused mostly on human capital resource value using a simple bottom-up approach by summing individual valuations to get the firm-level resource value (e.g., Lev & Schwartz, 1971; Ogan, 1976a, 1976b). As we see in Table 1, Likert's 1967 model was unique in conceiving of some of the organizational factors influencing what we now label as "emergence" in multilevel models (e.g., Ployhart & Moliterno, 2011), but his focus on correlational relationships did not translate into a widely applied economic model. Flamholtz (1971, 1972c, 1999) and Jaggi and Lau (1974) touched on "emergence" issues in only a limited way in considering that human capital resource value was contingent on the positions people occupied over the course of their careers. Flamholtz (1974) was reluctant to specify a group-level model because he thought the aggregation approach would depend on the organization; this may also reflect lack of theory at the time regarding aggregation processes such as compilation and composition (Kozlowski & Klein, 2000). Another weakness of all the human resource accounting approaches is that they ignore contingencies associated with the external environment, strategic choices, and complementarities with other resources that influence human capital resource value.

A third potential explanation for why this research slowed is that the demand for it was increasingly met (or seemed to be) with alternative techniques, such as utility analysis, that addressed some financial information needs related to human resource interventions. In reaction to the nonresponse by accounting regulators on the issue of intangibles, there was also a widespread shift toward other sources of information about these resources in the form of nonfinancial measures. We discuss these in the next sections.

## What Are the Effects of Planned Interventions on Human Capital Resource Value?

In this section we consider financial decision tools for choosing among alternative interventions, processes, and/or techniques for managing human capital value and for evaluating the effects of interventions. It is important to keep in mind that these approaches all seek to assess how a specific and known intervention will effect *changes* in human capital resource value, and are not intended as tools for valuing the human capital resource in total at a given point in time. And, because they focus solely on the effects of specific interventions or decisions, they at best only explain a portion of the overall change in resource value from one time point to the next.

Perhaps the most commonly studied decision support tool in the management and psychology literatures for choosing among interventions is utility analysis. We discuss this approach in some detail because it is likely to be most familiar to academic researchers. Utility analysis attempts to quantify the economic value of HR-related investments or interventions such as training, selection, or compensation strategies. Many of these interventions (e.g., a change in training, selection, or compensation) aim to affect behaviors (Motowidlo, 2003); utility analysis is used to translate that expected behavioral impact into financial impact. Despite a great deal of sympathy for the topic by management researchers, utility analysis has traveled a rocky road.

Early attempts to estimate the “benefits” of an HR intervention (specifically, personnel selection) were based on an approach by Hull (1928), who developed an “index of forecasting efficiency.” Taylor and Russell (1939) developed a more rigorous estimation procedure for selection practices, by incorporating validity, selection ratio, and performance base rate information. While these early approaches had intuitive appeal, they failed to convert validity coefficients into a dollar metric, and they failed to sufficiently incorporate cost information.

Brogden (1946) addressed these limitations by attempting to express utility in terms of dollars. Cronbach and Gleser (1965) took this approach further to present much more detailed formulae to estimate utility in dollar terms. However, the biggest complication of these newer approaches was not the formulae but rather finding realistic numbers to include in the formulae. The Brogden (1946) and Cronbach and Gleser (1965) approaches were not widely adopted because of the challenges in estimating the dollar value of job performance variability. Schmidt, Hunter, McKenzie, and Muldrow (1979) provided one approach that made this problem more tractable. They had managers estimate the dollar value of job performance variability and then, assuming dollar value is normally distributed, used the normal curve to statistically determine dollar estimates of the variability of job performance (it has since been argued that such variability is 40% of salary; see Cabrera & Raju, 2001). They also argued that the complexity of the job is positively related to variability in job performance. The more variable job performance, the greater the effect on overall utility, and thus the greater importance of selection or training.

Research during the 1980s and thereafter took the early utility analysis formulations and expanded them in important ways. Researchers sought to adapt utility analysis to consider other interventions, such as recruiting (Boudreau & Rynes, 1985) and compensation (Sturman, Trevor, Boudreau, & Gerhart, 2003). Researchers also attempted to broaden the

treatment of costs and better align utility analysis estimates with accounting principles (Boudreau & Berger, 1985; Cascio, 2000). As one might imagine, there have been many alternative views about how to express or estimate the variability in job performance (see Boudreau & Ramstad, 2003).

Utility analysis research peaked in the early to mid-1980s, and has declined most years since for a number of reasons (see Cascio & Aguinis, 2008; Cascio & Fogli, 2010). The first is skepticism about the value of utility analysis for informing managerial decision making that was prompted in part by an influential article suggests that presenting utility analysis information actually decreased managerial support (Latham & Whyte, 1994). Scholars' concerns about the usefulness of utility analysis for decision making also relate to managers' likely skepticism about utility analysis estimates (Cascio & Fogli, 2010). As researchers have sought to make the estimation methods more realistic, they have also made them more complex. The estimates are also frequently overly optimistic, making it harder to accept them at face value (Schmitt, 2007). Yet another concern is that utility estimation methods are largely disconnected from accounting and broader economic market conditions (Cascio, 2000; Cascio & Fogli, 2010).

Second, and in contrast to concerns about acceptance among managers, interest in utility analysis may have declined due to the fact that academic scholars and scientist-practitioners have largely accepted the wealth of utility analysis research as sufficiently demonstrating that HR interventions produce monetary benefits. For example, Le, Oh, Shaffer, and Schmidt (2007) present estimates showing dramatic dollar improvements by using more valid personnel selection procedures (see also Schmidt & Hunter, 1998). Ployhart (2012) argued that the reason most selection research is focused on criterion-related validity at the individual level is because the majority of the field has accepted the premise that, since the relationships between individual-level predictors and criteria are linear, higher validity is equal to higher economic utility.

A third reason for the decline of utility analysis is that it suffers from a potential "levels of analysis" problem. Schneider, Smith, and Sipe (2000) argue that utility analysis was an attempt to generalize individual-level findings to organizational-level economic outcomes. However, this approach may in fact represent a cross-level fallacy because individual performance and group or firm performance are not perfectly isomorphic. It also assumes that the relationship between individual and unit performance is linear, such that "more is better" (Ployhart, 2012). These assumptions ignore the considerable multilevel research on groups and teams that finds otherwise (e.g., research on group process losses [e.g., social loafing] and group process synergies [e.g., distributed expertise]).

In addition to utility analyses, common financial/management accounting approaches such as cost-benefit analyses, NPV calculations, and ROI analyses can be utilized to evaluate prospective HR interventions (e.g., Boudreau, 2010; Director, 2012). They are also criticized for being overly simplistic relative to utility analysis and for sometimes providing radically different recommendations as a consequence (e.g., Sturman et al., 2003).

*Summary.* Utility analysis is an internal decision-making tool, similar to other managerial accounting tools like cost-benefit and ROI analysis. Utility analysis does a reasonably good job at what it was intended to do, which is to aid in evaluating the financial impact of changes in human capital expected to arise as a result of interventions. Specifically, we believe utility

analysis is most appropriate for conveying the economic value of HR and related interventions that are behavioral in their consequences, intended to compare a given intervention against alternatives, focused on within-firm comparisons, and used by HR managers for HR-related decisions. Utility analysis estimates are unlikely to be helpful for conveying the value of HR to non-HR managers, for linking HR interventions to between-firm competitive advantage, or for estimating the overall value of human capital resources (these limitations are not surprising, as utility analysis was never intended to address these topics). First, those trained in accounting or finance may fail to see the advantages of utility estimates over other methodologies such as NPV or ROI for choosing among alternative interventions. Like any decision tool, utility analysis is only as good as its assumptions, and many of the assumptions used in utility analysis are more familiar to and likely carry more weight with psychologists. Second, utility analysis is an approach that is useful for making intrafirm comparisons; it has little to say about making between-firm comparisons. Utility analysis does not answer the question, “Will HR practice X or Y make my firm outperform competitors?” Third, utility analysis is useful for quantifying the effects of HR practices (training, selection) because it seeks to put a dollar value on the change in performance behavior that results from these practices. However, because it focuses on the effects of only one specific intervention, and even then typically ignores the interactive effects of emergence and of external influences and strategic choices on the consequences of that intervention, it is limited as an indicator of changes in human capital value. Overall, utility analysis is not well suited for estimating a dollar value on “our most important asset” (as it was never intended to be), but should instead be seen as a complement to more holistic human capital valuation approaches because HR interventions are expected to influence the quality of human capital (Lepak, Liao, Chung, & Harden, 2006).

### **Managing Human Capital: Evaluating the Performance of Managers Within Organizations and Comparing Human Capital Management Across Organizations**

The idea that managers should be held accountable within organizations for how they contribute to overall workforce value (and not just for costs or for immediate productivity changes resulting from organizational interventions) has been discussed for years in manager-oriented journals like *Harvard Business Review* (e.g., Hekimian & Jones, 1967; Likert, 1958). Short-term reductions in costs (labor, training, etc.) often have immediate positive effects on profitability, but may come at the expense of longer term productivity in subsequent years if the human capital deteriorates as a result of these reduced expenditures (Likert, 1967). Clearly, short-term performance outcomes are important, but organizations also benefit from information on how managers are managing the human capital resource for the future.

A similar desire among external stakeholders for information about the management of human capital has manifested itself in calls for changes in financial accounting standards to allow financial statement recognition of human capital (e.g., Lev & Zarowin, 1999) as well as efforts to encourage voluntary reporting of human capital information in supplemental (nonaudited) disclosures to the public. For some, the human capital concerns are related to social responsibility (e.g., working conditions, diversity). In response, some organizations

provide nonfinancial information on these issues in corporate social responsibility reports or “triple bottom line” reports (Global Reporting Initiative, 2013; Mintz, 2011). The Society for Human Resource Management (SHRM) has also advocated for voluntary reporting of HR and human capital information, proposing standards for disclosure by public companies of information on turnover, costs of spending on human capital, leadership depth and quality, and employee engagement, among other metrics (McCann, 2011; SHRM, 2012b). SHRM subsequently withdrew that proposal in light of opposition from business leaders (Gurchiek, 2012; SHRM, 2012a), who raised concerns about the added compliance burden, lack of clarity regarding the linkages between SHRM’s proposed measures and business results, and concerns that competitors would benefit more from the information than would investors (Green, 2012; HR Policy Association, 2012).

Scholarly and managerial attention in recent years has shifted somewhat toward the use of indirect (and usually nonfinancial) measures for evaluating the management of human capital and other intangible assets (e.g., Ittner, 2008). Some companies such as General Electric have a history of utilizing nonfinancial employee metrics such as management development and employee engagement (Kaplan, 2010). Balanced scorecards, metrics dashboards, and causal models/value chain approaches comprising multiple measures have been adopted by many companies, including SYSCO (Carrig & Wright, 2006), Bristol-Myers Squibb, Cardinal Health (Huselid, Becker, & Beatty, 2005), and Sears (Heskett, Jones, Loveman, & Schlesinger, 1994; Rucci, Kirn, & Quinn, 1998). Many of these can be used both to evaluate managers and to evaluate units/organizations on an array of financial and nonfinancial measures (e.g., Becker, Huselid, & Beatty, 2005; Becker, Huselid, & Ulrich, 2001; Kaplan & Norton, 2001).

It is worth pointing out that most of these scorecard and value chain approaches emphasize the need to tailor these measures to individual organizations or business units, contingent on that business’s strategic aims. While this tailoring likely enhances the value of a scorecard for managerial evaluation, it results in scorecard measures that are by definition not uniform and comparable across organizations. Although the SHRM-proposed investor metrics use many nonfinancial indicators commonly included in corporate balanced scorecards and dashboards, one criticism of the SHRM proposal was that there is no universal set of metrics that is appropriate across organizations (Eickelberg, 2012).

Another criticism of the SHRM metrics was as follows: “In addition to being almost entirely backwards looking, nothing in the . . . proposed metrics informs investors (or other stakeholders) as to how the organization’s human capital ‘value’ is enhanced or impaired in financial terms. In fact, many of the metrics are not even financial in nature” (Eickelberg, 2012: 5). For organizations that use tailored balanced scorecards or causal/value chain models for internal management purposes, this should be a concern as well. While the metrics associated with these tools can be quite useful for evaluating strategy execution, it is unclear how routinely organizations seek to validate the relationship of those metrics with the financial value of longer-term human capital resources. This would seem rather difficult to do without a financial measure of the latter. Firms may link scorecard measures to last year’s sales, net income, or ROA (e.g., Ittner, 2008), which is useful information to know, but is not the same as understanding the relationship these measures have with the human capital resource, that is, the *future* benefits embedded in human capital.

One question that scholars of human resource accounting have considered is whether it really makes a difference whether decision makers have financial or nonfinancial information about human capital. There have been only a handful of studies directly on this question,



with mixed results (for reviews, see Cabrera & Raju, 2001; Flamholtz et al., 2002; Gröjer & Johanson, 1998). Although additional research is clearly needed to understand this question better, in at least some situations it appears that managers' decisions differ when they have financial information about human resources than when they have nonfinancial information that describes the same thing (e.g., Harrell & Klick, 1980).

*Summary.* The lack of direct measures of human capital value has contributed to the growing use of alternative, indirect measures for two key evaluation contexts: (a) internal evaluation of managers and (b) evaluation of organizations by external stakeholders. If the business community aim is to satisfy the information needs of the widest array of stakeholders, any newly developed approach to evaluating the effectiveness of human capital resource management in financial terms should (a) offer a compelling case for internal firm benefits that exceed the costs of implementation to encourage more organizations to voluntarily adopt it and (b) facilitate the generation of information and metrics that are comparable across organizations.

But what we are actually seeing seems to be the greater use of scorecard and other tailored approaches, suggesting a shift away from providing information that is useful to external stakeholders and toward the use of idiosyncratic and firm-specific human capital information most valuable for internal and strategic purposes. On the positive side, this means organizations are at least paying attention to strategic drivers and indicators that likely do have a bearing not only on annual performance but also on the long-term financial value of the human capital resource. The question is, how much? Measuring nonfinancial drivers is not the same as understanding the financial value of the resource itself. One concern is that nonfinancial measures get measured because they are relatively easier to measure and that they satisfy the urge to measure something (even if it is not exactly what you really want/need to measure). There are a lot of benefits to be gained from thoughtful attention to nonfinancial measures, but their use should not lull organizations and researchers into complacency regarding the need to continue to strive to understand the financial value of the human capital resource.

## **Challenges, Opportunities, and Proposed Future Directions: A Call for Action**

Although there is currently no universally accepted methodology for estimating the financial value of firms' human capital resources, the many attempts to develop valuation models, indirect and nonfinancial measures, and financial decision tools (see Table 1) suggest there is an appetite for better information, particularly financial information, about these resources. Using the conceptual and measurement framework described earlier and presented in Table 1 as a touchstone, we conclude this review by proposing a series of suggestions for advancing scholarship in this area.

### *Action Item 1: Develop Better Human Capital Valuation Models Based on Contemporary Multilevel Human Capital Theoretical Models*

Based on our review, we believe a critical first step in advancing the valuation of human capital resources is for valuation models to pay closer attention to and incorporate

contemporary theory regarding the multilevel nature of the underlying construct. As Table 1 illustrates, some human capital valuation methodologies have focused on either individual or unit levels, while others have tried to generalize from one level to the other. However, it must be recognized that generalizing across levels may create a host of interpretation problems and fallacies (Rousseau, 1985). While some human resource accounting scholars have been cognizant of the likely complexities associated with simple aggregation from individual human capital value to organizational human capital value (e.g., Flamholtz, 1999), in *none* of the existing valuation approaches are multilevel issues sufficiently addressed or explicitly modeled. Indeed, it is our suspicion that many prior approaches may have advanced to the point where they began to touch upon multilevel issues (particularly those surrounding emergence and aggregation), and then stalled due to a lack of theoretical frameworks for addressing them.

Therefore, in contrast to prior approaches, multilevel valuation approaches need to focus directly on the cross-level processes—the nature of interactions and collaborations among people. In essence, research needs to move beyond valuing individuals' human capital to also valuing interactions and relationships. Relationships are inherently unit-level properties and the focal unit needs to be minimally at the level of the dyad (Rusbult & Van Lange, 2003). On the surface this suggestion seems to bump into the topic of social capital (e.g., Nahapiet & Ghoshal, 1998), and it does, but the problem is that there are no methodologies for valuing social capital resources either.

This approach to valuing human capital resources focuses on cross-level emergence processes—that is, on *how* the human capital resources are built and how that in turn affects future benefits to be received from them. The emphasis is to model the emergence-enabling process, while recognizing that there are different ways that emergence may occur. Human capital resource emergence may be based on homogeneity (composition) or heterogeneity (compilation; Kozlowski & Klein, 2000). For example, homogenous human capital resources are created when KSAOs are so similar to each other that a unit mean of the KSAOs sufficiently describes the unit. In this case, from a valuation standpoint, the simple sum of individual human capital values at the lower level might in fact approximate the value of the higher level resource, all else equal.

On the other hand, heterogeneous human capital resources are created when KSAOs are different from each other. Sometimes heterogeneity is considered a sign of a poor emergence process (e.g., weak climates; Bowen & Ostroff, 2004); other times it is desired (e.g., when KSAOs are complementary to each other as in a surgery team). In this case, the unit-level resource value would potentially be a more complex combination of the individuals' human capital values that derive from their KSAOs.

Different emergence-enabling processes may contribute to different types of resources and affect the value of those resources. First, one may examine how different ways of structuring the task environment influence the emergence of human capital resources. All else equal, introducing tasks that require greater coordination and collaboration might lead to the development of greater homogeneity in some KSAOs (e.g., task knowledge), and more quickly. On the other hand, introducing tasks that require distributed expertise could lead to the development of heterogeneous but complementary human capital. Interestingly, in this situation, the combination of complementary human capital creates a synergy that could be reflected in a unit-level value greater than the sum of the values attached to individuals'

KSAOs. Second, one might consider how different ways of enhancing the intermediate enabling psychological states influence the emergence and valuation of human capital resources. For example, promoting cohesion, teamwork, and trust could (all else equal) lead to greater homogeneity in some characteristics that affect the value of individual human capital resources (e.g., organizational commitment), so they emerge more quickly and strongly and with greater value at the unit level.

An advantage of cross-level modeling methods is that the “independent variable” is the emergence-enabling process—the tasks and/or enabling states that support human capital resource emergence. This is an approach that directly incorporates the kinds of relationships and processes that make human capital resources only partially isomorphic with KSAOs. A disadvantage of these methods is that the relationships and the specific factors that influence them are complex and probably idiosyncratic to each organization, making valuation more challenging. But this type of approach may help explain some of the differences that have been observed across levels. For example, research finds that collective (unit-level) turnover is more costly than estimates provided from the individual level, because the latter fail to account for coordination disruptions, losses of human capital, and the possibility of turnover contagion (Hausknecht & Trevor, 2011).

### *Action Item 2: Address Feasibility Issues in the Valuation of Human Capital Resources*

As noted above, a number of valuation models already exist in the human resource accounting literature, but their limited adoption in practice suggests that organizational managers either do not know about them or do not believe the informational benefits are sufficiently compelling to offset cost/feasibility issues. We cannot rule out the first explanation as it may well be the case that some managers are not aware of existing valuation approaches. We are hopeful that this review and the work of other authors we have referenced here will help heighten managerial awareness and address this potential explanation. In what follows, we focus on the other potential explanation—feasibility.

Acceptance by managers is likely to continue to be slow until quantitative models are developed that are both credible (i.e., they have validity, reliability, and can demonstrate financial value-added) and feasible. The latter is particularly important, in that the costs associated with generating inputs for the model and implementing and updating the model in a complex organization would likely be considerable.

As Table 1 suggests, existing models and approaches seem to meet one or the other but not both of these criteria. Human resource accounting approaches that operationalize human capital using historical or current cost information have the advantage of feasibility (because they use cost information already being generated or relatively easy to obtain). However, they fail to operationalize the construct of human capital consistent with the economic definition of a resource that focuses on the future value expected to be generated, as costs do not *necessarily* equal future value. On the other hand, more sophisticated models (e.g., Flamholtz’s stochastic rewards model) that have a tighter linkage with the construct definition, and that even factor in the likelihood of turnover, have also seen limited adoption. This is likely due to feasibility issues as this approach requires organizations to estimate the economic value (e.g., future revenues to be received) of a person in a position.

Additional research would be helpful to try to ascertain the magnitude of the trade-off, and whether it is worth the additional effort and expense to generate the data (assuming it is possible to do so) on future benefits to be generated by employees, or if the more feasible cost-based models are reasonably sufficient. For instance, we do not know much about how value-based models compare to cost-based models in the same organization, how far apart they might be in terms of calculated human capital resource value, and whether that relationship is systematic and predictable across organizations.

Another recommendation is that the field of organizational behavior (OB) in particular needs to take greater ownership of the human capital valuation problem. In the management domain, most of the concern with human capital valuation resides within the HR or strategy literatures. HR in particular has taken the majority of initiatives for implementing human capital valuation approaches—and the majority of criticism as well. However, the multilevel nature of human capital resources clearly shows that OB covers the territory that connects the micro and macro fields (Ployhart, 2012). Prior valuation methods have stalled when they hit this “meso” landscape, but OB scholarship has the theories and methods that can make sense of it. Yet this will require OB research to connect concepts such as trust, teamwork, and related interpersonal phenomena, to financial outcomes. This in turn will require a very radical shift to the broader trajectory of OB research, which to date has tended to ignore strategic or valuation issues.

A final recommendation is that scholars and managers become more adept at leveraging data for human capital valuation purposes, as current trends in “big data” management and analytics may enhance the feasibility of using more complex valuation models. Ongoing advances in the use of HR information systems and analytic techniques now facilitate the generation and integration of vast amounts of HR data that can then be related to nonfinancial and financial outcomes and even used in predictive modeling (e.g., Davenport, Harris, & Shapiro, 2010; Fitz-Enz, 2010). While not everyone is on board with the “big data” revolution, many proponents believe that future scholars and analytically minded managers would likely benefit from the development of predictive analytics and advanced statistical models to generate predictions of future behavior, much like the algorithms used for credit scoring and for the tailoring of customer shopping experiences in marketing applications (e.g., Google, Amazon, etc.). To be sure, even advocates acknowledge that these techniques are not without certain shortcomings, such as the potential for invasion of privacy and for inappropriate use of such data (Mayer-Schönberger & Cukier, 2013). But used appropriately, they could prove useful as a means of leveraging historical data to make predictions about various risks (e.g., turnover) that affect human capital valuation models. It may also be possible to leverage these tools to use past performance data to predict future income streams that can then be discounted to estimate asset values, as Likert speculated.

### *Action Item 3: Study Subjective Valuation Approaches*

Within the field of strategic management, there is growing emphasis on understanding the subjective valuation of resources (Schmidt & Keil, 2013; also see Helfat & Peteraf, 2003; Teece, Pisano, & Shuen, 1997), as well as the subjective processes involved in managing these resources (Sirmon, Hitt, & Ireland, 2007). It may seem odd to propose subjective estimation methodologies given the heavy evidence-based focus of this article, but such approaches are needed because the ex ante valuation of resources is inherently subjective, as

is the evaluation of strategic risks. Understanding why requires a brief overview of strategic factor markets.

A classic proposition from the strategy literature suggests that the value of generic resources will be offset by their acquisition cost if they are acquired from efficient strategic factors markets (Barney, 1986). For human capital these markets are labor markets. This means that generic and mobile human capital resources, such as cognitive ability and personality, would not be expected to offer above-normal returns because the costs of hiring high-ability and highly motivated people will be offset by their value. However, the valuation of strategic human capital resources is actually more subjective, and less perfect, than previously thought. First, resources acquired in strategic factor markets may not be efficient because of supply-side or demand-side imperfections (Campbell, Coff, & Kryscynski, 2012). Second, human capital resources may be bundled or combined with other resources to create complementarities, and complementary resources offer synergistic value greater than the sum of their parts (Adegbesan, 2009; Schmidt & Keil, 2013). Third, resource complementarities do not exist in factor markets but are necessarily specific to a firm's existing resource endowments (Denrell, Fang, & Winter, 2003; Schmidt & Keil, 2013).

Schmidt and Keil (2013) argue that the valuation of resources is actually a very subjective process. The value of resources is based on managerial knowledge and judgment, the firm's existing market position, the firm's position among competitors and other organizations, and the firm's existing other resources. Therefore, a firm may be able to acquire a human capital resource that is significantly undervalued by the market because it complements the firm's existing resource portfolio. For example, the manager of an R&D team may realize that the team has a strong, supportive emergence-enabling process (e.g., favorable climate, strong cohesion, high trust). Rather than recruit the very top scientists and have to pay the highest salaries, the manager may instead recruit solid but less established scientists at lower salaries, realizing that the supportive emergence-enabling process will make up for slightly lower quality human capital. In this manner, the value of the human capital resource is greater than its acquisition costs. Resource complementarities may also serve as another type of moderator of the emergence process, enhancing the value of the aggregated resource by increasing future income expected to be derived from the resource. Thus, subjective evaluation by knowledgeable managers may be used as a basis for assessing the moderating effect of complementarities on emergence of human capital resources for a given firm. Research that studies these subjective evaluations needs to consider both psychological factors (e.g., managerial cognition and motivation), the firm's existing complementary resources (e.g., technology), and its market position (Helfat & Peteraf, 2003; Schmidt & Keil, 2013).

#### *Action Item 4: Learn From Others*

HR scholars and managers are not alone in being tasked with valuing intangible assets. Those in other disciplines like operations and marketing face similar challenges, and there have been calls to adapt their approaches (e.g., supply chain analysis, decision support systems, risk management systems) in the HR context (Boudreau, 2010; Cappelli, 2008; Cascio & Boudreau, 2010, 2012). We echo those calls and encourage scholars to explore whether these approaches are valuable. To that end, we offer two recommendations for scholars seeking to borrow or adapt financial valuation and/or management approaches from other disciplines.

First, before simply “borrowing” formulae or empirical methodologies from other disciplines, scholars should give some thought to how much the resource being valued in that discipline is conceptually similar to and different from human capital resources, in terms of both the underlying construct itself as well as the aspects of the construct that give rise to financial value. For example, in marketing, the concept of customer lifetime value (CLV) is defined as “the present value of the future cash flows attributed to the customer relationship” (Pfeifer, Haskins, & Conroy, 2005: 17). CLV is an attempt to estimate the current and future value that a customer may provide to the organization over the course of his or her lifetime. Just as employees are in a voluntary relationship with the organization and are not truly “owned,” so too are customers. And just as some financial valuation models of human capital compute different levels of future revenue potential for different employees or jobs, CLV incorporates the idea that different customers offer disproportionate long-term value (e.g., Kumar, Venkatesan, Bohling, & Beckmann, 2008). Given these and assuming sufficient other points of similarity, financial valuation approaches developed for CLV stand a better chance of being successfully adapted for human capital valuation than approaches for valuing tangible assets, for example.

In addition to conceptual similarity at the construct level, scholars also need to be conscious of the broader context. Since many of the potential benefits and pitfalls associated with borrowing theory from other disciplines extend to the borrowing of measurement and analytical techniques from those disciplines, scholars seeking to adapt these types of approaches from others areas would benefit from studying the scholarship on theory borrowing (e.g., Whetten, Felin, & King, 2009). Whetten et al.’s discussion of pitfalls associated with vertical borrowing mirrors the problems with generalizing from one level of analysis to another within organizations that we discussed earlier. Horizontal borrowing, that is, borrowing from other disciplines, can be problematic if one does not consider that the assumptions, actors, and motivations that underpin valuation approaches and analytical techniques may be structurally different in one context or discipline versus another (e.g., Whetten et al., 2009). For example, financial valuation models from disciplines where focal resources are not assumed to have free will or discretion over their own efforts or where social relationships do not affect the revenue generated by them are not likely to be useful for generating accurate financial valuations of human capital resources, at least not without some adaptation. One should also be cautious when borrowing valuation approaches from areas that do not concern themselves primarily with the motivations and needs of organizational managers (e.g., some areas of finance focus on financial information needs of stock market participants instead, and thus focus exclusively on firm-level stock market valuations); borrowing valuation methods blindly, without adapting them to the management context, would likely result in the development of methods with limited practical usefulness within organizations.

## Conclusion

In our view, a significant research opportunity exists to better conceptualize and operationalize human capital valuation by using multilevel theory and incorporating perspectives from multiple disciplines. In this review, we offer three main contributions to the management literature. First, we provide a review of the scholarly literature across a variety of disciplines that has considered the financial valuation of human capital, the effects of interventions on human



capital, and the evaluation of how well human capital is managed. Second, we compare and contrast (Table 1), and integrate, existing scholarship using a multilevel measurement framework as a lens for better understanding how prior work that has sought to address various financial information needs related to human capital resources. And finally, we propose a number of action items that emerge from the review and that offer specific suggestions for advancing research and practice.

Future research focused on the financial valuation of human capital stands to yield a number of benefits. Like organizational leaders, many organizational scholars accept the premise that human capital is valuable based in some part on faith rather than scientific data. Better representing the financial value of human capital is not only a worthy scientific endeavor, but may also translate into research findings that will be more actionable in practice, improved decision making, greater accountability of managers responsible for human capital, and perhaps, someday, better and more comparable information about the stewardship of human capital across organizations. In contrast, neglecting the issue of financial valuation of human capital could lead to negative consequences. One implication may be the continued perception that management is a soft science relative to accounting, finance, operations management, and other disciplinary areas that deal with resources and processes that have a clear and understandable financial value or can be discussed in financial terms. The inability to communicate about human capital in specific terms as a financially meaningful resource makes it more difficult to persuade others of its relative contribution to the organization's future success, which may lead to inattention to or poor management of the resource relative to others. Another implication is that if scholars do not become reengaged in the conversation about this issue, management practice may proceed without them. Given the current revolution in data analytics, where companies are increasingly able to manage and sift through "big data" to derive predictive models, data mining may replace management theory in the creation of human capital valuation models in organizations. The concern then is that such models may not result in accurate valuations of human capital resources that reflect the future benefits to be received from them. Valuation models based on current theory about what actually makes a resource like human capital valuable to organizations and how that resource value emerges from people (and can change over time) should increase the accuracy of the valuation and make it more useful for strategic planning and day to day management. Another practical consequence of neglecting valuation research is that human-capital-related interventions in many organizations will continue to be chosen on the basis of short-term costs (for which information is readily available), rather than with consideration of the long-term effect they have on the human capital resource.

In conclusion, this review has highlighted the ongoing scholarly and practitioner interest over the years in generating various types of information related to the financial value of firms' human capital resources. It has also highlighted some of the innate difficulties associated with this work, including the constraints associated with developing measures to suit different stakeholders' needs and the influence of institutional actors that have shaped (or attempted to shape) the landscape. But, on the bright side, recent theoretical developments in the management literature and new developments in the realm of data analytics show promise for overcoming some of the roadblocks encountered in prior work. We hope that reviewing this literature, particularly in light of these new developments, will stimulate fresh interest

in the subject and lead to significant future innovation in this area. Developing methodologies for the valuation of human capital is scholarship that simultaneously connects and advances multiple disciplines and has great potential to both inform and transform management practice. Advancing a research agenda for understanding the valuation of human capital presents a challenge but also an opportunity, one that we all share.

## References

- Adegbesan, J. A. 2009. On the origins of competitive advantage: Strategic factor markets and heterogeneous resource complementarity. *Academy of Management Review*, 34: 463-475.
- Ballester, M., Livnat, J., & Sinha, N. 2002. Labor costs and investments in human capital. *Journal of Accounting, Auditing, and Finance*, 17: 351-373.
- 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.
- Barth, M. E., Clement, M. B., Foster, G., & Kasznik, R. 1998. Brand values and capital market valuation. *Review of Accounting Studies*, 3: 41-68.
- Becker, B., & Gerhart, B. 1996. The impact of human resource management on organizational performance: Progress and prospects. *Academy of Management Journal*, 39: 779-801.
- Becker, B., Huselid, M. A., & Beatty, R. W. 2005. *The workforce scorecard: Managing human capital to execute strategy*. Boston: Harvard Business School Press.
- Becker, B. E., Huselid, M. A., & Ulrich, D. 2001. *The HR scorecard*. Boston: Harvard Business Review Press.
- Becker, G. S. 1964. *Human capital*. New York: Columbia University Press.
- Boudreau, J. W. 2010. *Retooling HR*. Boston: Harvard Business School Press.
- Boudreau, J. W., & Berger, C. J. 1985. Decision-theoretic utility analysis applied to employee separations and acquisitions. *Journal of Applied Psychology*, 70: 581-612.
- Boudreau, J. W., & Ramstad, P. M. 2003. Strategic industrial and organizational psychology and the role of utility analysis models. In W. Borman, D. Ilgen, & R. Klimoski (Eds.), *Handbook of psychology*: 193-221. New York: John Wiley.
- Boudreau, J. W., & Rynes, S. L. 1985. Role of recruitment in staffing utility analysis. *Journal of Applied Psychology*, 70: 354-366.
- Bowen, D. E., & Ostroff, C. 2004. Understanding HRM-firm performance linkages: The role of the "strength" of the HRM system. *Academy of Management Review*, 29: 203-221.
- Branson, R. 2012. Richard Branson's 5 rules for good business. *Entrepreneur*, July 30. <http://www.entrepreneur.com/article/223979>. Accessed June 1, 2013.
- Brealey, R. A., Myers, S. C., & Allen, F. 2008. *Principles of corporate finance* (8th ed.). New York: McGraw-Hill Irwin.
- Brogden, H. E. 1946. On the interpretation of the correlations coefficient as a measure of predictive efficiency. *Journal of Educational Psychology*, 37: 65-76.
- Brummet, R. L., Flamholtz, E. G., & Pyle, W. C. 1968. Human resource measurement—A challenge for accountants. *Accounting Review*, 43: 217-224.
- Cabrera, E. F., & Raju, N. S. 2001. Utility analysis: Current trends and future directions. *International Journal of Selection and Assessment*, 9: 92-102.
- Campbell, B. A., Coff, R., & Kryscynski, D. 2012. Rethinking sustained competitive advantage from human capital. *Academy of Management Review*, 37: 376-395.
- Cappelli, P. 2008. *Talent on demand*. Boston: Harvard Business School Press.
- Carrig, K., & Wright, P. W. 2006. *Building profit through building people*. Alexandria, VA: Society for Human Resource Management.
- Cascio, W. F. 2000. *Costing human resources: The financial impact of behavior in organizations* (14th ed.). Boston: Kent.
- Cascio, W. F., & Aguinis, H. 2008. Research in industrial and organizational psychology from 1963 to 2007: Changes, choices, and trends. *Journal of Applied Psychology*, 93: 1062-1081.
- Cascio, W. F., & Boudreau, J. W. 2010. *Investing in people* (2nd ed.). Upper Saddle River, NJ: FT Press.

- Cascio, W. F., & Boudreau, J. W. 2012. *Short introduction to strategic human resources*. New York: Cambridge University Press.
- Cascio, W. F., & Fogli, L. 2010. The business value of employee selection. In J. L. Farr & N. T. Tippins (Eds.), *The handbook of employee selection*: 235-252. New York: Routledge.
- Coff, R. W. 1997. Human assets and management dilemmas: Coping with hazards on the road to resource-based theory. *Academy of Management Review*, 22: 374-402.
- Coff, R. 1999. When competitive advantage doesn't lead to performance: Resource-based theory and stakeholder bargaining power. *Organization Science*, 10: 119-133.
- Coff, R., & Kruscynski, D. 2011. Invited editorial: Drilling for micro-foundations of human capital-based competitive advantages. *Journal of Management*, 37: 1429-1443.
- Combs, J., Liu, Y., Hall, A., & Ketchen, D. 2006. How much do high-performance work practices matter? A meta-analysis of their effects on organizational performance. *Personnel Psychology*, 59: 501-528.
- Cronbach, L. J., & Gleser, G. C. 1965. *Psychological tests and personnel decisions* (2nd ed.). Urbana: University of Illinois Press.
- Davenport, T. H., Harris, J. G., & Shapiro, J. 2010. Talent analytics: What the best companies know about their people, and how they use that information to outperform rivals. *Harvard Business Review*, October: 52-58.
- Dechow, P. M., Hutton, A. P., & Sloan, R. G. 1999. An empirical assessment of the residual income valuation model. *Journal of Accounting and Economics*, 26: 1-34.
- Denrell, J., Fang, C., & Winter, S. G. 2003. The economics of strategic opportunity. *Strategic Management Journal*, 24: 977-990.
- Director, S. 2012. *Financial analysis for HR managers: Tools for linking HR strategy to business strategy*. Upper Saddle River, NJ: FT Press.
- Eickelberg, H. C. 2012. *Comments in response to investor metrics draft American National Standard (ANSI-SHRM-02001.201X dated April 9, 2012)*. [http://www.hrpolicy.org/downloads/2012/Comment\\_on\\_Investor\\_Disclosure\\_of\\_HR\\_Metrics.pdf](http://www.hrpolicy.org/downloads/2012/Comment_on_Investor_Disclosure_of_HR_Metrics.pdf). Accessed June 16, 2013.
- Fama, E. F. 1970. Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25: 383-417.
- Financial Accounting Standards Board. 2008a. *Statement of financial accounting concepts no. 5: Recognition and measurement in financial statements of business enterprises*. Norwalk, CT: Author.
- Financial Accounting Standards Board. 2008b. *Statement of financial accounting concepts no. 6: Elements of financial statements*. Norwalk, CT: Author.
- Financial Accounting Standards Board. 2010. *Statement of financial accounting standards no. 141 (revised 2007): Business combinations*. Norwalk, CT: Author.
- Fitz-Enz, J. 2010. *The new HR analytics: Predicting the economic value of your company's human capital investments*. New York: American Management Association.
- Flamholtz, E. 1971. A model for human resource valuation: A stochastic process with service rewards. *Accounting Review*, 46: 253-267.
- Flamholtz, E. 1972a. Assessing the validity of a theory of human resource value: A field study. *Journal of Accounting Research*, 10: 241-266.
- Flamholtz, E. 1972b. On the use of the economic concept of human capital in financial statements: A comment. *Accounting Review*, 47: 148-152.
- Flamholtz, E. 1972c. Toward a theory of human resource value in formal organizations. *Accounting Review*, 47: 666-678.
- Flamholtz, E. 1974. Human resource accounting: A review of theory and research. *Journal of Management Studies*, 11: 44-61.
- Flamholtz, E. 1999. *Human resource accounting: Advances in concepts, methods, and applications*. New York: Springer.
- Flamholtz, E., Bullen, M. L., & Hua, W. 2002. Human resource accounting: A historical perspective and future implications. *Management Decision*, 40: 947-954.
- Flamholtz, E., Searfoss, D., & Coff, R. 1988. Developing human resource accounting as a human resource decision support system. *Accounting Horizons*, 2: 1-9.
- Fulmer, I. S., Gerhart, G., & Scott, K. S. 2003. Are the 100 Best better? An empirical investigation of the relationship between being a "Great Place to Work" and firm performance. *Personnel Psychology*, 56: 965-993.
- Global Reporting Initiative. 2013. *Globalreporting.org*. <https://www.globalreporting.org/Information/about-gri/Pages/default.aspx>. Accessed February 15, 2013.

- Green, P. S. 2012. HR group creates workforce metrics. *Bloomberg Businessweek*, July 19. <http://www.businessweek.com/articles/2012-07-19/hr-group-creates-workforce-metrics>. Accessed June 16, 2013.
- Gröjer, J. E., & Johanson, U. 1998. Current development in human resource costing and accounting: Reality present, researchers absent? *Accounting, Auditing & Accountability Journal*, 11: 495-506.
- Guest, D. 2001. *Voices from the boardroom*. London: Chartered Institute of Personnel and Development.
- Gurchiek, K. 2012. Investor metrics withdrawn as subject of HR standard. *SHRM.org*, November 29. <http://www.shrm.org/publications/hrnews/pages/investor-metrics-withdrawn.aspx>. Accessed June 16, 2013.
- Harrell, A. M., & Klick, H. D. 1980. Comparing the impact of monetary and nonmonetary human asset measures on executive decision making. *Accounting, Organizations, and Society*, 5: 393-400.
- Hausknecht, J. P., & Trevor, C. O. 2011. Collective turnover at the group, unit, and organizational levels: Evidence, issues, and implications. *Journal of Management*, 37: 352-388.
- Hekimian, J. S., & Jones, C. H. 1967. Put people on your balance sheet. *Harvard Business Review*, January/February: 105-113.
- Helfat, C. E., & Peteraf, M. A. 2003. The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, 24: 997-1010.
- Hermanson, R. G. 1964. *Accounting for human assets*. Occasional paper no. 14, Bureau of Business and Economic Research, East Lansing, MI.
- Heskett, J. L., Jones, T. O., Loveman, G. W., & Schlesinger, L. A. 1994. Putting the service-profit chain to work. *Harvard Business Review*, 72: 164-174.
- Hitt, M. A., Bierman, 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.
- HR Policy Association. 2012. More organizations join HR Policy in asking SHRM to withdraw investor metrics proposal. *HRPolicy.org*, July 27. [http://www.hrpolicy.org/position\\_issue\\_newsstory.aspx?rid=2225](http://www.hrpolicy.org/position_issue_newsstory.aspx?rid=2225). Accessed June 1, 2013.
- Hubbard, D. W. 2007. *How to measure anything: Finding the value of "intangibles" in business*. Hoboken, NJ: John Wiley.
- Hull, C. L. 1928. *Aptitude testing*. Yonkers, NY: World Book.
- Huselid, M. A., Becker, B. E., & Beatty, R. W. 2005. *The workforce scorecard: Managing human capital to execute strategy*. Boston: Harvard Business School Press.
- Ittner, C. D. 2008. Does measuring intangibles for management purposes improve performance? A review of the evidence. *Accounting, Organizations, and Society*, 38: 261-272.
- Jaggi, B., & Lau, H. 1974. Toward a model for human resource valuation. *Accounting Review*, 49: 321-329.
- Jiang, K., Lepak, D. P., Hu, L., & Baer, J. C. 2012. How does human resource management influence organizational outcomes? A meta-analytic investigation of mediating mechanism. *Academy of Management Journal*, 55: 1264-1294.
- Kaplan, R. P. 2010. *Conceptual foundations of the balanced scorecard*. Working paper no. 10-074, Harvard Business School, Boston.
- Kaplan, R. P., & Norton, D. P. 2001. Transforming the balanced scorecard from performance measurement to strategic management: Part I. *Accounting Horizons*, 15: 87-104.
- Kozlowski, S. W. J., & Bell, B. S. 2003. Work groups and teams in organizations. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Handbook of psychology: Industrial and organizational psychology*, vol. 12: 333-375. London: John Wiley.
- 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: Jossey-Bass.
- Kumar, V., Venkatesan, R., Bohling, T., & Beckmann, D. 2008. The power of CLV: Managing customer lifetime value at IBM. *Marketing Science*, 27: 585-599.
- Lado, A. A., & Wilson, M. C. 1994. Human resource systems and sustained competitive advantage: A competency-based perspective. *Academy of Management Review*, 19: 699-727.
- Latham, G. P., & Whyte, G. 1994. The futility of utility analysis. *Personnel Psychology*, 47: 31-46.
- Le, H., Oh, I., Shaffer, J., & Schmidt, F. 2007. Implications of methodological advances for the practice of personnel selection: How practitioners benefit from meta-analysis. *Academy of Management Perspectives*, 21: 6-15.

- 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.
- Lev, B., & Schwartz, A. 1971. On the use of the economic concept of human capital in financial statements. *Accounting Review*, 46: 103-112.
- Lev, B., & Zarowin, P. 1999. The boundaries of financial reporting and how to extend them. *Journal of Accounting Research*, 37: 353-385.
- Likert, R. 1958. Measuring organizational performance. *Harvard Business Review*, 36: 41-50.
- Likert, R. 1967. *The human organization*. New York: McGraw Hill.
- Likert, R. 1979. From production- and employee-centeredness to systems 1-4. *Journal of Management*, 5: 147-156.
- Likert, R., & Bowers, D. G. 1969. Organizational theory and human resource accounting. *American Psychologist*, 24: 585-592.
- Likert, R., & Bowers, D. G. 1973. Improving the accuracy of P/L reports by estimating the change in dollar value of the human organization. *Michigan Business Review*, March: 15-24.
- Likert, R., & Pyle, W. C. 1971. Human resource accounting: A human organizational measurement approach. *Financial Analysts Journal*, 27: 75-84.
- Litan, R. E., & Wallison, P. J. 2003. Beyond GAAP. *Regulation*, 26: 50-55.
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. 2001. A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26: 356-376.
- Mayer-Schönberger, V., & Cukier, K. 2013. *Big data: A revolution that will transform how we live, work, and think*. New York: Houghton Mifflin.
- McCann, D. 2011. Power from the people. *CFO.com*. [http://www3.cfo.com/article/2011/11/human-capital-careers\\_talent-management-higgins-fitz-enz-cascio-financial-statements-bassi-ansi-cfa-orsagh?curpage=0](http://www3.cfo.com/article/2011/11/human-capital-careers_talent-management-higgins-fitz-enz-cascio-financial-statements-bassi-ansi-cfa-orsagh?curpage=0). Accessed June 27, 2012.
- Miller, P., & Power, M. 2013. Accounting, organizing and economizing. *Academy of Management Annals*, 7: 555-603.
- Mintz, S. 2011. Triple bottom line reporting for CPAs. *CPA Journal*, 81: 26-33.
- Motowidlo, S. J. 2003. Job performance. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Handbook of psychology: Industrial and organizational psychology*, vol. 12: *Industrial and organizational psychology*: 39-53. Hoboken, NJ: John Wiley.
- Nahapiet, J., & Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23: 242-266.
- Nyberg, A. J., Moliterno, T. P., Hale, D., & Lepak, D. P. 2014. Resource-based perspectives on unit-level human capital: A review and integration. *Journal of Management*, 40: 316-346. doi:10.1177/0149206312458703
- Ogan, P. 1976a. Application of a human resource value model: A field study. *Accounting, Organizations, and Society*, 1: 195-217.
- Ogan, P. 1976b. A human resource value model for professional service organizations. *Accounting Review*, 51: 306-321.
- Ohlson, J. A. 1995. Earnings, book value, and dividends in equity valuation. *Contemporary Accounting Research*, 11: 661-687.
- Ohlson, J. A. 2009. Accounting data and value: The basic results. *Contemporary Accounting Research*, 26: 231-259.
- Pfeifer, P. E., Haskins, M. E., & Conroy, R. M. 2005. Customer lifetime value, customer profitability, and the treatment of acquisition spending. *Journal of Managerial Issues*, 17: 11-25.
- Ployhart, R. E. 2012. The psychology of competitive advantage: An adjacent possibility. *Industrial and Organizational Psychology*, 5: 62-81.
- Ployhart, R. E., & Moliterno, T. P. 2011. Emergence of the human capital resource: A multilevel model. *Academy of Management Review*, 36: 127-150.
- Ployhart, R. E., Weekley, J. A., & Ramsey, J. 2009. The consequences of human resource stocks and flows: A longitudinal examination of unit service orientation and unit effectiveness. *Academy of Management Journal*, 52: 996-1015.
- Pyle, W. C. 1970. Human resource accounting. *Financial Analysts Journal*, 26: 69-78.
- Qi, D. D., Wu, Y. W., & Xiang, B. 2000. Stationarity and cointegration tests of the Ohlson model. *Journal of Accounting, Auditing, and Finance*, 15: 141-160.



- Rabl, T., Jayasinghe, M. M., Gerhart, B., & Kuehlmann, T. M. 2011. How much does country matter? A meta-analysis of the HPWP systems-business performance relationship. *Academy of Management Proceedings*, 2011: 1-6.
- Rousseau, D. 1985. Issues of level in organizational research: Multilevel and cross level perspectives. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 7: 1-37. Greenwich, CT: JAI.
- Rucci, A. J., Kirn, S. P., & Quinn, R. T. 1998. The employee-customer-profit chain at Sears. *Harvard Business Review*, January/February: 83-97.
- Rusbult, C. E., & Van Lange, P. A. M. 2003. Interdependence, interaction, and relationships. *Annual Review of Psychology*, 54: 351-375.
- Schmidt, F. L., & Hunter, J. E. 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, F. L., Hunter, J. E., McKenzie, R. C., & Muldrow, T. W. 1979. Impact of valid selection procedures on work-force productivity. *Journal of Applied Psychology*, 64: 609-626.
- 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. 2007. The value of personnel selection: Reflections on some remarkable claims. *Academy of Management Perspectives*, 21: 19-23.
- Schneider, B., Smith, D., & Sipe, W. P. 2000. Personnel selection psychology: Multilevel considerations. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions*: 91-120. San Francisco: Jossey-Bass.
- Schultz, T. W. 1961. Investment in human capital. *American Economic Review*, 51: 1-17.
- Sirmon, D. G., Hitt, M. A., & Ireland, R. D. 2007. Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review*, 32: 273-292.
- Society for Human Resource Management. 2012a. Investor metrics withdrawn as subject of HR standard. *SHRM.org*. <http://www.shrm.org/publications/hrnews/pages/investor-metrics-withdrawn.aspx>. Accessed February 11, 2013.
- Society for Human Resource Management. 2012b. New performance management and investor metrics standards open for public review, comment. *SHRM.org*. <http://www.shrm.org/about/pressroom/pressreleases/pages/performance-management-investor-metrics-standards.aspx>. Accessed June 27, 2012.
- Sougiannis, T. 1994. The accounting based valuation of corporate R&D. *Accounting Review*, 69: 44-69.
- Steffy, B. D., & Maurer, S. D. 1988. Conceptualizing and measuring the economic effectiveness of human resource activities. *Academy of Management Review*, 13: 271-286.
- Sturman, M. C., Trevor, C. O., Boudreau, J. W., & Gerhart, B. 2003. Is it worth it to win the talent war? Evaluating the utility of performance-based pay. *Personnel Psychology*, 56: 997-1035.
- Subramony, M. 2009. A meta-analytic investigation of the relationship between HRM bundles and firm performance. *Human Resource Management*, 48: 745-768.
- Takeuchi, R., Lepak, D. P., Wang, H., & Takeuchi, K. 2007. An empirical examination of the mechanisms mediating between high performance work systems and the performance of Japanese organizations. *Journal of Applied Psychology*, 92: 1069-1083.
- Taylor, H. C., & Russell, J. T. 1939. The relationship of validity coefficients to the practical effectiveness of tests in selection: Discussion and tables. *Journal of Applied Psychology*, 23: 565-578.
- Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, 18: 509-533.
- Tziner, A., & Eden, D. 1985. Effects of crew composition on crew performance: Does the whole equal the sum of its parts? *Journal of Applied Psychology*, 70: 85-93.
- Upton, W. S. 2001. *Special report: Business and financial reporting. Challenges from the New Economy*. Financial Accounting Series 219-A. Norwalk, CT: Financial Accounting Standards Board.
- Whetten, D. A., Felin, T., & King, B. G. 2009. The practice of theory borrowing in organization studies: Current issues and future directions. *Journal of Management*, 35: 537-563.
- Whole Foods Market. 2012. Letter to stakeholders. *Wholefoodsmarket.com*. [http://www.wholefoodsmarket.com/sites/default/files/media/Global/Company%20Info/PDFs/2012-WFM\\_Letter\\_to\\_Stakeholders.pdf](http://www.wholefoodsmarket.com/sites/default/files/media/Global/Company%20Info/PDFs/2012-WFM_Letter_to_Stakeholders.pdf). Accessed June 1, 2013.
- 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.